ELF Update: Macworld Lab Tests Monitors

# MACWORLD

October 199

\$3.95

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# **Desktop Publishing Tools**

## COLOR MONITORS

28 Products Tested

MW LAB

How Good Is Your

MAC TYPOGRAPHY



## SCANNERS

13 Products Tested

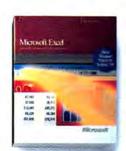
MW LAB

All About

**COLOR PREPRESS** 



# New Microsoft Excel of an exhaustive cor



Betsy Mill put it all in perspective when she wrote to us, "I love [Microsoft] Excel as much as my microwave oven but no love is perfect."

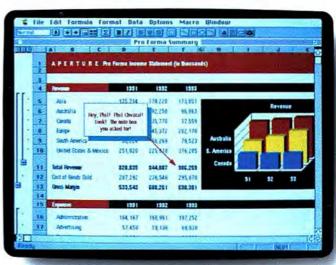
Well, Betsy, get a load of this. We think new Microsoft Excel version 3.0 is the closest thing to perfec-

tion ever seen in a spreadsheet for the Mac. For one good reason.

Power made easy.

The new Toolbar, for instance, reduces common, time-consuming tasks down to one step.

Highlight a row or column of numbers, hit the  $\Sigma$  button (that's Autosum'),

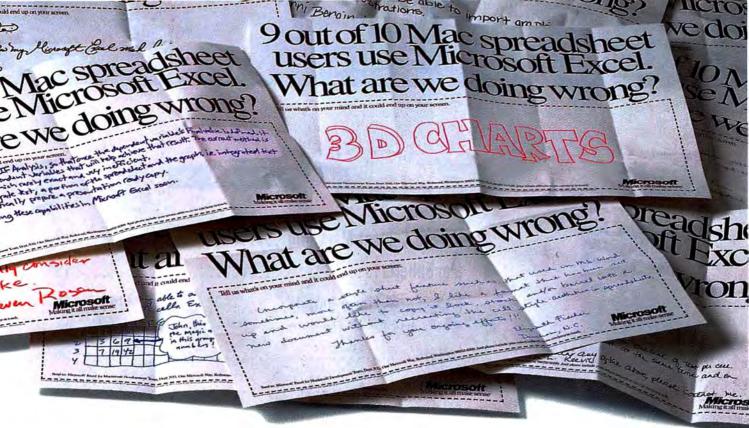


Yes, Paul, a single button now lets you access 68 chart types, 24 of which are 3-D. You can incorporate these right into your worksheet, along with lext and data.

And notice the outlining feature on the left? Go nuts.

and voilà - it all adds up.

Do quick, push-button formatting. Use outlining features to collapse



# version 30. The result respondence course.



Take a look at the new Toolbar. In one step, you can now access style sheets, outlining features, Autosum, formatting options, drawing tools, charts of all kinds and macros. Go or expand worksheets without having to variable you need? create multiple files.

As for charting, we took our cue from Paul Woods, who began his letter with the salutation, "Charts, charts, charts!" Hey, Paul - check out the picture and caption for the full scoop.

Did we mention that you can consolidate up to 255 worksheets at a time, regardless of format?

Or the Goal Seek feature, which lets you put in the total you want and works backwards from there to fill in the Or the fact that this is the first Sys-

tem 7.0 application available?

Plus, you can update to version 3.0 for \$129. If you acquired your current version of Microsoft Excel on or after 12/7/90. the upgrade is only \$50. Call (800) 541-1261, Department Q83, to find out more.

By the way, Bryan Larson: we said hi to Bill for you. He sends his regards.

Microsoft<sup>\*</sup>

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#### On the Cover

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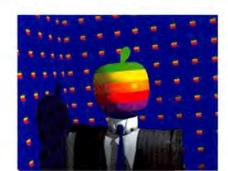
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#### The Iconoclast

Apple gets cozy with IBM—and the future looks grim, page 55.



#### FEATURES

#### Color Monitor Mirage 🌉

By Charles Seiter As competition heats up in the 8-bit world, it gets harder to tell color monitors apart. We help you translate the differences into a sound buying decision.

### 

concerns by designing displays with reduced electromagnetic emissions. Macworld Lab tests 32 color monitors to find out if those efforts have paid off.

#### 

By Joe Matazzoni Today's electronic prepress options make it possible to do four-color publishing on the Mac-with quality results and fewer costs.

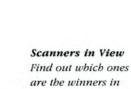
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separate the top contenders from the pretenders.

#### 

By Jim Heid Having access to powerful font technology isn't enough to make you a skilled typographer. In this fourth and final part of our series on digital type, we show you how to use Mac typographic tools to your best advantage.





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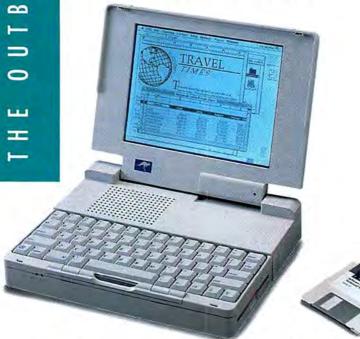
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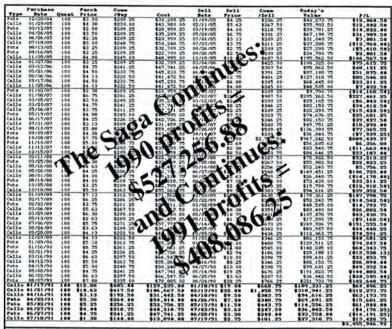
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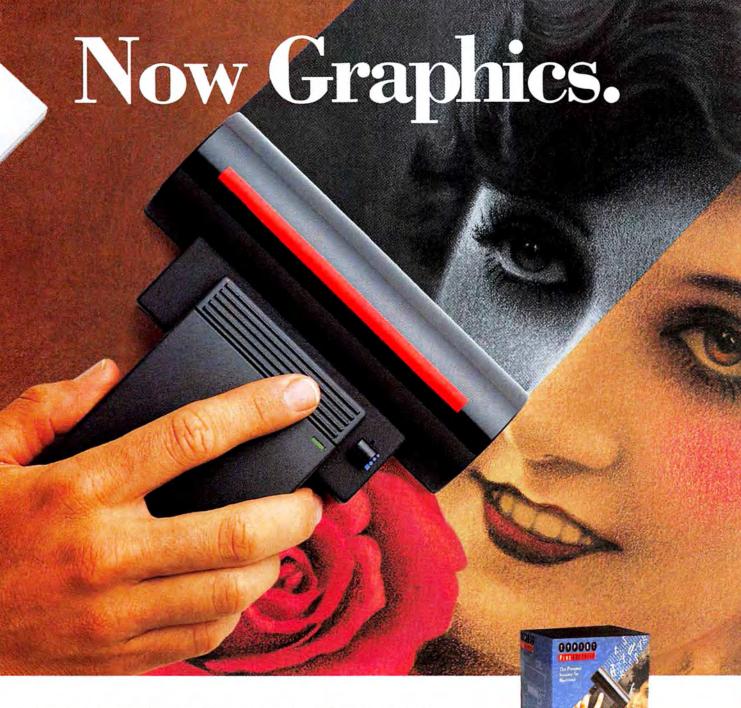
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100 Cooper Court

Los Gatos, CA 95030



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Circle 1 on reader service card



The benefits of the most complete, most powerful, most advanced color system on the market are not always easy to gauge. But if we can use free time, disposable income, and smiling faces as any sort of a yardstick, then

success. • Here under one name is everything you need for all your color publishing and design applications. Whether you want acceleration and image capture, or compression



### THE ART OF WINNING



WIN
INSTANTLY
FREE
radius
Color System

PLAY NOW! WIN NOW! Instructions: For a chance to win an instant prize, scratch off the ink from any 3 boxes to uncover 3 matching messages. Game cards submitted with more than 3 boxes uncovered will be considered void and unacceptable. Proof of purchase may be required to claim prize. See Rule #3 for more information.





Your name					
Title					
Company name_					
Company address	s			_	
City		Sta	State		
Zip		Da	ry phone ()		
Radius product pur	chased: 🗆 P		home use,		
If prize claimed is a If prize claimed is a	cash rebate	, make check	payable to: shipped to company add		
		OFFICIA	L RULES		
1. Rub off the ink from any same prize description in three	three (out of six) be boxes, and rample	oxes appearing on t	he face of this card for a chance to u	incover a prize. If you uncover the aim your prize see Rule #3 below.	
2. The following prizes are available: Prize Description Prizes Available Odds of Winning		Note: All Radius product purchases must be made between August 1, 1991 and November 30, 1991, and received by December			
Radius PresisionColor Calibrator*	500,000	1 in 2	31, 1991. Mail all prize claims described above to: Radius Winners P. O. Bax 4346 Santo Clara, California 95056-4346		
Radius Impressit	500,000	1 in 2			
S200 cash rebate off a Color Pivot Display	1,000	1 in 1,000	Grand Prize		
5500 cash rebate off a Radius	1,000	1 in 1,000	Complete Rodius Color System: Two Page Color Display with 24- bit Interface; Radius Rocket Accelerator; Impressit "; Precision- Color "Calibrator	No purchase required, Mail in your winning game card by	
Rocket <sup>™</sup> Accelerator Complete Radius Color System valued at \$12,000 "Suggested list price \$495. "Sugges	5	T in 200,000		Registered Mail to: Prize Winners, P.O. Box 26811, Son Francisco, CA 94126.	
3. Follow these instructions to			4. Unclaimed prizes will not be a	warded. No prizes will be awarded	

Int price 5495. "Soggested for price 5179
these instructions to claim your prize;

Requirement
risionColor" Purchase any Radius Two Page Color
or Radius ... Disables and mail in your vinning come

\$200 cash rebate

SS00 cash rebate

Radius PrecisionColor Colibrator, or Radius Two Page Color Display and mad in your winning game lampnessth? Compression on Radius I wo Page Color Display), and a copy of the waternay road (from a Radius I wo Page Color Display), and a copy of your invoice (dated August I I through November 20, 1997) from an Authorized Radius Reseller to verify and a surface of the color of the co

proof of purchose. To reterive a check for \$700, mail in your winning game card, a copy of the warronty card (from your Radius Coller Privat \*\*Display) and a copy of your mockes (dated August I through Morember 30, 1991) from on Authorized Radius 16 to exterity proof of purchase. In steeline to westly proof of purchase. In steeline to westly proof of purchase from your Radius Rockes\*\* Actalerator) and a copy of your inside. (dated August I through Movember 30, 1991) from an Authorized Radius Reseller to vereify proof of purchase.

- 4. Unclaimed prizes will not be owarded. No prizes will be owarded if front or book of game card is found to be incomplete, illegible, mutilated, lorged, tampered with, or irregular in any way, if this game card contains printing or other errors of omission, or if more than three boars are uncovered.
- 5. All prize claims must be received by December 31, 1991, at which time game officially ends and no further prizes will be awarded.
- 6. This program is not open to employees of Radius Inc., its advertising opency personnel, difficulted game reproduction arganizations, Radius Authoritica Resellers or Developers or their families. Void where prohibited by Iow. All federal, state and local regulations apply. Prize winners are solely responsible for any taxes. No substitution of prizes allowed. Good only in U.S.A. Not valid with any other Radius promotional offers.
- 7. Winners should make a photocopy of their winning game cards, and should allow to to 8 weeks for delivery of prizes. No responsibility is assumed for lost, modifrested or last mail. Winners may be required to submit an affidovit of eligibility and must be 18 years of age to participate.
- 8. For a list of Grand Prize winners, send a stamped, selfaddressed envelope to: Winners List, P.O. Box 26811, San Francisco, CA 94126.



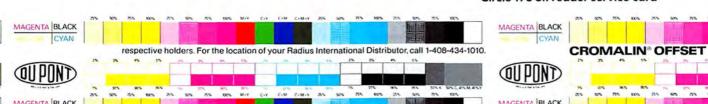
all now (and we can hardly blame you), it's here. • And, of course, all Radius products offer the RadiusCare service plan which

extends your warranty for up to two years. • If

you haven't already perused the above for product specifics, we invite you to do so now.

If you have done so, and still want more information, call us for a complete color systems brochure at (800) 227-2795.

Circle 178 on reader service card





# You Can't Buy A Better Surge Protector Than Curtis Guaranteed Protection—Proven Performance

When it comes to protecting their valuable data and electronic equipment, more computer users rely on Curtis surge suppressors than any other brand. Here's why:

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\*Surge protectors are not lightning arrestors and cannot be guaranteed to protect against direct hits.

## MACBULLETIN

#### Apple to Bring Its 21-Inch Color Monitor to the U.S.

In October Apple is expected to offer its Macintosh 21" Color Display to customers in the U.S. for the first time, according to sources close to the company. Apple announced the two-page monitor in early June for early-July shipment but so far has distributed it only through its subsidiaries outside the U.S. The monitor has been the target of criticism from third-party vendors who feel that its introduction infringes on a critical market that they pioneered (see July MacBulletin and September News). Assembled in Italy using a Japanese CRT tube, the monitor is designed to reduce VLF and ELF magnetic-field emissions. The monitor's international guideline price was set at \$5550 at the June announcement.

#### **Apple Posts Record Loss**

In the wake of massive layoffs, Apple Computer reported a \$53.1 million loss for the third fiscal quarter, which ended in June. The loss resulted from a \$224 million one-time charge due to the heavy costs of the layoffs, restructuring of Apple's management and manufacturing, and other cost-reducing measures, according to Apple. Total revenues were up in the same quarter, from \$1.365 billion last year to \$1.529 billion. Apple chairman and CEO John Sculley predicted that the restructuring will make Apple more competitive in the future.

#### Thunder Boards Rev Up Mac Graphics

SuperMac has announced the Thunder/8 and Thunder/24, 8-bit and 24-bit graphics boards that can drive large-screen monitors and accelerate Quick-Draw by up to 500 percent. Both boards display resolutions from 512 by 390 up to 1152 by 870 on monitors ranging in size from 12 inches to 21 inches. Both also have a connector for adding future enhancements from SuperMac, possibly including image compression or additional acceleration. The two boards work with System 7 and will be compatible with 68040-based NuBus Macintoshes expected from Apple, according to a SuperMac representative. The boards support Apple's Macintosh 21" Color Display, which is currently available only outside the United States. The Thunder/ 8 has a list price of \$1899, and the Thunder/24 lists for \$4999. Both were expected to ship in August. For more information, contact SuperMac at 408/245-2202.

#### Hard Work

Hard on the heels of Symantec's integrated package GreatWorks (see News in this issue), Beagle Bros. Software is pulling on its boots with BeagleWorks. BeagleWorks has paint and draw tools, a spreadsheet, a database, word processing, charting, and communications; pieces of each (except communications) can exist side by side in a single document, with hot links to the source documents. Many functions can be used in all the modules-for example, you can check spelling in a database, zoom in or out on any page, and split any window into two or four views. Like most integrated packages, BeagleWorks' feature set is somewhat limited, but the program does support 8-bit color in the paint and draw modules, true style sheets, and text that automatically wraps around objects in the word processor. The package will list for \$299.95. Beagle Bros. is at 619/452-5500.

#### Mergers and Acquisitions

Buy-outs and agreements are changing the face of the software industry. Giants Ashton-Tate and archrival Borland plan to merge, though dBASE and Paradox, the companies' competing database products, are incompatible. Closer to home, MacroMind and Paracomp are merging. The two companies' products are largely complementary—for example, Paracomp's Swivel 3-D is a 3-D modeler, and MacroMind 3-D renders models created in other packages-but Paracomp recently fielded Film-Maker, which competes head-to-head with Macro-Mind's flagship, Director. The new company, to be called MacroMind/Paracomp, has not established offices. Also, ChipSoft, which shipped its first Mac version of TurboTax this year, has acquired Softview, whose MacinTax long dominated the Mac taxsoftware market.

#### Apple Discontinues Many Hard Drives, May Deal with Microtech

Apple has agreed to farm out all of its external hard drives to Microtech International, according to sources close to the companies. As part of Apple's recent restructuring, Microtech will manufacture Apple-labeled external drives and ship them to Apple for distribution. The sources said that the move will allow Apple to concentrate its resources on designing future personal computers. Apple recently removed (continues)

all but one of its external hard drives from its price list, leaving only the Apple Hard Disk 80SC still shipping.

#### **Hayes Introduces High-Speed Modem**

Hayes Microcomputer Products has introduced the V-series Ultra Smartmodem 14400 modem, which has a line speed of 14.4 Kbps and offers V.42bis modulation for data rates of up to 38.4 Kbps. The modem can connect to ISDN, X.25, and IBM SNA networks. It provides synchronous communication via Hayes AutoSync, supports PABXs, and can talk to the installed base of proprietary Hayes V-series Smartmodem 9600 modems. The Ultra 144, slated to ship in August, will list for \$1199. For more information, contact Hayes at 404/441-1617.

#### Shiva Hublet Expands 10BaseT Networks

Shiva Corporation has announced the Hublet, a port repeater that lets Ethernet administrators expand their 10BaseT networks without running extra cables to the wire closet. A single 10BaseT outlet with a Hublet attached supports up to four workstations, Macs, IBM PCs, or other devices. The Hublet requires that the 10BaseT network include the Link Test protocol. Shiva expected to ship the port repeater in late July at a list price of \$399. For more information, contact Shiva at 617/252-6300.

#### Watching the Clock

The number of calendar keepers and information managers for the Mac is burgeoning. One of the most full-featured, MyTimeManager (MTM), adds some System 7 features in version 3.5. MTM has day, week, and month views of a calendar as well as a scrolling list of unscheduled to-do items. The program can filter items by user-definable categories and other criteria; provides free-floating text memos; and can search memos and calendar items. MTM's alarm feature does not require an INIT, which is a mixed blessing (MTM doesn't slow down the Mac as INIT-based alarm systems do; on the other hand, MTM must be running to notify you of an alarm). MTM does not allow you to drag events between days; you must change the calendar setting of a task just to move it, and MTM does not let you schedule overlapping events or interrupt an event. Under System 7, MTM can pass messages among MTM users, has an in/out board feature, and can schedule meetings for groups. It lists for \$79.95. For more information, call Mac-Shack at 617/876-6343.

#### **New Money**

Intuit is bumping the version number of its checkbook manager, Quicken, from 1.5 to 3.0 and redirecting the program's focus to personal-finance management. With 3.0 you can set up expense categories and subcategories and assign transactions to them with pop-up lists; split transactions across multiple categories; create recurring transactions with or without fixed amounts; manage net worth and loans; and customize the program's eight home reports and eight business reports. The new Quicken has a built-in spreadsheet and can maintain a general ledger, accounts receivable, and accounts payable. It lists for \$69.95. Intuit is at 415/ 322-0573. Quicken is still nouveau riche next to MECA's Managing Your Money 4.0, which shipped last winter with a vast set of tools for dealing with such financial issues as life insurance and pensions, estimating taxes, saving for your kids' college expenses, building a portfolio, analyzing investment opportunities, estimating life expectancy, and planning for retirement. Managing Your Money lists for \$119.95. MECA is at 203/256-5000.

#### **Big Projects**

Mac project managers are getting some big help. Micro Planning International is fielding a simplified package called MicroPlanner Manager; the formerly privately distributed Task Monitor is now available commercially; and mainframe vendors are sniffing out the Mac market (see following bulletin). The \$595 MicroPlanner Manager has an internal desktop with folders for charts, reports, and projects. It supports creating projects in outline, table, Gantt, or PERT view; has a very flexible report-design module; supports multiple baselines; and can split tasks to optimize resource allocations. Micro Planning is at 415/389-1420. Monitor Systems' \$695 Task Monitor is a high-end scheduler (a resource module is in development). It provides pessimistic, optimistic, and most-likely completion dates; has five work-breakdown structures; can draw dependency lines on the Gantt chart; and can arrange the PERT chart based on task dates. Monitor Systems is at 415/949-1688.

#### Artemis Lays Plans for the Mac

Lucas Management Systems, which publishes the mainframe project-management package Artemis, will market a \$2000 Macintosh package called Schedule Publisher. Schedule Publisher's most unusual feature is its ability to incorporate reports designed with draw or presentation software. It also provides translators for exchanging data with Artemis on minicomputers and mainframes. Lucas Management Systems is at 703/222-1111.

#### **Database Publishing**

Timeworks' Publish-It Easy version 2.1 is proof that System 7's interapplication communication won't be the death of omnibus programs. The new Publish-It, which is System 7-compatible, adds an internal database and mail merge capability to a full-featured page-layout package. The database can hold 32,000 records with up to 255 fields. The program's price remains \$249.95. Timeworks is at 708/559-1300.

# Anti-Radiation Screens. What's The Difference?



# Only One Does It All. NoRad.

The **NoRad Shield** ™is the only product that performs the tasks others try to do. Some claim to reduce ELF and VLF radiation, but fall short when test time arrives. Most of them cut down radiation in the electric field only. The NoRad Shield blocks the *entire* range of electric fields *and* the high range of magnetic fields.

- Electric Radiation Virtually the entire spectrum of electric field radiation is blocked by more than 99.99% - from ELF through VLF and beyond, up into the microwave range.
- Magnetic Radiation Magnetic radiation is cut down by more than 50% in frequencies above 30 KHz, to levels no other screen manufacturer offers.

Some screens reduce glare, but actually increase reflections because they're made of polished glass. The NoRad Shield's high-resolution screen tackles these two problems handily and also eliminates the static field which attracts dust to your monitor and propels dust to your skin and eyes.

Why buy a screen that only does a fraction of what you need, when one does it all? **NoRad.** 



The NoRad Shield is available in several models to fit virtually all IBM®PCs and compatibles, terminals and large format displays.



The NoRad Shield fits Apple® and Macintosh® displays, and is available in a platinumcolored frame for the SE and the Classic.

Call now to learn more about the **NoRad Shield** and receive your free MYTHS AND FACTS OF ANTI-RADIATION SCREENS booklet.



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Circle 292 on reader service card

# With all this acclaim, you

"The MSF-300Z color/gray scanner is a breakthrough product in price, image quality and value. Microtek has set a clear standard for affordable, quality color scanning." MacUser March 1990



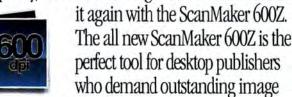
"At \$2,695, Microtek's scanner isn't only the least expensive flatbed scanner we looked at, it's also FIVE STAR AWARD 1990 the best." Publish March 1990

# Guess

### Introducing the ScanMaker family of affordable flatbed and slide scanners.

Microtek's color scanner has consistently earned awards, praise and top ratings as the best value in scanning. But, if you thought we'd rest on our laurels, we've got news for you.

The leader in high quality, low cost scanning is at



quality and versatility in a flatbed scanner.



From presentations and newsletters to pre-press and comp work, the ScanMaker 600Z handles it all. It boasts 24 bit.

The totally redesigned ScanMaker 600Z offers bigber resolution for a lower price.

color, 8 bit grayscale and an incredible 600 dpi resolution.

But the most dramatic news is that we've given it an incredible low price to match.

Add to

that a sleek, compact design that fits neatly in your work space. And you've got the color scanner that others will be hard pressed to match.



Both ScanMaker models include either PhotoStyler or Adobe Photosbop, absolutely free.

# dthink we'd be satisfied.

"If you need color, we recommend the Microtek MSF-300Z. It's the least expensive full-sized color/gray-scale four mice rating 1990 MacUser scanner..."

MacUser September 1990

"...the Microtek MSF-300Z is a clear winner, again, because it comes complete

MACWORLD

and the software is easy to use."

Macworld August 1990

again.

If you need high quality scans of 35mm slides, take a look at the revolutionary ScanMaker 1850.

The first affordable slide scanner for the serious publishing professional.

It offers 24 bit color and 8 bit gray-scale capabilities. And it's also

easy to use. Just drop in a slide and you're ready to start scanning. At resolutions up to 1850 dpi.

And best of all, it costs thousands less than other comparably equipped slide scanners. Which explains why the ScanMaker 1850 is

the logical choice for 35mm slide scanning.



 ScanMaker
 600Z

 (PC)
 \$1,995

 ScanMaker
 600ZS

 (Mac)
 \$2,195

 ScanMaker
 1850

 (PC)
 \$2,995

 ScanMaker
 1850S

 (Mac)
 \$3,195

If all this weren't enough, both ScanMaker models include the latest image processing software. Enhance, refine and separate your images with

The ScanMaker 1850 scans any 35mm slide for thousands less than other comparable slide scanners. the full version of Adobe Photoshop for the Macintosh or PhotoStyler from

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So, whether you're working in black and white or color, with photographs or 35mm slides,

get a ScanMaker scanner from Microtek. We won't be content until you're satisfied.

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## Thunder from SuperMac. Workstation-class graphics performance on your Macintosh!

SuperMac's new Thunder series of 8- and 24-bit accelerated color graphics cards provides you with awesome power — that results, as never before, in splitsecond responses on your screen!

Thunder is explosively fast! Its sizzling graphics capabilities are the result of SuperMac's latest achievement in chip design — workstation-class graphics performance on the Macintosh — that's as much as 1000 percent greater than its rivals. So now you can squeeze every ounce of performance out of Aldus PageMaker and Freehand, Adobe Photoshop and Illustrator, QuarkXPress, and other leading programs — and spend your time creating, not waiting.

Thunder supports the widest range of color displays, up to 21 inches in size. It provides pan and zoom in hardware, and a Virtual Desktop™ of up to eight square

24-Bit Accelerated Graphics on 19" Displays
[Relative Performance Ratings on Macintosh Ilir]

SuperMac Thunder/24

18.1

Radius DirectColor/24

RasterOps 24XLTV

Radius card tested with optional accelerator, requiring an additional slot. Comparisons based on results as of July 1991, running Potrero<sup>22</sup> Graphics Performance Benchmarks. All tests run on a Macintosh Ilfx in identical configurations. Detailed performance results available upon request.



Thunder/8" and Thunder/24" color graphics cards

feet for poster-size projects. Plus, on-board GWorld memory, for faster manipulation of large color images.

Pathway to the future. Thunder ensures your investment in the future with OpenSlot, SuperMac's exclusive expansion connector. With it, Thunder can be expanded to support your ever-increasing needs for more performance and more functionality. Making it both easy and cost effective for you to upgrade in the future.

Roll like thunder to your nearest authorized reseller to get a blazing-fast test drive today. For the location of the authorized SuperMac reseller nearest you, call (800) 334-3005.



Circle 88 on reader service card

### IBM and Apple: What's It All Mean?

How Apple prepared for the year 2000

BY JERRY BORRELL

swore at corporate executives, and expounded on our own interpretation of what it meant for Apple to announce that it will be doing business with IBM. No one can be blamed for that. Apple

Computer has been this country's favorite rags-to-riches saga for 15 years. The company has seemed destined to have a Henry Ford-like influence on America, its role all but defined for PBS documentaries.

But the announcement from the two companies' public relations groups was suspiciously timed, sandwiched as it was between repeated criticism of John Sculley's salary (in Time, Newsweek, Business Week, Fortune, and Forbes) and the announcement of Apple's third-quarter loss of \$53.1 million. It was too easy to think that the announcements were manufactured solely for the purpose of creating a diversion from bad press. Unfortunately, the announcement was so sudden that it harmed the credibility of the official explanations of the development.

For the record, here are the official reasons for Apple's deal with IBM: to share microprocessor technology, to share the development of a company and a future object-based operating system (not the current Macintosh Operating System), to share networking technology, to share multimedia technology, and to plan for future multiplatform computing environments. (In other words, to plan for that elysian time when computers manufactured by several companies will all be able to run the same software.) The unofficial reasons are to

divert the press (as mentioned above) and to teach Microsoft a lesson.

#### What Does Apple Get?

e all did it. Tore at our hair, beat our breast,

The thing that left many of us scratching our heads was the question of what precisely did Apple get out of such a deal. You know, the tangible thing. The reason that sent Apple staff knocking at corporate doors in Armonk, New York. What were John Sculley and Mike Spindler actually thinking about?

One answer is found in the need for a new generation of microprocessors. Apple, like most other computer manufacturers, is beholden to the developer of the particular microprocessor that is the heart of its products, Motorola's 68000. Personal computers are based on similar microprocessors made by different manufacturers. Most of us recognize Intel and Motorola, which make the most popular microprocessors. Intel's famous 8086 family of processors and Motorola's 68000 family are classified as CISC chips: complex instruction set computers. But a newer architecture came into vogue some years ago, called RISC, for reduced instruction set computers.

RISC architecture became popular for several reasons, some of which had to do with the business proposition that the technology was available from a source hungrier and cheaper than Intel, Motorola, and others. As a



result, a once little (now big) Silicon Valley company called MIPS made a fortune for its founders by licensing RISC microprocessors to companies like Sun Microsystems and Digital Equipment Corporation. (For a great article on this subject, see *Upside* magazine, July 1990, p. 28. You can reach *Upside* at 415/377-0950.)

The most important reason RISC architecture has become popular is that a computer's microprocessor spends most of its time doing the same thing many times. The sets of instructions it processes most of the time are redundant, so a microprocessor built to handle those types of calculations more efficiently, such as a RISC chip, is much faster than a general-purpose microprocessor.

(A brief digression—now there is a shift in the direction of microprocessors toward architectures that are a hybrid of the two approaches, called CRISP, for complex reduced instruction set computers.)

My main point has to do with Apple's belief that the future of its personal computers lies with RISC-(continues)



Circle 58 on reader service card.

based technology, and with the ongoing problems that Motorola has had in developing its own RISC processor, called the 88000. The 88000 is generally thought to be no contender against future RISC microprocessors from MIPS, or even from Sun Microsystems (which developed its own

As a result of the Apple-IBM agreement, people buying and using Macintosh technology will get access to better components. It's hard to gripe about that.

RISC microprocessor, called SPARC, some years ago). These issues left Apple executives wondering how the company was going to come up with a generation of much more powerful computers, with 10 to 20 times today's level of performance—not just another miserable 30 percent to 100 percent performance enhancement (as in, Boy, the cursor really comes back fast with an fx!).

Enter IBM-rife with financial woes, a generation of workstations based on IBM's proprietary RISC chip, falling market share in mainframes and personal computers, and publicly asked questions like how IBM can make a return on its technology investments such as semiconductor design and manufacturing. Combine IBM's state with the frame of mind of some Apple executives who are looking at early progress reports on Apple's 88000-based next generation of personal computers, due out in 1992, and a joint agreement begins to make sense.

Now add IBM's complete disclosure of its future RISC releases and deliverable dates from manufacturing (one of which is also timed for 1992). Also add in the stipulation that IBM will allow third parties (Motorola being specifically, but not exclusively, named) to manufacture this line of products under a license agreement,

thereby allowing IBM to make money via royalties. Such an agreement allows Apple to continue doing business with a loyal and capable manufacturing ally, Motorola (which has more experience in mass microprocessor production than IBM). And for the first time Apple will use a microprocessor that can be second-sourced—that is, manufactured by others—perhaps from the onset, thus ensuring that the price of the chips will be lower.

And as a result, people buying and using Macintosh technology will get access to better computers. It's hard to gripe about that.

#### Will the Mac Go Away?

Does the pope wear white? Apple is planning to introduce a new Apple II! Why would it get rid of the Mac? Apple cannot afford to give up the Macintosh. There is enough work left for improving and evolving the Mac Operating System to keep Apple's engineers working for several years. There will be a constant stream of smaller but powerful revisions of the operating system, and more major changes like 7.0. Apple can plot the next several hardware generations of the Macintosh, too. While it is not clear that the RISC-based computers will be called Macintosh, they will run the Mac Operating System and Macintosh applications.

The Mac will be with us for the remainder of the decade. Every so often, over that period, the oldest generation of Macintoshes will no longer run the latest version of the operating system with all its features. It won't be practical to upgrade older Macs to run the latest hardware and software. and these machines will continue to be used into the late 1990s. But through the next several years, while the microprocessor architecture/ hardware evolution progresses, software evolution will determine how we will use computers toward the end of the decade. And that is what the second part of the IBM-Apple deal is all about.

#### Sleeping with the Enemy

IBM will not obtain access to the Macintosh Operating System. Instead it will share access to Apple's new op-(continues)

### WHEN WAS THE LAST TIME A DRAWING PROGRAM MADE YOUR PALMS SWEAT, YOUR PULSE RACE, AND YOUR HEAD SPIN.

### UNLEASH THE AWESOME POWER OF CANVAS 3. Fasten your seat belt and

get ready to take the incredible new Canvas 3.0 for a spin. Its exceptional performance and nimble handling make Canvas 3.0 the hottest precision drawing program on the market. And its formidable list of major enhancements puts it miles ahead of anything else on the road. CRUISE INTO THE FUTURE TODAY. Canvas 3.0 is System 7 Savvy with all of the features Apple® wants to see in System 7 graphics applications. Publish & Subscribe, Balloon Help™, AppleEvents™, and 32-bit memory are fully supported. What's more, Canvas 3.0's breakthrough

Open Architecture technology lets you add new tools, effects and file translators with ease, at any time. IT WILL LEAVE YOU SPEECHLESS. Canvas 3.0 offers a wide range of professional text handling features. Fractional leading and kerning. Tab support within

text blocks (left, right, center, decimal). Subscript and Effects Macro

Tent

Edit

superscript text. You can even bind text to any curve. Object Layout

File

Wrap text around or encrust it within irregular shaped objects. Fully justify and slant text margins.

Apply character by character font scaling. And convert TrueType™ and PostScript® Type-1 fonts into their Bézier curve outlines.

#### NOTHING HANDLES CURVES BETTER.

While other drawing programs make vou draw Bézier curves by "connecting the dots", Canvas 3.0's freehand tool lets you create any curve by simply drawing it. And it gives you unparalleled Bézier curve editing power -- from multi-point selection and editing to automatic object conversions, combinations, and blends.

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erating system based on object-oriented programming (OOP) techniques. The form of this sharing is to be a jointly established company that will deliver a new operating system to Apple, IBM, and other companies who want to license it.

My initial reaction to the announcement was wanting to ask the press-release writers to cut us some slack. Apple can't form a software business (Claris) successfully, let alone go into a jointly operated business with IBM. And even if a company is formed, the concept is dumbfounding. A group of senior software engineers from both companies will sit around and amicably discuss how to get product out? More likely, battles will begin from day one, and at best, the joint company might become two camps battling over niggling points of direction.

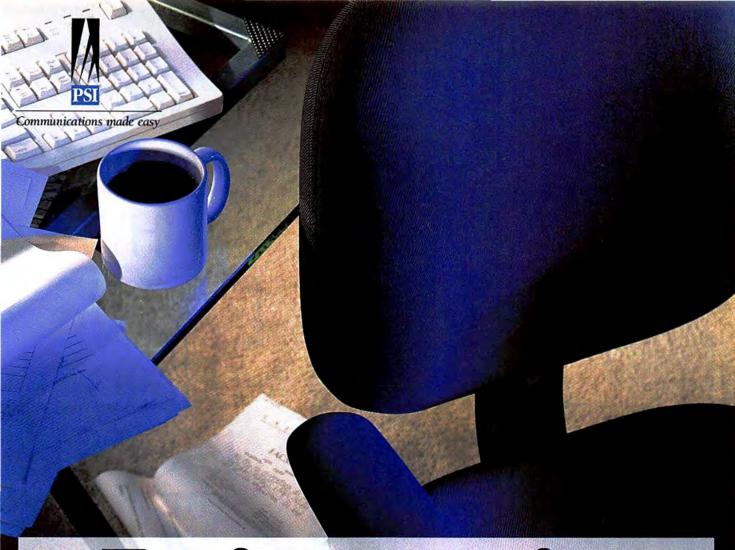
That minor point aside, the substance of the Apple-IBM agreement revolves around the theory that the industry needs common ground for an operating system so that computers, applications, and data can be shared across all computers. This discussion is driven by large businesses that influence people such as John Sculley. It was popularized by Bill Gates. When computer-company leaders succumb to this siren's song, they inevitably begin mumbling about cross-platform compatibility. Businesses find it more profitable to work with older, stable, depreciated, but antiquated computer technology. So they use their financial clout to suggest that computer manufacturers should get together and solve problems by creating one unified approach to operating systems.

Those who propose this choose to ignore the experience of personal computer manufacturers in Japan with MSX, a unified operating system that was supposed to help businesses by allowing all applications to run across all platforms. The idea was that companies would compete based on their hardware. But the MSX effort failed, despite government support.

Proponents of a standard, crossplatform OS must believe that Unix, which after two decades of standardization is a worse mess than ever, is a flawed model too. (Perhaps they be-(continues)

Steven Bobker

Maclison



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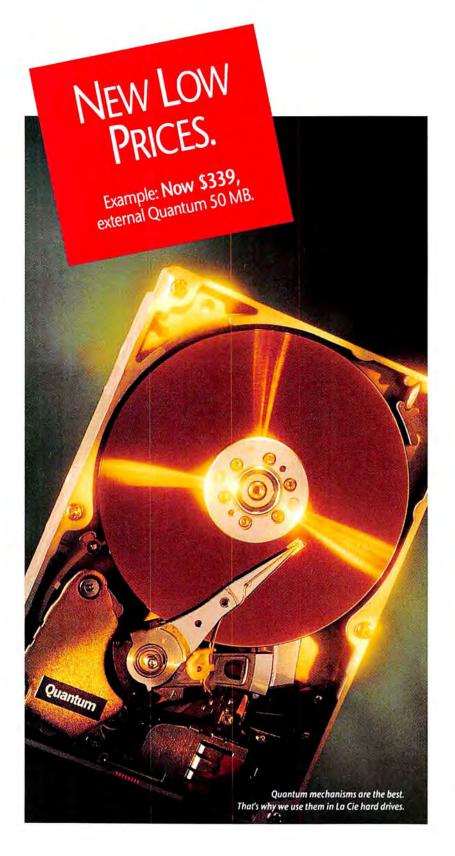
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#### tttt -MacUser

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lieve the Unix experience can be avoided by good planning.) Similarly the implementation of Motif, a common interface developed by a consortium of nearly two dozen computer companies, is a flawed model.

And finally the proponents will have to hope that IBM working with Apple—even if successful—will not be like IBM's deal with Microsoft, in which IBM adopted Microsoft's operating-system technology and was then led about for years by Bill Gates.

#### So What?

I agree with those who say that the metaphor of personal computing will change by decade's end. I believe that there is likely to be another advance in technology, like the Mac, that is different from all that came before it. And I agree, as a manager in a business, that stability in computing

I don't think that
the next great advances
in computer operating
systems will come
from a consortium

would help my business to avoid unnecessary expenses in the near term.

But I don't think that the next great advances in computer operating systems will come from a consortium. I don't think that a socialistic approach to development (from each according to his programming ability, to each according to his hardware need) is how the computer industry is going to advance. Or we'd be buying computers from Moscow. And if I think like a standard business manager and push for cross-platform compatibility, I'll lose my shirt to Japanese competitors in the next decade.

Apple is an independent company. It can remain so. Whether its citations in PBS programs of the future will be history lessons or a current profile will depend upon whether Apple's leaders see that leadership starts at home, not at committee meetings.

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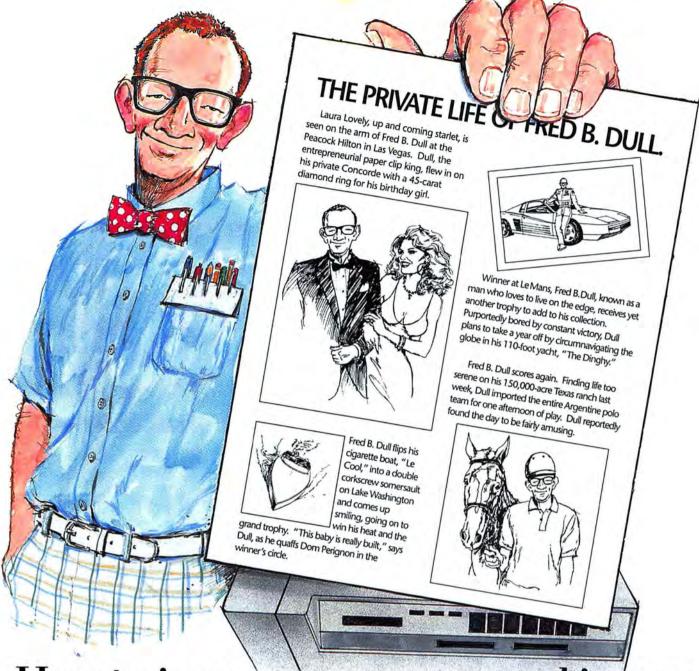
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## LETTERS

# For Sole

#### Quitting Macintosh Motoring

In the late sixties and early seventies, British motorcycles dominated my life. When you got up in the morning, you never knew if they were going to start, but when they did, the ride was incredible.

Today, I spend my time kick-starting a Macintosh, and as with the British motorcycle, you never know when the plugs are going to foul and the Mac simply won't run. Rather than fix the problems with the Macintosh Operating System, Apple made a new one, with even more problems than the first. I have done just about everything but overhaul the motherboard, and the Mac still doesn't run smoothly.

I gave up on British motorcycles. System 7 has convinced me it is time to do the same with my Macintosh. This Mac is up for sale and I am walking away. Robert Irwin Lynden, Washington

Lynaen, wasnington

#### **Emphatically Not Yet**

Y our two-word review of System 7 is "emphatically yes" ["Confessions of a System 7 User," July 1991], but after reading the article, I don't see what the excitement is about. Anyone who uses the Macintosh daily doesn't need more crashes or a system that is ahead of the software that runs on it. This Mac-

intosh user will wait until the thrill seekers have done the debugging and the developers have come up with software that recognizes System 7.

Richard Harrison Portland, Oregon

#### Incompatible System 7 Review

found your coverage of System 7 in the July 1991 issue to be quite inadequate. I expected some down-to-earth information from Jim Heid's how-to article, "Getting Started with System 7." I knew I was going to be disappointed when I read the words, "I discovered remarkably few incompatibilities."

My compatibility-check report found that three of my applications were compatible, five were mostly compatible, though two of those had newer versions that were recommended, and ten applications I had to upgrade.

Lowell Erickson Granada Hills, California

#### The Speed of Compact Pro

avid Pogue states that StuffIt Deluxe 2.0 [Reviews, July 1991] is "even generally faster than Compact Pro." From testing various file types, I found that StuffIt Deluxe's Best Guess compression is usually within 1 percent of the file size of Compact Pro's compression scheme. For this equivalent compression, Compact Pro was, on average, more than twice as fast as StuffIt Deluxe.

Ken Hancock Waltham, Massachusetts

#### Lite Desktop Publishing

was quite dismayed to read Jerry Borrell's article [Commentary, July 1991]. Your readers don't need 90MB image files, gigabyte drives, or even a copy of Photoshop to produce quality color from the desktop. What they do need is an adequate level of training on color-printing technology and a good OPI [Open Prepress Interface] service bureau.

#### Corrections

The résumé software from Individual Software (Window Shopping, July 1991) is called ResumeMaker.

The Gravis MouseStick (Best Sellers Product Watch, August 1991) is made by Advanced Gravis Computer Technology.

The correct phone number for Nanao USA Corporation (Where to Buy, August 1991) is 213/325-5202.

The actual results for the Mobius Accelerator ("The Accelerated Course," July 1991) were faster than portrayed in the "Speed Tests." The Mobius should have been positioned among the MacProducts, NewLife, and Total Systems 25MHz accelerators in overall performance.

Borrell complained about the storage costs. You could get all the scans for an entire magazine on one \$3 8mm tape. Why archive on expensive hard drives?

Jerry Jewell Rancho Cordova, California

#### Information Slavery

Prior to reading "How the Good Guys Finally Won" [The Iconoclast, June 1991], I was only vaguely familiar with Lotus's reasoning for abandoning Marketplace. I am pleased (continues) that this product was pulled because, "flawed [public] perception" or not, this type of product has abuse written all over it. What really amazes me is that Lotus and Equifax stood to make big bucks from this product while the people who supplied the information, namely us, would get nothing.

David Oliver Springfield, Virginia

#### Information Monopoly

The people who won in the withdrawal of Lotus Marketplace were the reactionaries in a small segment of our society. This vocal group has helped those who already have access to this information keep a lock on it, thereby creating the likelihood that abuse of this privilege will happen in the future.

Being on a computer list and being a target market is part of our system. I choose to participate in our society, and I am glad others feel they have something to say to me.

Mark Cline Birmingbam, Alabama

#### **How to Double Data Loss**

A friend recently showed me a review [in *Chicago Computing*, September 1989] of a device called the DoubleDisk Converter.

The Converter is essentially a precision hole punch designed to produce the extra hole in the double-density floppy-disk case that allows the Macintosh to format and run the disk as a 1.4-megabyte high-density disk. The reviewer claims that all major disk

manufacturers produce double-sided disks that meet the minimum ANSI coercivity standard of 600 oersteds for high-density drives. On this argument, a double-sided disk should function quite well as a high-density disk. What do you make of these claims? Charles Rootbaan Chicago, Illinois

According to Bay Area disk manufacturer Dysan, the coercivity spec for double-density (800K) disks is indeed 600 oersteds, but for high-density (1.4MB) disks, it is 720 oersteds. Reformatting double-density disks and using them as high-density disks is like stuffing yourself into a too-tight pair of jeans: it can be done, but something may give way. See *Quick Tips* in this issue for more information.—Ed.

#### No Word on ROM Upgrades

A pple advertised and documented the Macintosh II, IIx, IIcx, and SE/30 as having the capability to address as much as 128MB of memory, an amount that should be sufficient for most users many years into the future. In addition, Apple has the foresight to manufacture their System ROMs [for these machines] on SIMMs, to allow these machines to easily upgrade their System ROMs.

The current System ROMs are not "32-bit clean." Users of these Macintosh machines are limited to 16MB, and even less after the addition of expansion cards.

We the users, owners, and administrators of these Mac computers would like

### How to be social.

Think how much more effective your people would be if they could communicate better. That's the idea behind WordPerfect Office 3.0 for the Macintosh.

It's actually several programs in one.

WordPerfect Office comes with a very versatile E-mail package (WordPerfect Office Mail'), that makes it easy for people on a

Macintosh network to keep in touch. The mail screen shows you everything you need to compose and circulate messages to an individual, to a group, or to the entire corporation.

With Mail, not only can you send and receive messages, but you can also attach up to 100 files of any format. Beyond that, you can add sound or voice annotation, broadcast

a message to anyone logged onto your network, or send carbon and blind copies.

Ever wish you could take back your words? Mail's unique status tracking capabilities let you know when a message has been delivered or opened. So if a message hasn't been read yet, you can retract and edit it.



to see Apple make a public statement regarding its plans to make a ROM upgrade available.

Adam Engst, Jim Gaynor, Tonya Joy Byard, Jeffry Hexter, John Lawson, [followed by 567 signatures from all over the world]

See MacBulletin, August 1991, for news on the available alternatives to ROM upgrades for 32-bit addressing.-Ed.

#### Hazards of Recycled Paper

Thees are a renewable resource; they do grow with sunshine and water. Paper is safer for the environment before it becomes a chemically hazardous sludge during the recycling process. The solvents used to remove the old inks and copier toner, plus the repulping (shredding), leave only about 20 percent of the recycled paper usable. The remaining [material) must be dumped as a hazard.

Lee Holmes Sacramento, California

According to Jeff Rabuck of Earth Care Paper of Madison, Wisconsin, diffusing ink into the recycled paper product and bleaching without chlorine are methods that limit the release of petroleum-based inks into the environment as a by-product of recycling, and only 20 percent of the paper at most being recycled is wasted. Macworld is exploring with our printer the use of recycled paper and soy-based inks in the production of the magazine, but unfortunately the quality of the products does not allow us to change over at this time. On another front, Macworld is working on electronic publishing alternatives that may reduce our reliance on paper and ink.-Ed.

#### Subscription Sabotage?

P lease note that the December 1000 cember 1990 Macworld arrived only this week [May 10, 1991]. I realize that there was a war in this area and that we had many days and nights of Scud attacks and air[craft] flying over on bombing raids of Iraq, most of which interrupted my sleep, reading Macworld, and computing, but it shouldn't have interrupted my subscription service.

I [further] request that you take into account the following points: 800 telephone numbers do not work from most overseas locations to the U.S. I suggest you require advertisers to add fax numbers to all ads. Foreign residents also encounter difficulty in obtaining updates to software. I've been trying to update software without success and am mad about poor dealer service [abroad]. Ward E. Whitley Dhahran, Saudi Arabia

#### Steamed Subscriber

his spring I renewed my subscription to Macworld by returning one of the renewal cards I received in the mail. I recall having mailed this sometime in mid-April. By mid-May I had become a deadbeat. I was guilty of nonpayment of my renewed Macworld subscription. No simple invoice, but a letter stating my name was being placed in a bad-debt file and my account was being turned (continues)

## How to get a date.

Of course, open communication is only one of many ways to bring people together. That's why WordPerfect Office 3.0 for the Macintosh also offers an integrated calendar and network scheduler to help you make appointments, coordinate meetings, schedule events and company resources as

well as make to-do lists.

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## WordPerfect Office 3.0 For the Macintosh



over to a collection agency! The tone of the letter seemed to indicate that these actions would be taken regardless of whether or not I paid.

I protest this form of consumer abuse. Your credibility has been damaged. The next article concerning consumer rights or market fairness by you will be met with considerable suspicion.

Tom Schneider Chicago, Illinois

According to our records, Tom Schneider mailed a renewal notice on February 19, 1991. Macworld mailed three bills over the next three months requesting payment. When we received no payment, a fourth bill, referred to in his letter, was mailed in late May. Like Time, Newsweek, and many other maga-

zines, Macworld uses a collection agency for delinquent subscription payments. Unfortunately, we couldn't know that Mr. Schneider had not received his first three bills. Our apologies to him for any concern about his credit rating, which has not been damaged.

Finally, some readers seem confused about direct-mail solicitations that offer a free issue to new subscribers. If you accept the offer but then ignore the bill, we assume you want to subscribe but have postponed payment. You must write "cancel" across the bill and return it if you don't want to receive future issues or bills. To resolve subscription problems, call 800/288-6848 or 303/447-9330.—Ed.

#### **Electronic Censorship**

lectronic speech may be omnipresent, but how far is it protected? The U.S.

Freedom of Information Act has failed to keep pace with the demands of new technology. The rules of access remain obscure. Fears have also arisen that commercial interests may soon be able to corner the market in data distribution, setting the price for information that should be available to everyone. How [do we] define electronic privacy when the FBI is unashamedly eavesdropping on electronic bulletin boards?

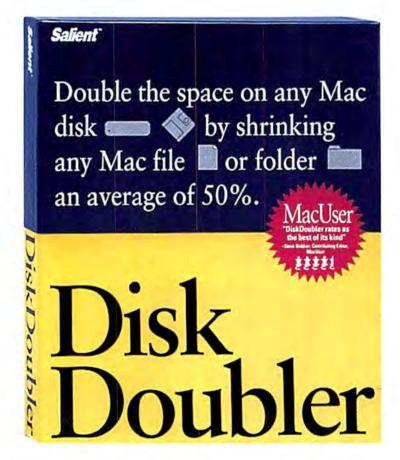
Senator Bob Packwood and legal scholar Laurence Tribe have both proposed constitutional amendments extending the Bill of Rights to electronic media. Organizations have been set up to explore the legal and moral boundaries of the computer world.

Until these questions

are answered, cyberspace will remain, in the words of John Perry Barlow, "vast, unmapped, culturally and legally ambiguous, and up for grabs."

Philip Spender Publisher, Index on Censorship London, England

Letters should be mailed to Letters, Macworld, 501 Second St., San Francisco, CA 94107, or sent electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld) or AppleLink (Macworld1). Include a return address and a daytime telephone number. We regret that, due to the high volume of mail received, we're unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld.





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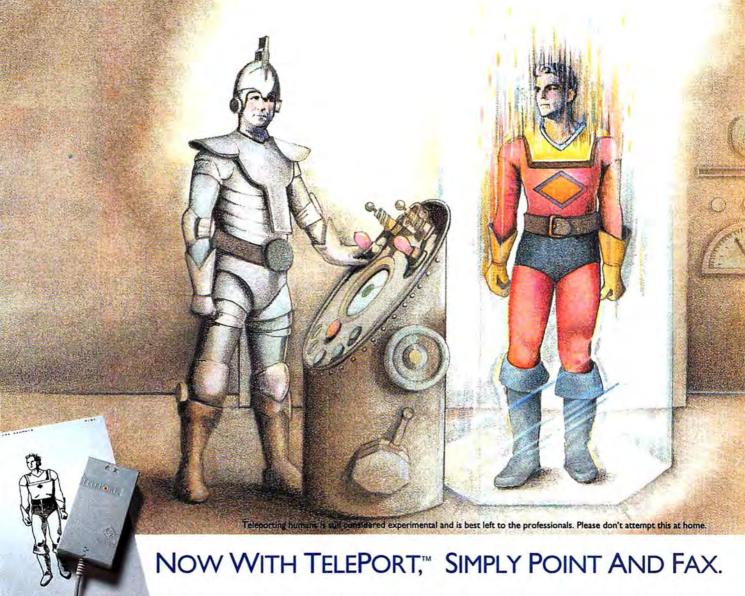
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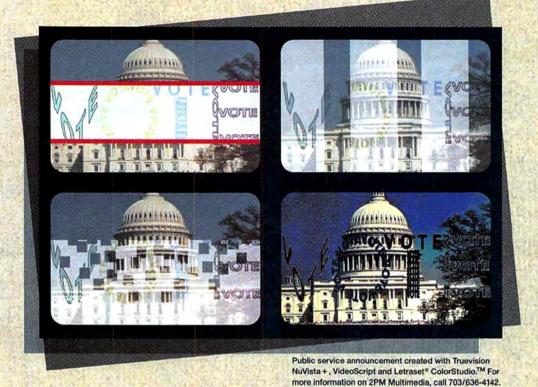
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GLOBAL VILLAGE

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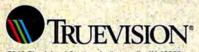
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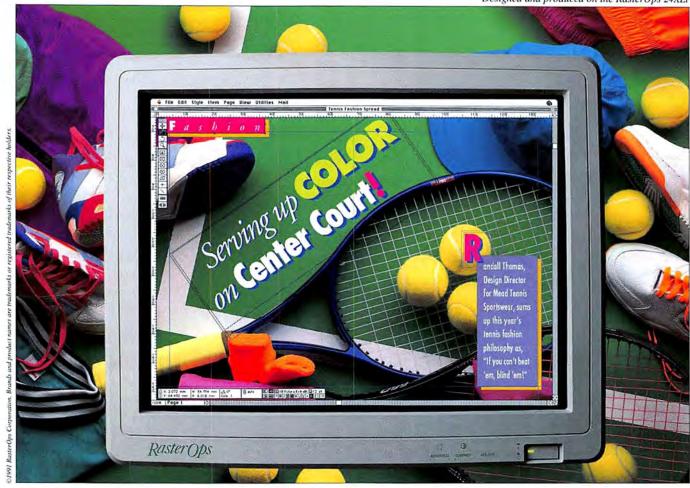






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## ART BEAT

#### by Cathy Abes

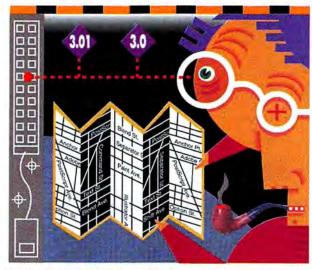
The tools and the talent behind Macworld's graphics and the techniques that make them possible

Artist: Free-lance illustrator and designer Gordon Studer has done work for a number of publications, including *Time*, *In Health*, *Publish*, and the *Los Angeles Times*. Studer also does illustration part-time for the *San Francisco Examiner*. This is his first illustration for *Macworld*.

**Tools:** Mac IIcx with 8MB of RAM; 80MB internal hard drive; RasterOps 24-bit color board; 13-inch Apple RGB color monitor; Microtek MSF-300ZS color scanner; Adobe Illustrator 3.0; Adobe Photoshop 1.0.7.

How It Was Done: For the illustration that opens this month's "Insights on Adobe Illustrator," Studer started by making a rough sketch in heavy black marker. Using Illustrator, he drew the basic geometric shapes and added colors, then began positioning each shape in relation to the others and experimenting with different colors.

Next he began filling in details for the rest of the drawing, including the glasses, the eyes, and the map. To create the shadow of the glasses, Studer selected and option-dragged them to create a duplicate just below the original. He painted the duplicate with



The final illustration for "Insights on Adobe Illustrator" that appears on page 233.

a slightly darker shade of the skin color. Then, because duplicating an object always brings it to the front, he had to reselect the original white glasses and bring them in front of the shadow.

To create the magnifying effect of the left lens, Studer drew a separate circular object slightly larger than the lens. Because the line he used for the glasses was fairly thick, he didn't need the accuracy of a mask to block out the edges of the shape. He merely pasted the glasses in front of the object.

The dashed line at the top of the illustration is actually two lines. The one in front is a 6-point dashed yellow line with a 20-point dash and 15-point spaces between the dashes; the one underneath it is a 6-point solid black line that shows through the spaces of the dashed yellow line.

The wrinkles on the face were done as blends. Studer created a crescent shape with two points, grouped it, and duplicated it using option-drag. Then he chose the skin color and a slightly darker shade of that color for the blend. Next he ungrouped the original and the duplicate, selected both points of each crescent, selected the blend tool, and clicked on one point of one crescent and the comparable point of the other. After specifying a 15-step blend from dark to light in the dialog box, he selected the blended object, grouped it, and option-dragged it to create a duplicate.

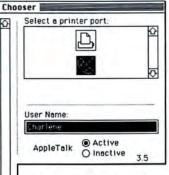
After drawing the black bars and white bars for the background of the map, Studer selected one of the shapes and option-dragged to make a duplicate off to the side. Then, on top of the duplicate, he began drawing the streets and entering the street names. Once the map was finished, he selected the duplicate shape and masked it. After ungrouping the mask and sending it to the back, Studer grouped the mask, the streets, and the street names so he could move them all—as one object—on top of the original shape.

From the start Studer planned to incorporate a photograph into the illustration, eventually settling on a black-and-white print of a pipe. Since he planned to convert the pipe into a color image, Studer scanned it as a 300-dotsper-inch color TIFF file. But even for images he plans to use in gray-scale mode, Studer finds that scanning in color provides better results. He ends up with a scanned image that has more detail than one scanned in black and white.

After importing the file into Photoshop, Studer began colorizing it. First he lassoed the bowl, made it reddish brown, and adjusted the color with the Color Balance slider. Then he gave the stem a darkblue tint. (Because he had to mask the pipe once he brought it into Illustrator, there was no need to position the colors precisely.) Then he selected the whole image and adjusted the brightness and contrast. Next he scanned in a piece (continues)

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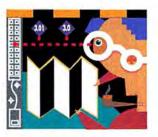
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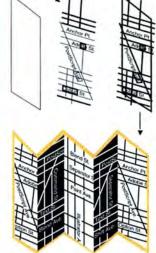
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The basic geometric shapes were drawn and colors added in Illustrator.



Details such as the glasses, the dashed lines, and the panels of the map were added.



After the maps were drawn and a mask made for each map panel, the maps and masks were grouped and placed over the original panels.

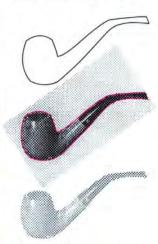




The wrinkles were created as 15step blends. The image on top is in Work mode, and the one on the bottom is in Preview mode.

of marble-textured wrapping paper-also scanned as a 300-dpi color TIFF file-and adjusted its color, brightness, and contrast in Photoshop.

To import the scanned images into Illustrator, he had to save them as EPS files. (When EPS files are imported into another file, they must always accom-



The scanned-in pipe was colorized in Photoshop, then rotated, skewed, and masked in Illustrator.

pany the finished file because they contain vital information that defines the image.) In the EPS Options dialog box, he chose 8 bits/ pixel, Binary coding, Include Halftone Screens, and Include Transfer Functions.

In Illustrator, Studer skewed and rotated the pipe to position it correctly. He used the pen tool to draw a mask around the pipe and did the same for the wrapping paper (the blue background behind the map), drawing its mask in the shape of an arc.



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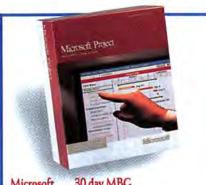
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5683 Nisus 3.06-Boasts ten clipboards, unlimited undos, noncontiguous selection, and a lightning-fast search/replace that can even check unopened files. Plus: graphics and two macro levels for custom features . . . . . \$245.

	Ares Software 30 day MBG
	<b>⊘</b> FontMonger 1.0 62.
	Baseline Publishing 30 day MBG
8055	Screenshot
7784	Color MacCheese 56.
7828	<b>②</b> Exposure Pro 78.
	Bitstream
9428	True Type Fonts 1 or 9429 Fonts 2ea.59.
1591	True Type Fonts 3 or 1595 Fonts 4ea.98.
	Broderbund Software
9351	<b>⊘</b> Kid Pix 1.1
1427	
6281	<b>⊘</b> TypeStyler 1.5.2
7	Casady & Greene 60 day MBG
8879	Fluent Font Library 4.0 99.
1945	True Type Starter Set 57.
	Claris
1123	MacPaint II 2.0 89.
2518	MacDraw Pro 285.
8007	OClaris CAD 2.0 629.

330C



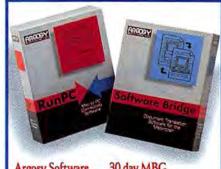
## How can you learn



Paracomp 30 day MBG
7441 Swivel 3D Professional 1.0—One of the
best selling 24-bit 3D programs available \$435.
7839 7 FilmMaker 2.0.1—Features full anima-
tion, anti-aliasing and transparency for multi-
media presentations

	Creative Software 30 day MBG
6645	Easy Color Paint 2.0 45.
-5.5	Custom Applications
8037	Freedom Press Light 3.01 (17 fonts) 55.
6517	Freedom of Press 3.01 (35 fonts). 255.
0017	DeltaPoint 60 day MBG
6095	DeltaGraph 1.5 125.
0000	Deneba Software 30 day MBG
6365	OUltraPaint 1.03 125.
1769	Canvas 2.1.1 (free upgrade to 3.0) 189.
1700	Dream Maker 30 day MBG
	Cliptures: Sports or Business ea. 68.
	Electronic Arts
4315	• Studio/8 2.0 189.
8056	• Studio/32 1.1
0000	Foundation Publishing 60 day MBG
6728	Comic Strip Factory 1.6 36.
9438	Comic Strip/People & Kid Stuff 71.
3400	IDD/Innovative Data Design
2417	MacDraft 2.1
4707	ODreams 1.1
41.01	Letraset 30 day MBG
2619	
4709	OLetraStudio 2.0
2621	
6301	• ColorStudio 1.5 599.
	Linguist's Software 60 day MBG
	Over 100 language fonts call
4	Mainstay 30 day MBG
9798	©Capture 4.0
	MediaLab Tech 30 day MBG
9725	PictureAccess (photo scanning) 169.
8218	PictureLink 1.1 215.
7	MicroFrontier 30 day MBG
7886	©ENHANCE 2.0 235.
7	MicroMaps 30 day MBG
7554	MapArt (Paint) 41.
7556	MapArt (PICT) or 7555 (EPS) ea. 95.
7	Microsoft 30 day MBG
2878	
7	Monotype Typography 30 day MBG
	Monotype Imprints-TrueType ea. 22.
	Classic Fonts (full line available) call
	Multi-Ad Services
8767	<ul><li>Multi-Ad Creator 2.5 455.</li></ul>
	PANTONE
7466	Process Color Imaging Guide 48.
1862	Process Color System Guide 48.

	Paracomp 30 day MBG
5028	
7728	SwivelArt 1.0 81.
2460	MapArt I-North & South America. 156.
2459	MapArt II-Europe, Africa, Asia 156.
2458	Viewpoint-Car Collection 156.
2457	Viewpoint-Air & Sea Collection 156.
2463	Viewpoint-Anatomy Collection 156.
7441	Swivel 3D Professional 1.0 435.
1441	Postcraft International
2210	© Effects Specialist 95.
2210	Layouts for PageMaker, ReadySetGo,
	& QuarkXPress ea. 69.
	Layouts: Stationery or Flyers ea. 45.
7010	Quark
1612	• QuarkXPress 3.1 519.
	Springboard 30 day MBG
3530	Certificate Maker 2.02 22.
	Strata
1113	• Stratavision 3D 2.0 549.
	SuperMac Tech 60 day MBG
3380	
5625	
	Tactic Software 30 day MBG
8251	
8252	
	Art Clips 1 . 49. 8261 Art Clips 2 . 64.
8248	FontShare 2.2 129.
	3G Graphics
	Images with Impact: Graphics 1 . 49.
4583	Images with Impact: Business 1 . 64.
2003	Images with Impact: People 1 94.
6379	Accents & Borders I 64.
*	Timeworks 30 day MBG
7115	Publish It! Easy 2.11 139.
*	T/Maker 30 day MBG
	Full line available.
	ClickArt (bitmapped) ea. 32.
	ClickArt (EPS format) ea. 82.
1292	Color Graphics Presentation 109.
1202	Ventura Software
8962	Ventura Publisher 3.0 499.
4	Visual Business Sys 30 day MBG
9867	• GraphMaster 1.1 189.
3001	Wildflower 30 day MBG
6512	SnapJot 3.01
3012	zZedcor 60 day MBG
3986	DeskPaint & DeskDraw 3.0.3 113.
0000	Cost and a Destiday 0.0.0 110.



Argosy Software ... 30 day MBG
7872 Software Bridge/Mac 2.0.1—Translate
documents between over 30 Mac and PC
word processors. Mount DOS disks.... \$99.
2448 Run PC/Network—Connect to a PC and
run DOS programs. Incl. Software Bridge . 279.



Paracomp ... 30 day MBG

SwivelAn Collections—Detailed 3D models to use in graphics and presentation applications.

Customized by illustrators and multimedia specialists (Map \*1-Americas, Map \*2-Europe, Anatomy, Air & Sea, and Cars). . . . ea. \$156.

#### PROGRAMMING

UTILITIES, HYPERCARD, SECURITY

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	Abbott Systems 30 day MBG
2515	• Calc + 1.0
5236	• CanOpener 1.1 62.
0200	Advanced Software 30 day MBG
8051	OIntouch 1.1
9986	Intouch Networking (3-Pack) 112.
	Affinity Microsystems 60 day MBG
7835	Tempo II Plus 2.0.3 105.
, 000	After Hours Software
1352	@TouchBASE 2.0
1002	TouchBASE Paper
4	Aladdin Systems 30 day MBG
6169	OShortcut 1.5
6740	©Stufflt Deluxe 2.0
	Aldus 30 day MBG
5100	Aldus SuperCard 1.6 211.
4	ALSoft 30 day MBG
9807	DiskExpress II 2.07 53.
9808	
	MultiDisk 1.27
2222	Apple Computer/Claris
1074	System 7(with free PCTV video) 99.
	HyperCard Development Kit 2.1 149.
	Argosy Software 30 day MBG
	Software Bridge/Mac 2.0.1 99.
2448	RunPC/Network 279.
*	ASD Software 30 day MBG
9440	
9439	
7085	• FileGuard 2.7 (1 user) 139.
7422	
*	Baseline Publishing 30 day MBG
7783	@INIT Manager
*	OINIT Manager 34.  Berkeley Systems 30 day MBG
5737	After Dark 2.0T 28.
2198	More After Dark (M.A.D) 23.
2196	
1541	
	Bright Star Technology
2614	At Your Service 30,
7	Casady & Greene 60 day MBG

2269 QuickDEX 2.0 34. 2528 (5 Pak) 99. 7443 A.M.E. (1 user). 159. 7831 (10 user). 849.

## what this will mean?



#### Palomar Software ... 30 day MBG 8210 PLOITERgeist 2.0—System 7-savvy Chooser-level driver connects plotters to your Mac. First to provide presentation-quality True Type and ATM text; also features background plotting and easy-to-use interface \$249.

-	CE Software 60 day MBG
	OCalendarMaker 3.0.1 31.
6278	<b>②</b> DiskTop 4.01 63.
7518	Alarming Events 1.03 84.
8024	• QuicKeys <sup>2</sup> 2.1
*	Central Point 30 day MBG
	Mac Tools Deluxe 1.2 79.
*	Connectix 30 day MBG
7830	Maxima 2.0
1563	OVirtual 3.0 (August '91) 74.
	• HandOff II 2.2
	Mode 32 1.0 95.
*	Dantz Development 30 day MBG
5255	• Retrospect 1.3 147.
	Retrospect Remote 1.3 264.
7946	Remote (10 Pack of inits) 147.
	Digitalk 60 day MBG
5166	SmallTalk/V Mac 1.1 123,



ON Technology ... 1 year MBG
9801 • Meeting Maker (5 user)—Plan, schedule & confirm meetings via network. Schedule a time & date, select required guests, & prepare agendas.
Personal calendar to block out activities . \$309.
9800 • Meeting Maker (10 user) . . . . . . . . . . . 549.

	A VINE VENE
	Dubl-Click Software
7074	OClickChange 1.05 \$56.
1914	ClickChange 1.05
1824	Calculator Construction Set 2.09.6 62.
A	ElseWare Corp 30 day MBG
1507	Bar Code Kit
	Bar Code Kit
-	Firth Generation 30 day MBG
4287	PYRO! 4.01
2055	00.4
3955	<b>⊘</b> Suitcase II 1.2.10 49.
8286	SuperLaserSpool 2.02 93.
5470	OF
51/8	• FastBack II 2.5 118.
5725	ODiskLock 2.01
0,20	THE TOTAL OF THE T
*	FWB, Inc 30 day MBG
2317	Hard Disk Partition 57.
2010	Hard Distriction 1
2319	Hard Disk DeadBolt 57.
-	Go Technology 60 day MBG
4400	Ottoble attachment (constant and a constant and
1488	O Hot Keys Universal (word process.) 36.
-	Insight Development 30 day MBG
0474	Magnitude Common III do day much
61/1	MacPrint 1.23 93.
-	JAM Software USA 30 day MBG
0000	00
6089	Smart Alarms w/Appt. Diary 3.07 63.
-	Kensington 30 day MBG
0001	ODD(-(-bt) 0000 (-bt)
9301	PassProof (right) or 9300 (left) ea. 65.
-	Kent Marsh Ltd 30 day MBG
5457	OQuickLock 2.0
0512	<b>⊘</b> FolderBolt 1.01 73.
9010	Or older bolt 1.01
2591	The NightWatch 1.03 84.
6134	
0104	Kind On the second of the MDO
*	Kiwi Software 60 day MBG
6267	• KiwiEnvelopes! 3.1.1 32.
_	Loop Software 30 day MBG
<del></del>	Loop Software 30 day mbd
5442	PictureBook 3.2A 39.
4	Magic Software 30 day MBG
/26/	<ul><li>AutoSave II 2.0</li></ul>
7270	<b>⊘</b> Backmatic 2.0 50.
,	Miles and devilled
- R	Microcom 30 day MBG
8562	Complete Undelete 1.1 48.
	<b>O</b> Virex 3.2
8561	<b>9</b> 911 Utilities 89.
0400	Citadel with Shredder 89.
2462	Ochadel with Shredder 89.
*	Microseeds Pub 60 day MBG
7000	AINITPicker 2.02
1000	• INTIFICKET 2.02
2913	<b>⊘</b> INITPicker 2.02
	Microsoft 30 day MBG
	O : 10 : 10
44/1	QuickBasic 1.0 64.
	Multi-Ad Services
OOFO	Multi-Ad Search 1.0
8850	Multi-Ad Search 1.0 115.
*	Nine to Five Software 30 day MBG
0707	OPenado 2.0
9/0/	Onepoils 2.0
*	Reports 2.0
6025	Now Utilities 3.0 (September '91). 84.
*	ON Technology 1 year MBG
6295	On Location 1.02 75.
0303	On Location 1.02
9801	Meeting Maker (5) 309. 9800 (10) 549.
2570	Instant Update (2) 309. 2571 (5) 619.
2010	Delegan Continue Cont
	Palomar Software 30 day MBG
8210	• PLOTTERgeist 2.0 249.
JE 10	College Coffware 20 day MDC
<b>*</b>	Salient Software 30 day MBG
7404	ODiskDoubler 3.7 49.
	Softstream 30 day MBG
5440	HyperHit 3.0 119. 1568 (network) 389.
4	Solutions, Inc 60 day MBG  SmartScrap & The Clipper 2 1 56
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0440	



Kent Marsh Ltd. ... 30 day MBG
A winning team! The perfect combination of hard disk and folder security. Rigorous yet elegantly simple. Full or read-only protection with a click of the mouse. And much more! 9513 © FolderBolt \$73. 2591 © Night Watch \$84.

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1	Symantec 30 day MBG
5176	Symantec AntiVirus for Mac (SAM) 66.
5724	Symantec Utilities for Mac (SUM II) 99.
6748	Norton Utilities for the Mac 1.1 87.
3421	THINK Pascal or 3420 THINK C 165.
9957	@THINK Reference 1.0 69.
7	Synex 30 day MBG
7147	MacEnvelope 5.02 57.
1	Tactic Software 30 day MBG
8964	MasterFinder 1.2 49.
7	Teletypesetting 30 day MBG
8058	TScript 1.4 91.
7	TGS Systems 60 day MBG
6667	Prograph 2.5 (September '91) 309.
1	Wolfram Research 30 day MBG
8273	Mathematica Enhanced 2.0 (Aug.) 799.
7	Zedcor 60 day MBG
3985	@ZBasic 5.0 99.



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MacConnection®

3448 SmartScrap & The Clipper 2.1... 56.

★SuperMac Tech. ... 60 day MBG

3377 DiskFit 2.0...

## To help you find out



Global Village ... 30 day MBG
TelePort A300—1990 MacUser Editors' Choice
Award for Best Communications Product. 2400
bps/MNP-5 modem connects via ADB Port.
SendFax (9600 baud) optional.
8946 ₱ Basic . \$139. 8945 with FAX . \$185.

#### CD-ROM

Adobe Systems

	Adobe Systems
8794	Adobe Type On Call CD/ATM 47.
9443	Adobe TOC & Porta Drive Bundle . 659.
	CD Technology
2321	CD-ROM Caddy 11. 2533 (5) 49.
8057	Porta Drive CD-ROM 649.
7686	Porta Drive & MS Office CD-ROM . 999.
1,10,00	
	Discovery Systems 60 day MBG
9968	Birds of North America (CD-ROM) 26.
9965	Sherlock Holmes on Disc (CD-ROM) 26.
9966	
9967	the state of the s
1874	Mammals of N. America (CD-ROM) 52.
2484	The Family Doctor (CD-ROM) 125.
	Dubl-Click
9944	The WetSet CD (CD-ROM) 218.
7	Everex 30 day MBG
	Metro CD CD-ROM Drive 649.
7	Highlighted Data 30 day MBG
7771	Webster's Dictionary (CD-ROM). 159.
	HyperGlot 30 day MBG
9778	Learn to Speak English, 7473 French,
	or 7829 Spanish (CD-ROM) ea. 64.
2615	Lingua ROM II (3-CD Set) 649.
7	Microsoft 30 day MBG
6382	The Microsoft Office (CD-ROM) 599.
	Monotype Typography 30 day MBG
	Classic Font Library on CD-ROM call
	NEC
6637	Clip-Art 3D (2500 full-color images) 246.
6636	Image Gallery (2800 line art) 246.
	Type Gallery PS (Adobe fonts) 246.
9441	
	General Reference CD-ROM Bundle
24/0	
	(inludes CDR36 kit & 3 titles) 529.
	Penton Overseas 30 day MBG
2011	Vocabulearn/ce Spanish 1 CD 59.
2610	Vocabulearn/ce French 1 CD 59.
7	Somak 30 day MBG
	LaserArt I or II (CD-ROM) ea. 62.
	Tactic Software 30 day MBG
2519	The street the street of the s
0716	Toshiba
6/49	XM 3201 CD-ROM Drive 659.

#### VIDEO & SOUND MUSIC, MIDI, ANIMATION

7	Ars Nova 30 day MBG
1215	Practica Musica 2.2 \$66.
	Articulate Systems
2034	Voice Impact 82.
2232	Voice Impact Pro 179.
9975	Voice Navigator II 549.
	Bogas Productions 60 day MBG
9279	
6135	Super Studio Session w/Music Library 99.
0.00	Coda Music Systems
8188	. "그렇게 가지가 다른 프라이엄 아이를 가게 하면데 !!
	© Finale 2.6.1
3004	
	Computer Friends
8271	<b>⊘</b> ColorSnap 32 + 1.1
	Electronic Arts
1846	Deluxe Music Construction Set 2.5 . 84.
1	Farallon Computing 30 day MBG
6770	
2199	- " - " - " - " - " - " - " - " - " - "
6766	MediaTracks 1.0 205.

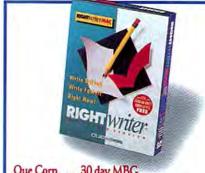


	Full Logic Studios
1163	
	MacroMind 30 day MBG
9353	
6159	
5087	MacroMind Director 3.0 (Aug. '91) 699.
2246	MacroMind Three-D 1.0 1029.
	Mass Microsystems
2592	QuickImage 24 579.
	Paracomp 30 day MBG
	@FilmMaker 2.0.1 435.
	Passport Designs
8253	
3117	
8250	
3115	
2244	System 7 Video (VHS)
2245	System 7 Video with Lon's Book 25. Pixar
1596	RasterOps
	Full line available. Partial listing.
8526	Video Expander 499.

9784	RasterOps 24SI \$649.
8944	RasterOps 24STV 1249.
7	Symmetry 30 day MBG
8172	Mariah 1.0 93.
7	Total Systems 30 day MBG
9282	Galileo I Video (Plus) 449.
	Galileo I Video (SE) 449.
	Voyager 30 day MBG
9322	Voyager Videostack 2.0 69.
9328	Voyager CD Audiostack 69.
	Beethoven Symphony No. 9 (CD-ROM) 69.
9327	Igor Stravinsky (CD-ROM) 69.
	LEARN & PLAY
	LEANIN & FEAT
֡	8944 8172 9282 8653 9322 9328 9326

FOREIGN LANGUAGES, TRAINING, GAMES

	Abracadata, Ltd 30 day MBG
9995	Instant Decorator 29.
9990	
	9992 Interiors or 9994 Landscape ea.63.
	Libraries available call
	Accolade
1423	Hard Ball II
8220	Jack Nicklaus Golf 34.
	Aldus 30 day MBG
	Dark Castle or 3502 Beyond DC ea. 36.
4	Baseline Publishing 30 day MBG
7785	Talking Moose
	Beacon Technology 30 day MBG
	HyperBible 2.03 (KJ or NI) . ea. 125.
	Broderbund Software
4314	
	The Playroom 1.1 (CP) 29.
	Carmen Sandiego Series (CP)ea. 29.
6384	PlayMaker Football 1.1.1 29.
9804	
8266	
4966	SimCity 1.2 (CP) 29.
5871	
	Carina Software 30 day MBG
5726	Voyager 1.2 87.
0,20	Casady & Greene 60 day MBG
2268	Crystal Quest 2.2x, 7495 Mission
LLUU	Starlight or 7498 OSky Shadow ea. 29.
4	Centron Software 30 day MBG
	Casino Master 3.24 (B&W) 41.
0020	Gasii O Masici 3.24 (Daw) 41.



Que Corp. ... 30 day MBG
7482 RightWriter for the Mac 3.1—Instantly improve your writing. RightWriter for the Mac makes it simple. With a few clicks of the mouse, RightWriter checks your grammar, style, word usage and punctuation . . . . . \$54.

## what it's all about

	Davidson & Associates
6128	Math Blaster Mystery 1.0 (CP) \$29.
8050	• EARTHQUEST 2.0 48.
	Electronic Arts
6716	Pipe Dreams 1.2 17.
8643	Harpoon
1907	• PGA Golf (August '91) 39.
	FTL/Software Heaven
1555	<b>⊘</b> OIDS
,	Great Wave 30 day MBG
2276	KidsTime or 5642 OKidsMath ea.26.
4334	NumberMaze 26. 8527 (Color) 36.
8044	NM Decimals & Fractions (Color). 36.
1517	ReadingMaze. 26. 1513 (Color). 36.
7	HyperGlot Software 30 day MBG
	Word Torture 4.0-Beginner to Advanced
	(Span., Fren., Germ., Ital. & Rus.) ea. 35.
	Pronunciation Tutor - Beginner
	(Span., Fren.) ea. 35. (Germ., Chin.) 39.
	Verb Tutor - Intermediate
	(Spanish, French, German) ea. 39.
	Survival Manuals (var. langs.). ea. 39.
6611	• Kanjimaster - Beg. (Japanese) 99.

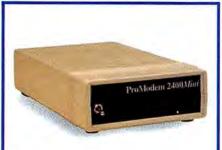


## DayStar Digital ... 30 day MBG PowerCache 030—Now the even faster Power-Cache will fit almost any Mac. Available in 25, 40 & 50 MHz, it can triple your performance. Proven 030 compatibility works with everything! ... see line listing. \*Penton Overseas ... 30 day MBG \*VocabuLearn/ce Levels | & || (French, Italian, Spanish, German,

	i cillott o verseus in so day mod	
	(French, Italian, Spanish, German,	
	Russian, Hebrew, & Japanese). ea.	35.
7	Personal Training Sys 60 day M	BG
	Training for System 7, QuarkXPres	
	Persuasion, FileMaker II/Pro, PageMa	ker.
	Illustrator, FreeHand, Word, HyperCa	
	Excel, & the Mac (beg. to adv.). ea.	
	Sierra On-line	
9733	Hoyle's Book of Games II	23.
7367		35.
	Sir-Tech Software	
8229	Bane of the Cosmic Forge	35.
8228	Wizardry II: Knight of Diamonds (CP)	
	Software Toolworks	
4619	Mavis Beacon Typing 1.3 (CP)	32.
1908	World Atlas or 1910 U.S. Atlas ea.	



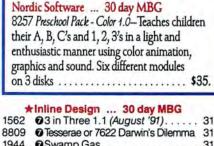
		Spectrum Holobyte 30 day Mi	36
	3464	Tetris 1.3 or 6112 Welltris 1.1 ea. 5	25
	8180	Faces 1.0	25
	3459	Falcon 2.2.1 or 8181 @ Vette 1.0 ea.	33
	7	Spinnaker 30 day MBG	
	2328	Sargon IV 1.03 (CP) (chess)	28
	1	Strategic Studies 30 day MBG	
	8085	Panzer Battles	26
	8084	Halls of Montezuma	26
		StudyWare	
		ACT, GMAT, GRE, or SAT Prep . ea.	29.
	8098	LSAT Prep for the Mac 2.5	35.
		Terrace Software 30 day MBG	
		Mum's The Word 1.0 (gardening)	79.
	1	Toyogo 30 day MBG	
	1993	Nemesis Scribbler	31.
ш	7624	Nemesis Go Master 5.0 (August '91)	36.
	2471	Nemesis Deluxe Toolkit	72.
		XOR 30 day MBG	
	6040	MacGolf Classic 1.0 (CP)	52.



#### COMMUNICATIONS

MODEMS, MAIL, NETWORKS

1	Abaton 30 day MBG
6266	InterFax 24/96 Modem 299.
	Applied Engineering
8363	DataLink/Mac Portable 209.
8362	@QuadraLink 1.1.1 205.
-	Beagle Bros 30 day MBG
	<b>©</b> Flash 1.2
-	CE Software 60 day MBG
	QuickMail 2.5 (5) 249. 5173 (10) 375.
	CompuServe 60 day MBG
	Macintosh Membership Kit 1.03 . 22.
	CompuServe Navigator 3.04 49.
	Membership Kit/Navigator Bundle 68.
	DataViz 60 day MBG
	MacLink Plus/PC 5.0 129.
	MacLink Plus/Translators 5.0 109.



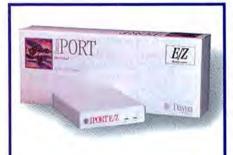
7	Inline Design 30 day MBG
1562	<b>3</b> in Three 1.1 (August '91) 31.
8809	Tesserae or 7622 Darwin's Dilemma 31.
1944	<b>6</b> Swamp Gas
	Interplay Productions
1894	BattleChess (3D animation) 29.
1893	CheckMate (infinite play levels) 31.
	Learning Company 30 day MBG
	• Reader Rabbit 3.0 (CP) (ages 4-7) 30.
7	Leister Productions 30 day MBG
	• Reunion 2.0 109.
	Microprose
2008	Pailroad Tycoon 40.
	Microsoft 30 day MBG
2868	Flight Simulator 1.02 (CP) 33.
1	Nordic Software 30 day MBG
8260	Word Quest 1.0
	PreSchool Pack - Color 1.0 35.

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MMC

## MacConnection ®

## We have a new video



#### Dayna ... 60 day MBG

Dayna's line of DaynaPORT EtherNet adaptors allow users to connect all models of Macintosh computers to any type of EtherNet cabling, including 10 Base T.....\$279.

*	Dayna 60 day MBG
	DaynaPORT E: SE, SE/30, II, Ilsi, LC 279.
	DaynaTALK (5 Pak) 379. (10 Pak) 689.
8719	EtherPrint or 9888 (10 Base T) ea. 349.
	Dove Computer
6758	DoveFax Desktop 1.1.1 295.
9634	DoveFax+ 1.1.1
	EveryWare
	AllShare 1.1.4
	Farallon Computing 30 day MBG
9805	<b>⊘</b> Timbuktu 4.0
4866	Timbuktu/Remote 2.0.1 135.
8707	Liaison 3.0.2
9960	PhoneNET Talk
9961	PhoneNET Card PC 209.
6273	PhoneNET StarConnector 10-Pack. 129.
4869	PhoneNET Connector 10-Pk (DIN8) 198.
2206	PhoneNET StarController 300 899.
6687	PhoneNET StarController-EN 500 1739.
-	Freesoft 60 day MBG
6115	White Knight 11 85.
-	Global Village 30 day MBG
8946	@TelePort A300 139.
8945	TelePort/FAX 185.
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2300	©Smartcom II 3.2A 84.
8614	
7391	
	k Insight Development 30 day MBG
1296	Mosaic 1.0 (3). 249. 1295 (10). 375.
1230	Inglania Calutiona
7557	
7058	SoftPC-AT/EGA Module 1.4 124.
9726	SoftPC 2.0 (Classic, LC, SE, Port.) 135.
4089	OSoftPC 1.3
4003	Intel Corporation
5119	2400EX Modem 179.
6420	2400EX MNP Modern
	rint'i Business Software 30 day MBG
8581	DataClub (3) 199. 8580 (10) 539.
0001	DataClub (3) 199. 8580 (10) 539. Kennect Tech 30 day MBG
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8189	FastPath V 1889
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4188	Teleconnector (DIN8) 23. 2230 (10) 189
	TOPS Flashcard 155
	TOPS Network 3.1 (August '91) . 187
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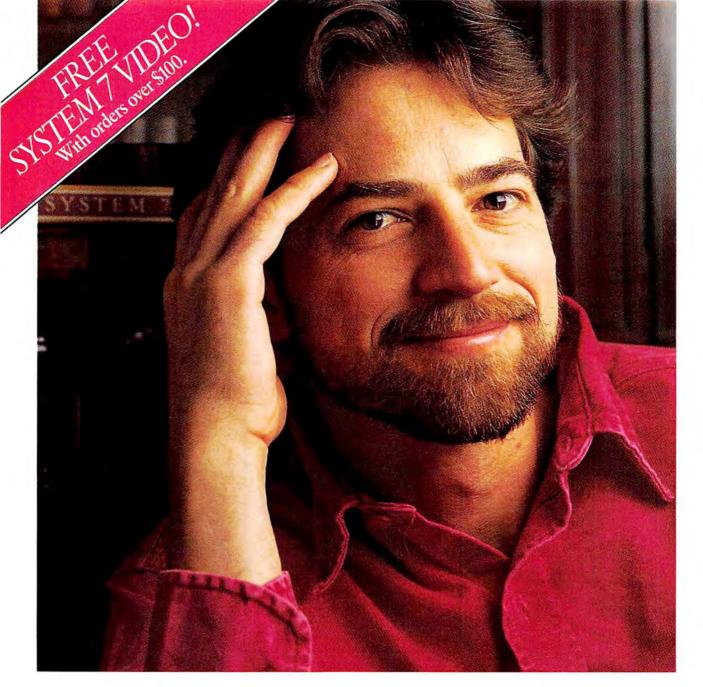
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2304	MAC101E Kybrd. with QuicKeys <sup>2</sup> . 149.
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	GDT Softworks
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### System 7? Lon Poole tells all!

As a Macworld Contributing Editor, author of The Macworld Guide to System 7, and allaround operating system aficionado, Lon Poole has been writing a lot about System 7 lately. But the best way to get a writer to really start making sense is to take his hands off the keyboard and put his face in front of the camera. So that's what we're doing—a video of Lon Poole explaining all about System 7 produced at the studios of PCTV®,

somewhere in the wilderness near Marlow, NH.

If you've been trying to figure out what System 7 can do for you, this is a great way to find out. And it's *free to anyone who places an order over \$100*. (Limit one per customer.) Or you can buy a copy for \$9.

By the way, Lon's publisher and accountant asked us to remind you that we'll also sell you his book on System 7 for just \$19. Or buy the book *and* video for \$25. You'll be System 7 savvy in no time.

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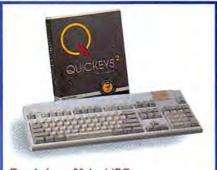
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#### STRANGE BEDFELLOWS AND THE END OF A DREAM

unny kind of world we live in. Every time you feel you've seen its worst, that you've shielded yourself from its slings and arrows, that you've observed the low points in human behavior and understand perfectly that the average

person lacks the morals of a zebra mollusk, something wallops you upside the head and tells you things are much, much worse than you suspected. *Welcome to Chinatown, Jake*. And you realize that despite your hard-won cynicism, you are but a rube without a clue, a widowed grandmother waiting outside the bank for the nice man who said he was a cop to return the life savings he borrowed in order to catch a crook.

That was the way I felt when I read about the ongoing negotiations and recent agreement between Apple Computer and International Business Machines to work together.

#### Rainbow and Blue

Hey, I should have known better. It's not like Apple Computer of late has been a model of the idealistic New Age company that its founders promised back when they were still within psychic shouting distance of the garage where it all began. Apple Computer is a serious business, raking in a billion bucks every quarter. You would have to be a tree stump to believe that the leadership of Apple doesn't participate in the short-term

greed-ridden mentality so pervasive in American business. The company is awash in meaningless reorganizations, energy-draining lawsuits, and cushy executive payouts, all while its technological leadership drip-drip-drips away.

BY STEVEN LEVY

It's also common knowledge that as Apple gets bigger, older, and richer, it more and more resembles Big Blue, the faceless, white-shirted mob that dominates the industry from its headquarters in New York. Apple hires executives who worked at IBM, and it cultivates a sheen of blandness to court corporate minions who kneejerk their buying decisions in the direction of Armonk.

This tendency on Apple's part has always been disturbing because IBM still stands as a symbol of the

> days when computers lived in air-conditioned fortresses and not on people's desktops. IBM believed that computers should be handled only by a high priesthood that Knows More Than You Do. It kept the productivity, not to mention the joy, of computing away from those who could mightily benefit from it. If IBM had its way, we'd

still be handing stacks of punched cards to pocket-pencil geeks.

IBM may tempt us with a good product or two (for its time, the IBM PC was quite a nice piece of machinery), but ultimately it shows its true loathsome face with something like the PC Junior or the hideous Presentation Manager, thus revealing that IBM never *got it* in the way Apple did so effortlessly. Computers are all about transcending limitations, and IBM is all about limiting computers (continues)

for its own dark corporate purposes. If it were in the company's own interests, IBM would bend our heads, spindle our best efforts, mutilate our hopes.

We know what IBM stands for. And just in case we forgot, IBM's chairman, John F. Akers, recently sent out a missive reminding his wingtipped warriors, exactly what Big Blue is and has always been about. According to several newspaper accounts, Akers wrote:

"IBM exists to provide a return to its shareholders... These facts of business life are as plain now as they were more than 45 years ago when Thomas J. Watson Sr. reminded people of them, saying, 'It becomes increasingly apparent in my small sphere of observation, and I conclude the company as a whole, that the average IBM'er has lost sight of the reasons for its company's existence. IBM exists to provide a return on invested capital to the stockholders.'

No wide-eyed rap about technology empowering people. No politically correct, technologically hip college teacher pep-talking students about a new Industrial Revolution with a chicken in every pot and a mouse on every desk. No promise to deliver cool product. We're IBM, baby, and the bottom line is the bottom line.

#### The Mission

Apple Computer, of course, is a profitmaking enterprise, too, and I wouldn't have it any other way. But from the first, it seemed to hold a promise that this was capitalism with a human

> As Apple gets bigger, older, and richer, it more and more resembles Big Blue, the faceless, white-shirted mob that dominates the industry

face—that little smiley guy who tells you, "Welcome to Macintosh." Apple was a company with vision, a company with a mission. It was going to make life better. It was going to make computers for the rest of us.

What did they mean by "the rest of us"? The people who hate IBM.

It was a mission that inspired passion. Apple led a revolution in personal computing—a big glorious gob of spit in IBM's face. When Apple made its stand, in the glory days, everything changed. Ask the people who worked for Apple in its first decade—were they knocking themselves silly for 90 hours a week to provide a return for stockholders? Suggest that concept to them and they would regard you as a kitchen cockroach, suitable for stomping (continues)



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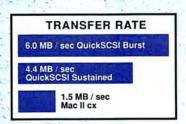
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upon and nothing more. They wanted to change the world.

Not everyone at Apple bought the mission whole hog. But enough Apple workers did to make the company something special, not only to its workers but also to its customers. To those of us who believed in the mission, Apple Computer meant something. We paid a price for it.

The czars at Apple, from Jobs to Sculley, knew the blindness of our devotion and milked it for all it was worth. They tested our patience. They charged too much for their products, they hoarded their sometimes questionably begotten software licenses, they acted in too many ways like the very companies they said they were different from. But we hung on, through overpriced computers, faulty power supplies, hubris-laden boardrooms, and nonexistent notebook computers. We continued to keep the faith, even when Apple's leaders didn't. We were buckled in for the whole ride.

Our continuing loyalty was based on two factors, intertwined like the bushes on the graves of Tristram and Isolde: Apple's products, by and large, were great. And no matter what else was wrong with the company, Apple Computer was not IBM.

Although often distracted by executive misdirection, Apple never really forgot that besides making money, there was a mission at stake. You could see this in its products, which more often than not displayed a useful amiability, and you could see this in the spirit of its employees, most of whom realized that the best part of working at Apple was participating in the mission.

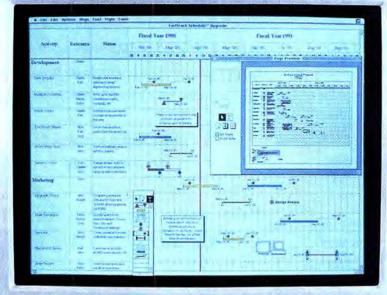
Apple knew that not being IBM was one of its prize assets, and the company sang that song from the rooftops. Apple ran commercials showing IBM customers walking off cliffs in their three-piece suits. Lemmings, I believe Apple called those Blueheads. Then it ran commercials of people frustrated with their IBM

PCs and bashing the things, in one case even taking a chain saw to the beast. At Macworld Expo, stockholder meetings, and random pep rallies, wherever Apple screened these promos, people stood up and cheered. For one sales meeting, Apple even hired the guy who sang "Ghostbusters" to redo the song, only this time the who-you-gonna-call were the "Bluebusters."

No matter how bad things got—with Apple suing just about everyone in sight for allegedly appropriating its interface, and with System 7 late, a Portable that sucked fish, the whole Macintosh development team in exile, and the corporate staff at Apple looking like an outtake from a Leni Riefenstahl movie—we still had one important thing to fall back on. It wasn't IBM. Envisioned geographically, there was the continent of Apple and the continent of IBM, and between them a gulf that would never be crossed.

(continues)

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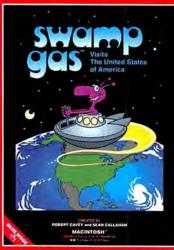
ThunderWorks is System 7 compatible. LightningScan 400 runs on all Macs. LightningScan Compact runs on Macintosh Classic, 5E/30, 5E with SuperDrive, and Portable. LightningScan, Pro 256 requires a Macintosh II, LC, or SE/30, four Mb suggested. LightningScan, SnapGuide, ThunderWorks, Thunderwore and its logo are registered trademarks of Thunderware, Inc. Macintosh and SuperDrive are trademarks of Apple Computer, Inc. © 1991, Thunderware, Inc. All rights reserved.

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#### The Betrayal

That's all over now. The Bluebuster T-shirts apparently have been stuffed into garbage bags and shuttled off to Goodwill. John Sculley and his white-bread lieutenants have huddled with the former forces of evil and emerged with an agreement that spells the end of an era.

Read it and weep, those of you who believed the dream: Apple and IBM are forming a joint venture to create the next generation of operating system, successor to the Macintosh. They may even sell each other's products. This is something that Nostradamus might have predicted as a sign of the apocalypse, the lion lying down with the lamb and all. But there it is.

Apple Computer can no longer lay claim to its aura of specialness—that quality was left in some conference room in Armonk, destined to spend eternity in the lost-and-found of good intentions. Bill Gates got it right when he said, "What's left? Apple has sold off its birthright... and that's sad."

Gates, of course, is the odd man out in this alliance, which was presumably motivated in part to fight Microsoft's increasing power in the personal computer industry. But he speaks the truth. The agreement is not only the biggest betrayal of its loyal customers in all Apple history, but also a signal that one of the pillars, if not the major pillar, of Apple's mission is hereby toppled. Apple can no longer say that it's not like IBM. Because in an essential way, it now is IBM.

Some industry analysts are applauding the agreement, saying that the strategic alliance will work for both companies. Others are warning that Apple may be lured into making a deal that ultimately will not serve its interests. Anyone with brains is wondering how the two company cultures will mesh. But at this point, I don't care about whether the deal works or doesn't work—the soul of Apple is no more.

What will Apple stand for if its products become interchangeable with those of IBM? What were the lords of Apple thinking to even consider this? Don't they understand

that Apple, despite its inclusion in the fraternity of corporate giants, still retains some of its sheen precisely because it stands as an alternative to the mind-numbing dominance of IBM? And that entering into a partnership with IBM on such critical matters is no less than a blood betrayal of the faithful? Down through the years, Apple's mission has eroded, but this is different—it means that there's no mission at all. It's Chinatown, Jake—let's get out of bere.

#### **Orwell Redux**

Remember Apple's great commercial introducing the Macintosh (another IBM-bashing spot, by the way), where the agents of repression were de-

Apple led a revolution—
a big glorious gob
of spit in IBM's face....
A partnership with
IBM is a blood betrayal
of the faithful.

stroyed by superior interfaces and we were promised that "1984 won't be like 1984"? If you reread the book that made that annum so notorious, you will find that the fictional world therein has three large nationalities, each of which is always at war with one and allied with another. The opposing nation is always referred to as a demonic, horrible, subhuman force that deserves no less than total destruction. But then, with no warning or explanation, that war is called off, and a new war initiated with the third entity. This new opponent is referred to with the same dehumanizing cant. And the country that for years had been considered a satanic blight on humanity? Suddenly, our ally!

And that is why 1991 looks like 1984. Apple, please—say it ain't so!

Macworld columnist Steven Levy is writing a book on artificial life.

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hen it comes to selecting the right scanner, be forewarned. V There is a difference you can see in black and white. And color. Just look at this comparison between the La Cie Silverscanner and the Microtek 300ZS. Both images were scanned at default settings with no corrections. This entire ad was then created and separated using Adobe Photoshop, Quark XPress 3.0 and a Linotronic 330.

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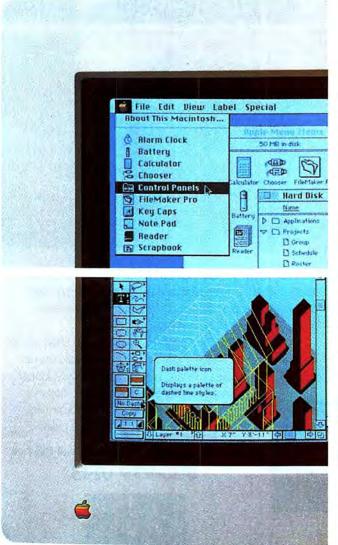
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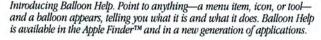
number above the coupon. But if you'd like a reminder of what System 7 is all about, please read on.

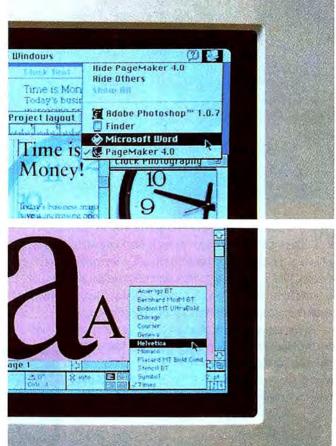
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That's what System 7 brings to your Macintosh. As soon as you install it, you'll enjoy an array of new capabilities, and be ready for a new generation of software. And since System 7 runs virtually all current applications, you'll enjoy its benefits without giving up a thing.

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With TrueType, even the largest letters display perfectly on the screen, with no jaggy, "staircase" edges. You also get terrific printed output with almost any kind of printer. And System 7 is compatible with the fonts you already have.

# the Macintosh on your desk.

We've also made Macintosh easier to use. For instance, take a look at Apple Balloon Help, our new on-line help feature. Point to an item on the screen, and a balloon pops up next to it, telling you what it's for. So applications are quicker to learn, and easier to make the most of.

#### Everything gets smoother and simpler.

With System 7, there's a big improvement in big type. Thanks to Apple's TrueType" font technology, you get perfectly smooth letters on the screen, no matter what their size, along with more professional-looking output. And you don't need the Font/DA Mover. To install TrueType fonts, just drag their icons into the System Folder. (Ditto for desk accessories.)

Open an application. Work. Save. Quit. Open another application. Until now, that's how you've probably moved from, say, a word processing program to a spreadsheet. With improved multitasking, you can keep several applications open at once, and choose between them with a mouse click. So you don't have to stop what you're doing to print, search for files, duplicate files, or share data.

Using applications simultaneously can demand lots of memory, but with System 7 you aren't likely to see a not-enough-memory message. Because there's virtual memory.\* When you need extra memory, just tell System 7 to use the spare room on your hard disk. Your Macintosh will work without interruption, and so will you.

#### See what's developing.

System 7 gives developers a far-reaching new set of tools, enabling them to offer applications that do new things for you. For example, to the fame and success of cut and paste, we've added publish and subscribe. Change something in one document, and it can change—automatically—in every document where it appears. Even if the documents are in different applications or on different computers across a network.

System 7 also enables any Macintosh on a network to share documents and applications with any other.

We could go on. But the main point is really this:

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To run System 7, all you need is 2 megabytes of memory and a hard disk. (If you don't have enough memory, you can purchase it from your authorized Apple reseller.)

System 7 sets new standards in personal computing, and so does the way Apple brings it to you. To make installation simple and sure, your System 7 Personal Upgrade Kit\*\* comes with everything you need—disks, manuals, and 90 days of telephone upgrade assistance. Yet your System 7 Personal Upgrade Kit costs only \$99 (plus shipping and handling).†

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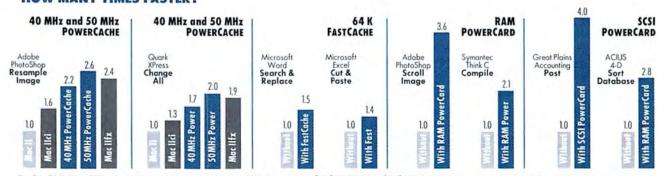
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#### **HOW MANY TIMES FASTER?**





# Electromagnetic Update

THE CONTROVERSY—AND RESEARCH—CONTINUES

BY DEBORAH BRANSCUM

hile the computer industry has moved fairly quickly to respond to consumer concerns about low-level electromagnetic fields (see "Seeking ELF Relief," this issue), there's still more controversy than consensus in the scientific debate about

whether such fields are harmful. Three recent studies fail to settle the debate, and add more questions.

Conducted by the University of Southern California, a soon-to-be-published epidemiological study of 232 childhood leukemia cases and 232 controls shows a link between leukemia and household-wiring configurations. That link confirms the observations of two earlier studies done in Colorado. But unlike the earlier work, USC's study, overseen by Dr. John Peters, also measured electric and magnetic fields in various areas inside and outside each home, and measured magnetic fields for at least 24 hours in each child's sleeping area.

Wiring configurations—which refer to the relationship between the number, capacity, and distance of power lines to houses—had been thought to represent electromagnetic field strengths within particular homes. If that were true, researchers who found a relationship between wiring configurations and leukemia risk should find a correlation between actual household measurements of electromagnetic fields and leukemia risk as well. But according to a summary of the USC study, the research



data "offer no support for a relationship between measured electric field exposure and leukemia risk, little support for a relationship between measured magnetic field exposure and leukemia risk, some support for a relationship between wiring configuration and leukemia risk, and considerable support for a relationship between children's electrical appliance use and leukemia risk."

(The electrical appliance risk referred to involved the use of hair dryers and black-and-white TVs among a small number of children. No one knows if the short-term, very high exposure of children to the fields from these appliances is actually responsible for the observed risk.)

There is no one explanation for the puzzling results of the USC study.

> The Palo Alto, California-based Electric Power Research Institute (EPRI) is a power-utilitysponsored research organizathat spending some \$9 million this vear on studies in this area, including USC's. Dr. Stanley Sussman of EPRI suggests several possible explanations for the study's find-

ings: (1) that the field measurements weren't taken over a long enough period to be meaningful; (2) that the critical element linking electromagnetic fields and leukemia risk wasn't registered by the measurements; (3) that wiring configurations don't represent electromagnetic fields but some other element such as traffic patterns or housing density that somehow contribute to an increased risk for leukemia; or (4) that a design flaw in the study suggests a false as-(continues)

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27811 Avenue Hopkins, Suite 6 Valencia, CA 91355 • (805) 257-1797 sociation between wiring codes and leukemia risk.

The questions raised by the USC study are more urgent than ever in the wake of a report released in June by the National Cancer Institute (NCI) in Bethesda, Maryland. Some scientists argue that if electromagnetic emissions affect leukemia risk, there should be an increase in cases. The NCI report shows an overall increase of 4.1 percent in cancer rates among white children age 14 and younger between 1973 and 1988.

Even with the increase, the total numbers are still quite small. The same NCI report shows that the rates of acute lymphocytic leukemia, the most common childhood cancer, increased between 1978 and 1988 by more than 10 percent, to 3.2 cases per 100,000 from 2.9 cases. Brain tumors, the second most common childhood cancer, were up more than 30 percent, to 3.3 cases per 100,000 from 2.5 cases.

Another recent study made headlines in March, when *The New England Journal of Medicine* published the results of a National Institute for Occupational Safety and Health (NIOSH) epidemiological study comparing pregnant telephone operators who used computers with pregnant telephone operators who used lightemitting diode or neon-glow tube displays. The study found no relationship between miscarriages and the number of hours worked at a computer terminal.

Many have interpreted these results to mean that low-level electromagnetic fields have no adverse reproductive effects, but critics of that interpretation point out that the abdomens of the women in the control group and of the women using the computer terminals were exposed to about the same level of extremely-lowfrequency (ELF) magnetic fields. I asked Dr. Teresa Schnorr, who led the research team, about the ELF-field aspect at an April meeting of the Electromagnetic Energy Policy Alliance (EEPA) in Alexandria, Virignia. She told me her study was designed to look at whether computer-terminal technology itself-not ELF electromagnetic fields-had any adverse effect on pregnancies. The NIOSH study was not an "ELF pregnancy study," said

#### SERVICE HERO

dward Berland of Santa Rosa, California, writes that when he had problems with his Microtek 300Z scanner, the company "made every effort to correct those problems over the telephone," walking him through diagnostics. When that failed, Berland returned the scanner for repair, twice. When it became apparent the scanner was still faulty, Microtek sent Berland a new scanner at no charge-even though the unit was out of warranty. Berland writes that he remains loyal to Microtek because the company "made a bad experience into a good one."

Dr. Schnorr, who suggested that researchers concerned about ELF exposures might want to look at other populations. At least one such study is under way.

#### **Differing Views**

Not everyone agrees that more research into the potential health effects of electromagnetic fields is good or necessary. In a paper published this year in Physical Review A, Yale physicist Dr. Robert Adair is blunt: "There are very good reasons to believe that weak ELF fields can have no significant biological effect at the cell leveland no strong reason to believe otherwise." Adair and others argue that the electromagnetic fields emitted by personal computers, power lines, and other devices are so much weaker than electric and magnetic fields created in the body itself that significant health effects are impossible.

The Food and Drug Administration (FDA), which is responsible for regulating devices that generate both ionizing and nonionizing radiation, such as ELF fields, responds mildly by pointing out that "there's no real agreement within the physical science community."

"Others in physics say you are ignoring the fact that the biological system may be able to receive this (continues)

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energy as an informational signal," said Dr. Mays Swicord, chief of the radiation biology branch of the division of life sciences of the FDA. "What is being put in is not random energy but 60Hz sine waves; therefore, the cell is not saying 'I am seeing a bunch of random energy,' but 'I see a specific signal and I am receiving that."

Swicord feels "very certain there

are biological effects from ELF fields; the question that remains in my mind is at what level, at what threshold are the effects triggered." (It's a critical question. Some argue that electromagnetic fields may not follow the traditional pattern that greater exposure means greater harm at all. One possibility is that exposure to high-intensity fields may

be less harmful than exposure to some lower intensity that is frequently interrupted.)

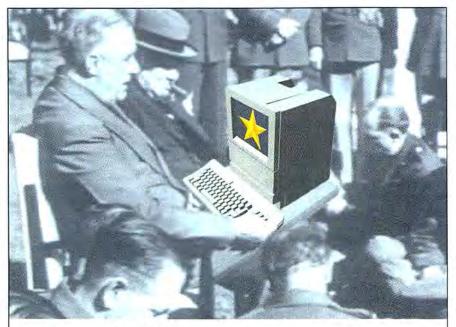
In any case, there's a considerable difference between demonstrating that ELF fields affect cells and that cell changes actually lead to adverse health effects such as cancer. Scientists agree that if there is any adverse health risk from electromagnetic fields, it is small. But even a very small risk to individuals may affect a large number of people because electromagnetic fields are a ubiquitous part of modern life.

So despite the critics, several hundred scientists in the United States are exploring how electromagnetic fields may affect cells and perhaps promote cancer. The FDA, for example, is "looking at two in vitro systems—one looking at gene expression and one looking at calcium-efflux changes," according to Dr. F. Alan Andersen, acting director of the FDA's Center for Science and Technology. The FDA will be involved in a replication of the so-called Project Henhouse study, examining the effect of magnetic fields on chick embryos. The replication of the earlier study should be welcome to many because biological experiments thus far lack the "reproducibility, replication, and robustness" that physicists rightfully demand, according to Dr. Swicord.

#### National Research Agenda Needed

Officials at NIOSH held a meeting in January to help establish a national research agenda, concentrating on workplace exposure. Epidemiologists at the workshop in Cincinnati agreed that female breast cancer, leukemia, brain tumors, and lymphoma were important areas for future research involving electromagnetic fields. Female breast cancer was added in the wake of a third report showing an excess of male breast cancer among workers exposed to electromagnetic fields, according to VDT News. Several industry groups, including the EEPA and a group of electric-utility companies, are pushing for their own versions of a national research agenda.

Late last year Apple Computer asked the National Academy of Sciences for a nationally coordinated (continues)



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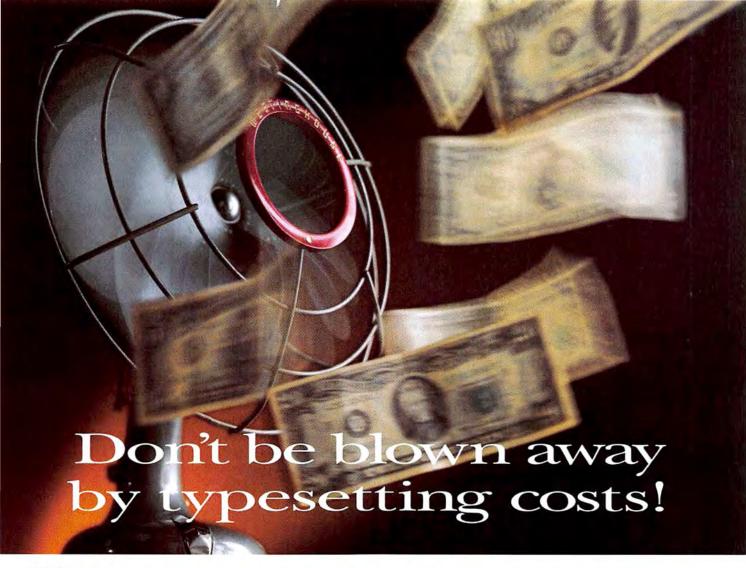
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#### CONSPICUOUS CONSUMER

study program "which can inform development of design and usage standards for a wide range of exposure conditions." Apple offered to provide financial assistance and other types of support. The academy approved the proposal but added a hook: "The governing board wanted the study to be done without appearance of conflict of interest or bias," said Dr. Charles Edington, director of the Board on Radiation Effects Research of the National Academy of Sciences. "Normally, 50 percent or more of the funds come from govern-ment; 49 percent or less from private funds. This time, no private funds will be accepted." The result has been no study. "We have been unable to obtain funds from the federal government," said Dr. Edington. "We can't move without funding."

#### What to Do?

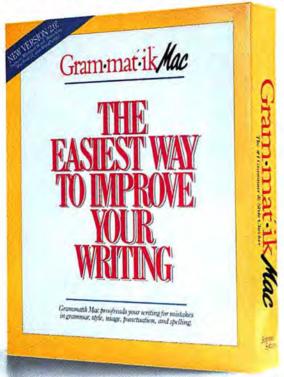
In the absence of scientific agreement on the issue, many wonder how to respond to the potential threat of health hazards from low-frequency electromagnetic fields. An Office of Technology Assessment report suggests taking a "prudent avoidance" strategy to minimize any potential risk. For computer users, such measures include sitting at arm's length from a monitor and moving away from the back and sides of coworkers' machines. The EEPA calls prudent avoidance an abandonment of science, but it's an approach several companies, including CBS News and the Boston Globe, are taking.

It will be many years before the question of whether electromagnetic fields are harmful is answered. If you want to help speed the process, lobby government officials to fund needed research. In the meantime, sit back from your computer, but don't become obsessed by it. Stress isn't a healthy response.

(Research assistance by Carolyn Bickford.)

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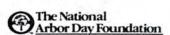
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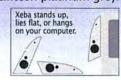
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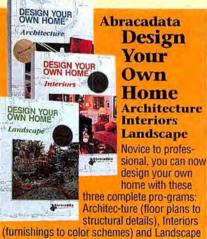




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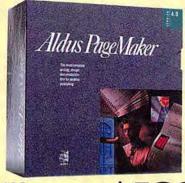
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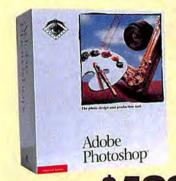
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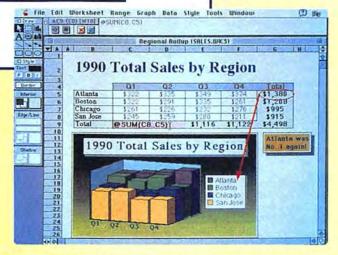
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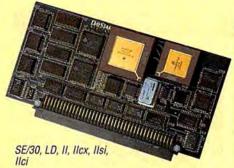
ViVa offers the latest modem technology capable of meeting today's communication standards. With data compression, error control, leased line support and automatic functions, it provides reliable performance

under the most demanding conditions.

24 FX(2400bps w/send Fax) .. \$159 9642E(9600 Fax/Modem) .....\$479

# Placed Between 9pm to 7am E.T. More at the Zone





# Universal Power Cache

The new PowerCache is even faster and fits most Macs, just change the adapter board. Completely universal. Uses the proven 030 processor for 100% compatibility with System 7 and AU/X and others. Get unparalleled performance at 25, 40 or 50 MHz.

# Total Systems Gemini 030 20 MHZ with FPU



Gemini transforms your Mac 128, 512, Plus or SE into a IIci-stomper. Virtual™ is free! Installation is easy. Even use your existing 256K and 1Mb SIMMs. Plugs into SE slot. #03633

#### ACCELERATOR CARDS

	OIL CARDS
Applied Engineering           Macintosh IIci           00289 Cache-In (IIci Cache Card)         194           04071 Cache-In 50 Mhz         1599           Macintosh LC         139           04120 Fast Math LC         269           Macintosh IIsi         269           00831 QuickSilver IIsi Cache Card         269           Daystar Digital         278           02877 Fast Cache IIci (64K)         309           Macintosh II         03729 SCSI Powercard w/o SIMMS         1199           03730 Ram Powercard w/o SIMMS         749           Macintosh II, IIcx, IIsi         1199           Macintosh II         1199           Macintosh II         1199           Macintosh II	Sigma         00215       Sigma Double-Up Board       167         Total Systems         Mac Plus , 512, 128       00036       Mercury 030 16Mhz       499         00034       Mercury 030 16Mhz w/Fpu       549         00048       Mercury SCSI Module       199         02902       Gemini 030 20Mhz       849         03633       Gemini 030 25Mhz       995         02903       Gemini 030 25Mhz       995         03634       Gemini 030 25Mhz W/Fpu       1,275         00045       Gemini II 030 33Mhz       1,299         03635       Gemini II 030 33Mhz       1,599         00047       Gemini II 030 40Mhz       1,499         03752       Gemini II 030 40Mhz       1,899         02899       Gemkit (Us Version)       125         Mac SE       00043       Mercury 030 16Mhz       388         00041       Mercury 030 16Mhz w/FPU       428         00049       Mercury Ram Module       245

### Applied Engineering QuickSilver

**\$269** 

QuickSilver gives your IIsi a slot extender, cache card and math-coprocessor. The extender enables cards created for the SE/30 to fit neatly inside the IIse case. It provides quicker screen refresh, scrolling and image manipulation, and greatly increases the speed of mathintensive applications. Five-year warranty. #00833



#### Mass Micro STIGE DataPak 88

Voted best by industry critics, it's still the first family of removable cartridge drives. 88 Mb on each cartridge adds capacity and backup to your valuable data. Actually faster than many fixed hard drives. Has PadLok utility and DiskDoubler software. #04062

#### HARD DRIVES

CD Tec	hnologies	
03767	Porta Drive CD-ROM	648
Datace	1	
00405	52 Mb Qlps External	399
	52 Mb Qlps Internal (Classic)	
04693	52 Mb Qlps Internal (NuBus)	299
	105 Mb Q External	
	170 Mb Q External	
new	210 Mb Q External	.1049
Everex	Systems	
03831	EMAC 20mb Impact	199
02161	EMAC 150 Tape Backup Drive	715
	EMAC 60T Tape Backup Drive	
IDS Liv	ringstone Tech	
00144	20Mb Clipper	369
00037	40 Mb Pro Drive	349
	80 Mb ProDrive	
00170	50Mb Wip Drive	439
00171	100Mb Qlps Wip Drive	649
00802	45 Mb Syquest Removable	589

#### La Cie Limited

LIIIIIEU
Tsunami 52 Mb Hd Qlps 699
Tsunami 105 Mb Q Lps929
Tsunami 170 Mb Hd Q1,225
Tsunami 210 Mb Hd Q1,325
La Cie Silverlining V 5.28149
gend
45 Mb Removable539
Microsystems
DataPak 45 Mb Removable 689
DataPak CX 45Mb Removable 749
105 Mb Q External699
Turbo 250 Mb External 1699
Turbo 600 Mb External2,595
1.2 GB External4,149
Infinity 40/40 Turbo Removable 1,399
Infinity 88 Turbo Removable 1,299
Infinity Optical 600 Mb3,794
CD-Rom Drive699
e

03807 45 Mb Syquest Removable ....... 549

# \$699



#### **Infinity 40 Removable**

Uses PLI's supercharged driver software to attain 20ms access time! Gives you infinite storage potential with removable cartridges. Each holds 44Mb. #02181

PLI Quick SCSI A simple, powerful way to solve SCSI port bottleneck. Lets your hard drive work at maximum speed. #00811





### Welcome to the If you have one computer

#### MAC - PC CONNECTIVITY

On Technology Instant Update V1.02

Instant management, instant productivity, instant changes: you get it all with Instant Update, It's the software that helps you create documents you need to develop in a group setting where everyone can contribute their expertise in an on-going process. #04048



Datav		
00039	Maclink Plus Pc 5.0 W/ Cable 1	28
	Maclink Translators	
Davna	Communications Inc	
	Dayna Dos Mounter 2.0	53
02609	Daynafile 360K 5.25" Drive 4	45
02612	Daynafile 1.44Mg 3.5" Drive 5	95
00320	Daynafile li 1.44 Mb Hd 5.25 4	35
00318	Daynafile li 360K Ld 5.25 4	
02615		
02616	Daynafile Dual 1.2Mg/1.44Mg Dr 8	04
02613	Daynafile Dual 360K/1.2Mg Driv . 6	49
Daysta	r Digita	
02215	LT200 MC Localtalk Board 2	95
02214	LT 200 PC Localtalk Board 1	85
FGM, I	Inc.	
00809	Picture This	64
Insigna	a Solutions	
	Soft Pc - Portable2	44
03664	Access Pc	61

Great

Value

03982	Soft PC Classic	125
03282	Soft PC Ega/At (Need 2506)	124
02506	Soft PC 1.3	241
Orange	Micro	
00000	xxxx	000
Sitka/T	ops	
01677	Tops Flashcard (Dos)	195
03364	Tops 3.0 Network Dos 3.5"	149
03363	Tops 3.0 Network Dos 5.25"	149
Traveli	ing Software	
03975	Laplink Mac III 3.2	92
	r, Richer, Quinn	
	Reflection 3 +	360
	Λ. Λ	



Argosy Run PC

Connect your Mac to an IBM PC compatible and run virtually any DOS program full speed in a Mac window while controlling it with the Mac. Includes Software Bridge/Mac for document translation.



#### Microtek TrueLaser Printer Tomorrow's printer-today, TrueLaser is the first laser printer that's fully PostScript, Truelmage, and PCL compatible. It's also the first to come bundled with 35 resident TrueType fonts. You get faster printing and even auto-switching between interfaces. Six month on-site service. #04047

#### Nuvotech **Nuvolink SC T** Plug the NuvoLink SC T into your Mac SCSI port and connect to an Ethernet LAN! It includes AppleLAP manager, an Ethernet compatible drive, installation software and statistical and diagnostic software for effective management. #00284 **Your Choice:** Extraordinary Price! Nuvotech **Nuvolink SC**

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#03115

# LAN Zone of Connectivity or ten, we have your solutions



Farallon Timbuktu 4.0

Timbuktu is a versatile network application that allows you to observe or control another Macintosh over any AppleTalk network. It provides clipboard exchange and full background file transfer. This new version of the Eddy Awardwinning software now supports color. #00420



The Mac Jone Established 1986

Star Controller PN-507

# \$1399

The StarController EN repeats
Ethernet signals over 12 ports
and monitors network traffic
and error rates. It supports a
variety of Ethernet devices
from PCs to VAX minicomputers. It continuously
checks the connection to each
device, shutting off unused
ports to prevent disruptive

signal error. #03333

#00829 PhoneNET StarController Series 300 ......\$799

#### LAN Accessories

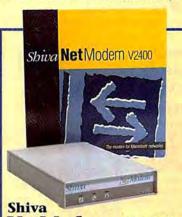
Farallon	Nuvotech
03474 Farallon Portable Pak       328         00199 Te-447 Rj-45 Patch Panel       199         00826 Phonenet To Appletalk Adapter       8         00831 Repeater       309         00955 Phonenet - Db-9       34         03475 Star Connector En Pn 501       120         00828 Phonenet Din 8 (10 Pk) Pn 310       197         02751 Star Connector (10Pk) Pn311       125         00832 Phonenet - Din-8       32	01226 Turbo Net To Appletalk Adapter       6         01929 Turbo Net St - Db-9       29         01918 Turbo Net St - Din-8       29         03341 Turbo Net St 12 Pack Din-8       278         01225 Turbo Net - Db-9       19         03340 Turbo Net 12 Pack Din-8       198         01224 Turbo Net - Din-8       19         Sitka Tops
00032 T HOHERET - DIN-0	02223 Teleconnector - Din-822

#### ETHERNET CARDS, MODEMS, CONTROLLERS

Asante
03648 Mac Con SE E269
Macintosh IIsi & SE/30 Thick/Thin
03647 Mac Con + 30iE 64304
00020 Mac Con+ 30iE269
04031 MC + 30iE/Radius269
00228 Mac Con + 30iE 64K Ram304
00820 Mac Con + 30iE MC 64k Ram 399
Macintosh IIsi & SE /30 Thick/10 Base T
00228 Mac Con + 30i ET 64304
03646 Mac Con+ 30i Et
04030 MC + 30iET/Radius269
Macintosh II Family
03642 Maccon + II ET 64304
03641 Maccon + II E269 Macintosh LC
00324 Mac Con + LC MC 379
00029 Mac Con+ LC E&T269 00325 FNLC 10T269
10 Base T External Products
03885 10 Base T Hub699
03945 10T Mau99
Cauman Suctoms
00181 Gator Box CS 1955
Gator Box CS -T1995
03117 Gator Card E/II (IISeries)
Gator Card E/Si MC447
Dayna Communications Inc
03547 DaynaPort E/SE264
00805 DaynaPort IIsi264
03549 DaynaPort E/30264
03548 DavnaPort E/II264

00806 00805 00003 03546	DaynaPort E/LC	264 348
Dove C 02530	Computer Corp Ethernet Fastnet SE	340
02531 02532 <b>Farall</b> o	Ethernet Fastnet SE/30 Ethernet Fastnet III	340
	Star Controller PN 507	200
00829		
03902	Farallon Ethernet Mac II Card	200
03901	Farallon Ethernet SE/30 Card	
Nuvote		
02184	Turbo Bridge	318
03121	Turbo Star	
03119	Nuvolink II	
00284	Nuvolink Sc-T	369
03115	Nuvolink Sc	369
Shiva		
01406	Shiva Netserial	274
02701	Etherport SE	350
02702	Etherport SE/30	350
02542	Shiva Telebridge	408
02700	Etherport II	350
02985	Ethergate	1295
01615	Shiva Netmodem V2400	.338
03251	Shiva Netmodem V.32 96001	1165
	Shiva Netmodem/E	749
02685	Fast Path IV	885
04038	Fast Path V (thick/thin)	1899
	Fast Path V (10 base T)	1899

Davna Communications, Inc.



NetModem \$ V2400

This 2400-baud modem can be shared by Macs and PCs on the AppleTalk network. It plugs in anywhere along the network and needs only a single phone line. It also has Dial-in support so you can use the AppleTalk network from a remote location. #01615



#### Texas Instruments MicroLaser PS 17

MicroLaser PS 17 is the solution for the entrylevel desktop publisher. It combines features of the standard MicroLaser plus Adobe PostScript language with 17 built-in, scalable PS fonts. The MicroLaser control panel makes the printer extremely user-friendly. #04096



# Our back to school advice

Use it each day to make a Grade A

#### FOREIGN LANGUAGE

Hyperg	lot	
03749	Japanese Kanjimaster	98
03737	Spanish Word Torture	34
03750	Japanese Easy Kana	128
03741	French Word Torture	34
03745	German Word Torture	34
03740	Spanish Pronunciatio	34
03739	Spanish Tense Tutor	41
03738	Spanish Verb Tutor	38
03742	French Pronunciation	34
03893	Learn Spanish CD Rom	60
03892	Learn French CD Rom	60
03743	French Verb Tutor	38
03732	Russian Word Torture	34
03733	Intro To Russian	28
03746	German Pronunciation	34
03735	Russian Noun Tutor	58
03748	Italian Word Torture	34
	03749 03737 03750 03741 03745 03740 03738 03742 03893 03744 03744 03747 03732 03733 03746 03735	Hyperglot 03749 Japanese Kanjimaster 03737 Spanish Word Torture 03750 Japanese Easy Kana 03741 French Word Torture 03745 German Word Torture 03740 Spanish Pronunciatio 03739 Spanish Pronunciatio 03738 Spanish Verb Tutor 03742 French Pronunciation 03893 Learn Spanish CD Rom 03893 Learn Spanish CD Rom 03743 French Verb Tutor 03744 French Tense Tutor 03747 German Verb Tutor 03732 Russian Word Torture 03733 Intro To Russian 03746 German Pronunciation 03735 Russian Noun Tutor 03748 Italian Word Torture

03734 Russian Verbal Aspect ......41

FRENCH

WITH

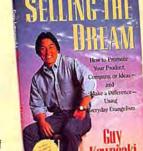
IGNDO2



#### Microsoft Word 4.0

The word processing program that has a range of features to keep pace with the most demanding professional, yet easy for novices to use. New: WYSIWYG editing display, enhanced table support, more page layout features, enhanced

customizability. #02238



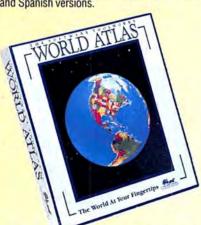
#### **Harper Collins** Selling the Dream

Guy Kawasaki's latest book presents a new approach to selling: how to turn your customers to converts. It includes the original Macintosh Product Introduction Plan and how it served as the foundation of one of the century's greatest marketing successes: the Macintosh personal computer. #04068

#### Hyperglot French Survival Manual

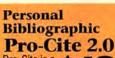
An electronic phrase book divided into topics of interest to travellers. Each con-

tains about 25 recorded phrases by native speakers plus other study guides. With a MacRecorder, you can record your own voice and then compare pronunciation. Also German and Spanish versions.



#### **Electronic Arts World Atlas**

Bring the globe to your computer screen. Includes world atlas, almanac and world fact book with instant access to over 240 EGA/VGA color maps and database of international information. #03589



powerful database enabling you to manage and format bibliographic and text

information automatically. Latest version offers new features including instant searching, expanded word processing and increased record capacity, #01892

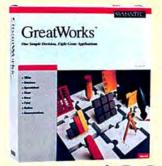
### Pro-Search \$139

Pro-Search is a specialized front-end software program that simplifies searching of DIALOG databases. It's unique, menudriven interface helps you select the most useful database to search



#### Biblio-Links Biblio-Links are companion

programs to Pro-Cite. Each transfers records downloaded from online services, CD-ROM and disk-based data directly to Pro-Cite. You can merge with existing databases or store in a Pro-



#### Symantec **Great Works**

New Great Works offers eight feature-rich applications in a single, easy-to-use integrated program. Get full word processing, database, spreadsheet, charting, drawing, painting, outlining and communications modules. Includes a 100,000 word spell checker and 660,000 word thesaurus. .#04032

# TopWriting Tools A Lasting Impression

03103	Resume Expert	47
03243	Resume Xprt - Cover Letters	47
Caere		
00120	Omnidraft-Mac	79
02158	Omnipage 2.1	494
00418	Omniproof	104
00419	Omnispell	68
03659	The Typist	478
Claris		
02485	Macwrite Ii V1.1	138
	oft Corporation	
	Microsoft Word 4.0	244
OCR S	ystems, Inc	
00461	ReadRight For Macintosh	329
Parann	on Courseware	
03479	Nisus 3.05	244
01473	Qued-M	85
	erfect Corporation	
	Wordperfect 2.01 Upgrade	99
03972	Wordperfect 2.01	278
		0

# will Energize your Mac

#### with these Great Products from the Zone



**Mass Micro Sytstems** QuickImage 24 Video Frame Grabber

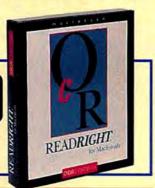
Super

The QuickImage 24 Video Frame Grabber captures 24 bit color or 8 bit gray scale images from full motion

video. It fits in a single NuBus slot and does auto switchintg between NTSC and PAL signals. A PhotoShop plug-in allows users to capture images directly into Adobe Photoshop. Now with PhotoShop Limited, while supplies last. #00180

#### **OCR Systems** ReadRight MAC

With ReadRight and a full-page scanner you can easily and efficiently convert paper documents into editable computer text files. Recognizing with 99.9% accuracy, it automatically separates text from graphics and outputs text directly to software programs. #00461



#### **S**CANNERS

Abaton	Technology Corp
	Scanner 300/GS (8 Bit -
256 Gr	1,495
Animas	5
00149	True Color Hand Scanner575
Dest	
03929	Dest Scanner W/Recognize OCR . 685
Logited	ch
02561	Scanman 32w/Digital Darkrm 298
Microto	ek
04047	True Laser Printer 1,699
The Co	mplete PC
03231	Half-Page Scanner294
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Thunde	erware
01242	Thunderscan Plus198
02212	Thunderware Lightning Scan 400 384
	Lightning Compact279

#### Monitors

Established 1986

The

E-Machines - Color Systems for Mac II	
03919 T16 8-Bit19	95
00205 T-19 24-Bit39	99
02414 TX-16 24 Bit36	95
03920 T16/XL2429	99
03921 TX16 8-bit IIsi26	99
04105 Colorpage E-1611	49
Megagraphics Macintosh LC/II/SE30/SE	
Rival 19 Mono Monitor1,1	99
Microtek	
04122 14" Color (1280 X1024)5	69
Sigma	
03859 Silverview MacII18	50
Macintosh LC/II/SE30/SE	
Pageview Monitor8	50
MultiMode13	99



Caere The Typist

Typist, personal scanner for the Mac, gives you all the power of a small typing pool right at your desk. Scan rows of

800 Now Open

numbers directly into your spreadsheet, or columns of text to your word processor. It handles virtually any font or font size. #03659

#### Logitech Scanman 32 and Digital Darkroom An extra-value offer from Logitech and Silicon Beach/Aldus: buy ScanMan Model 32 and get Digital Darkroom (list \$499) absolutely FREE! ScanMan offers easy scanning and excellent

results. With its software you can scan directly into Digital Darkroom which offers a wide choice of filters, printing options and even colorization.

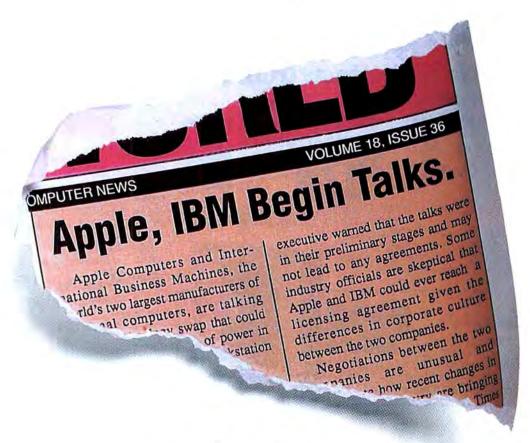
#### Kensington Turbo Mouse V.3.0 Winner of the '87, '88 and '89 Macworld World Class Awards for Best Input Device. Turbo Mouse is quicker, more precise and easier to use than any other mouse. You move only the ball, not the whole mouse. #01411 **Other Great Kensington Products** LaserStand

Holds and organizes all laser printer accessories, raises printers to more convenient height, manages your cables, and has special storage areas. #09523 PassProof Offers total defense against unauthorized use of your Mac. It works with a simple series of hardware and software locks that you can control.



#### MICE TRACKBALLS JOYSTICKS

	Abaton Technology Corp 01507 Pro Point ADB (SE & II)79
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	Datadesk 03780 Switchboard Switch Track Ball 97
	Kensington 01292 Trackball107
	Microspeed 03306 Mactrac Trackball 512/Plus60 03305 Mactrac Trackball ADB74
	Micro Touch Systems 03412 Unmouse159
>	Mouse Systems Technologies 03629 Little Mouse A+ (512/Plus)74 03630 Little Mouse For ADB74
	Advanced Gravis 02740 Mousestick Joystick 512 & Plus 64
	Kraft 00941 Joystick Quickstick 512 & Plus39 01990 Joystick (Premium III) ADB49



# **Big Deal.**

MAC PC

MAC TRANSLATORS

When Apple and IBM start talking it makes front page news. But savvy Macintosh owners know that Macs and PCs have been on speaking terms for years, thanks to DataViz's MacLinkPlus.

Since 1984, our award winning MacLinkPlus has been providing file transfer and translation solutions for Macintosh and PC owners everywhere. With its vast library of over 350 translators, MacLinkPlus keeps the lines of communication open between all popular word processing,

spreadsheet, graphics and database programs.

Our latest version includes over 50 new translators for the hottest new software around, including Word for Windows, Windows graphics, Multimate 4.0 and WordPerfect for the Mac. We've even included DOS Mounter software from Dayna, so you can access DOS disks with your SuperDrive

both on the Macintosh desktop and within all Mac applications.

If your Mac and PC are already connected, then all you need is MacLinkPlus/Translators, a full library of Mac-PC translators and DOS Mounter software. If you need to connect your Macintosh and PC, MacLinkPlus/PC includes a serial cable and modem communications software in addition to the translators and DOS Mounter.

So don't just speculate on the future of better communications between Apple and IBM. Call DataViz at (800) 733-0030 or

(203) 268-0030 for technical support.

Look Who's Talking Now!



\*\*\*\*

DATA

T his section lists the latest versions of selected Mac applications that were announced by the time we went to press. To have products considered for this section, send a press release to Updates, Macworld, 501 Second St., San Francisco, CA 94107, or fax it to 415/442-0766.

PRODUCT	v.	REQ.		s
4TH	2.1.1	1MB/6.0		FREE
DIMENSION				
AATRIX	3.02	512K/4.1		
CHECKWRITER II				
AATRIX	2.0	512K/4.2		FREE
TIMECARD				
ACCOUNTANT, INC.	2.1	1MB/6.0.3		
PROFESSIONAL	100			
ACCUTEXT	2.0	4MB/6.0.2		
ADDRESS	2.0	1MB/6.0.2		\$25
BOOK PLUS				
ADOBE	3.0	ZMB/6,0,3	2/91	*
ILLUSTRATOR				
ADOBE	2.0	2MB/6.0.2	9/91	5199
РНОТОЅНОР				
ADOBE	2.0	1MB/6.0.2		FREE
TYPE MANAGER				
AFTER DARK	2.0	512KE/4.1	5/91	
AGFATYPE	2.0	2MB/5.0.2		FREE
ALDUS	3.0	1MB/6.0.3	8/91	
FREEHAND	-			
ALDUS	4.0.1	1MB/4.1		FREE
PAGEMAKER	1.474			
ALDUS	2.0	1MB/6.05		
PERSUASION	100			
ALDUS	21	1000/6.0.5		-
SUPER 3D				
ANTITOXIN	1.4	512K/3.2		\$15
APPLESHARE	2.0	512K/3.2		•
FILE SERVER				
APPMAKER	1.2	1MB/6.0.5		
THE ART	2.0	1MB/6.0		\$20
IMPORTER				
ARTROOM	5.0	512K/3.2		1.
ASHLAR	2.0	4MB/6.0.2		\$95
VELLUM	10.00			
ATONCE	1.2	1MB/6.0.5		10
A/UX	2.0	4MB/6.0.5		
BACKFAX	1.5.1	1MB/6.0.3		\$25
BACKMATIC	2.0	1MB/4.2		
BILL-IT	2.6	1MB/6.0.3		
BITSTREAM	2.0	1MB/6.0		
TYPEFACE	150			
LIBRARY				

PRODUCT	v.	REQ.	*	\$
BUSINESS	1.4.1	1MB/6.0		
SENSE				
BUSINESS	3.2	512X/3.2		FREE
SESSION	1.4			
CA-CRICKET	2.0.1	1MB/6.0		
PRESENTS	/			
CANOPENER	1.1	512K/3.0		FREE
CANVAS	2.1	1MB/6.0		
CAPTURE	4.0	1MB/6.0		\$30
CARBON	2.0	1MB/6.0.5		
COPY MAC				
CLARIS	2.0.2	2MB/6,0		\$79
CAD				
CMS UTILITIES	7.0	ZM8/7.0		\$25
COLOR	2.07	1M8/6.0.5	11/90	\$15
MACCHEESE				
COLORSTUDIO	1.5	4M8/6.0.5		
COMPUSERVE	1.00	1MB/4.1	12/90	*
INFORMATION MANAGER				
COMPUSERVE	3.0.4	512K/4.1	12/90	*
NAVIGATOR				
CONCERTWARE	5.1	512KE/4.2		\$35
CORRECT	2.0	1MB/4.2		
GRAMMAR	LJ T			
DATAMERGE	2.0.3	512K/3.2		FREE
DATAPRISM	1.1	1MB/6.0		FREE
DELTAGRAPH	2.0	2MB/6.0.5		\$50
DELTAGRAPH		2MB/6.0.5		\$75
PRO				
DELUXEMUSIC	2.5	512K/6.0.2		
CONSTRUCTION SET				
D.E.S. DOCUMENT	4.1	1MB/6.0		
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DESIGNCAD	3.0	2MB/6.0.5		
DESIGNSTUDIO	2.0	1MB/6.0		
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STACK	100			
DIGITAL	2.0	1MB/6.0	9/91	
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DISKEXPRESS II	Z.07	1MB/5,0	11/90	161
DISKFIT AND	2.0	1MB/6.0	7/91	
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PRODUCT		REQ.	•	s
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DOLLARS &	5.0	512KE/3.2		
SENSE				_
DOUBLE HELIX	3.5	1MB/6.0		\$99
DREAMS	1.1	1MB/6.0.2		•
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EARTHQUEST	2.0	1MB/5.0	4/91	*
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PAINT				
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FASTBACK II	2.1	512KE/4.1		\$30
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FASTLABEL	2.02	1MB/6.0		1
FASTTRACK	1.5	512KE/5.5		\$20
FAXGATE	1.12	1MB/6.0		FREE
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FILMMAKER	2.5	5MB/6.0.3	3/91	
FINALE	2.6	1MB/6.0.2		FREE
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FOXBASE+/MAC	2.01	1MB/6.0		FREE
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FREEDOM	3.0.1	2MB/6.0.3		FREE
OF PRESS				
FREEFLOW	4.0	1MB/6.0.3		•
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IMPACT				
FULLWRITE	1.5	2MB/6.0.2		
PROFESSIONAL				
GENERIC	1.1	1MB/6.0.5		,
CADD				
GEOQUERY	2.0	1MB/6.0		•
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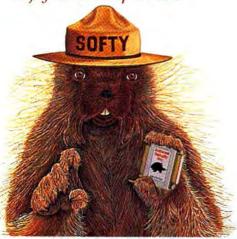
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V. = version #. Req. = min. RAM and system software required.

<sup>★ =</sup> last time (in the past year) this or an earlier version reviewed. • = contact your dealer for update policy.

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Blue = new version this month. Yellow = reviewed product.



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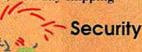
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INSIGHT	2.1.1	1MB/6.0	
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INSIGHT	2.2	1MB/6.0.2	
EXPERT			
ACCOUNTS RECEIVABLE			
INSIGHT	2.2	1MB/4.2	\$99
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LIGHT CHECKBOOK		2MB/6.0 1MB/6.0.3	\$45
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LIGHTSPEED	2.5	1MB/6.0.5	- 7
COLOR LAYOUT			
SYSTEM			
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	2.1	512K/4.2		\$25
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FILE				
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MICROSOFT	2.01	1MB/6.0		FREE
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WORD	14			
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# 64 Pages in July Macworld! Zone's creative minds achieve the impossible with Macs





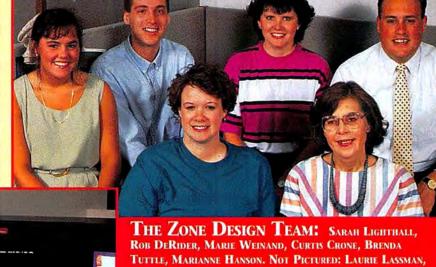
As the computer age continues to gain

momentum, the word "impossible" seems to be losing its strength when you talk about getting something done. That's what we found out when we created these 64 pages with the help of our Macs and some motivated professionals. From the "Let's do it!" from our chief, and the initial concept to the pages you read in July Macworld, we produced this catalog in weeks instead of months.

Pumping out a 64-page full color catalog complete with design, photographs, copy and a tidal wave of planning and coordination in that amount of time is enough to drive anyone completely insane. That is, if you don't have a Macintosh and loads of bright creative people that love to work on them.

Using our talented in-house design team, and our MacAdvisors, we eliminated some of the time wasting, painstaking "old world" procedures by going digital, from start to finish. With

access to technology like Aldus PageMaker 4.0 and Freehand 3.0, Zedcor Desk Draw/ Desk Paint, and Adobe Photoshop mechanials, all those hassles are a thing of the past. We use the software we sell in the production of all our ads. Information on the latest products and hardware from our MacAdvisors has saved many a headache.



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#### **Technical Notes on the Production**

The page layout was designed in Aldus PageMaker 4.0 with graphics imported from Freehand and Adobe Photoshop. Photo imposition was shown in the Mac files with Zedcor Desk Draw. Microsoft Excel helped us keep track of what went where (which we could count on changing every day). Adobe Illustrator, Photoshop, Quark XPress and Aldus Freehand helped us manipulate furnished files and scans.

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#### UPDATES

# What's the Difference between a Font and a Typeface?

... And what's all this about PostScript versus TrueType ? Is there a difference between tracking and kerning? What is an outline font, anyway?

At Altsys, we've spent the last 6+ years understanding and developing Macintosh' software for creating and editing type and fonts. And during that time, a special vocabulary has developed just for computer type. It's made up of new words and different uses of traditional typographical terms.

So, to help you understand fonts in this age of technology, we'd like to offer you a free copy of our booklet, Type Terminology on the Desktop. Just call us at the phone number and extension below or use the enclosed magazine reader reply card.



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	2.0	Zmb/6.0.3		
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UTILITIES				
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PIXELPAINT	2.0	3MB/6.0.2	9/91	\$12
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READ-IT OCR	3.0	2MB/6.0.3		
PROFESSIONAL	-			
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REMOTE	1.0	7711070.0		
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SMART	3.06		12/90	\$25
ALARMS	3.00	THID/U.U.Z	12/30	323
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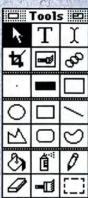
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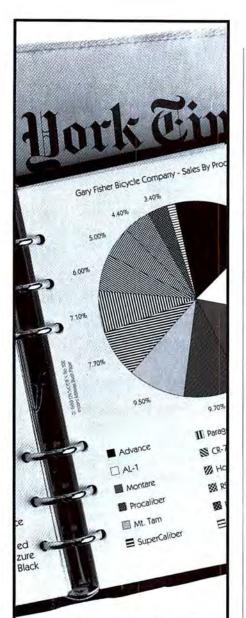
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SUPERANOVA	1.1	1MB/6.0.2		FRE
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GLUENOTES				
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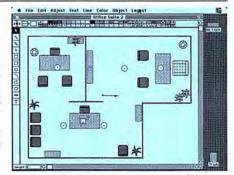
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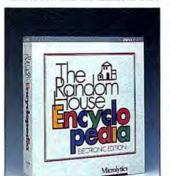
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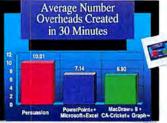
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# MACWORLD NEWS

by Dan Littman and Tom Moran

#### HP Adds Color to DeskWriter



Hoping to please desktop publishers who'd like to add a little color to their work,

Hewlett-Packard has introduced a version of its popular DeskWriter ink-jet printer that can produce monochrome, gray-scale, or three-color output. Not intended as a full-time color printer, the Hewlett-Packard Desk-Writer C comes with a black-only ink cartridge and with a three-ink cartridge that can combine cyan, magenta, and yellow to produce millions of colors. The user manually swaps the cartridges when switching between black text and color graphics.

The 300-dpi QuickDraw printer produces a black-only page in about 20 seconds, while a full-color page takes around 4 minutes. HP includes a new printer driver that supports spooling, matches printer colors to monitor colors, and offers a choice of dithering patterns for creating different textures. The DeskWriter C comes with Times, Symbol, Courier, and Helvetica (the same four scalable fonts that the previous DeskWriter has) and supports Adobe Type Manager and TrueType. The printer works with System 6.X and 7.

The DeskWriter C accepts legalor letter-size paper and can print labels, envelopes, and transparencies (HP recommends using HP's LX Jet-Series transparency film for the latter).

The printer includes an AppleTalk connector and an RS422 interface. It will begin shipping on September 1 at a list price of \$1095. Owners of the DeskWriter can upgrade to the DeskWriter C at a list price of \$450.



The DeskWriter C doubles as a color printer for occasional color graphics in newsletters or presentations. The user swaps the black ink cartridge for a three-color cartridge.

HP also reduced the price of its Paint-Writer color ink-jet printer to \$995 to remain competitive with other color printers from HP. For more information, contact Hewlett-Packard at 800/752-0900.—T.M.

#### Alias's New World



Sketch is a drawing package under development at Alias Research that seems a bit

like Adobe Illustrator or Aldus Free-Hand—except that it draws in a threedimensional world. You create Sketch designs in a single 3-D window instead of the top, front, and side views common to most 3-D software; instead of creating single objects that you later combine in a scene, Sketch's window is the scene where you model, assemble, and assign rendering attributes to everything.

In addition to a few 3-D primitives and standard extruding and lathing, Sketch has some striking features. For example, you can draw a curved line, extrude it with a tug to make a wavy surface-and then draw right on it. You can deform an object in three dimensions by grabbing and yanking on it; Sketch senses the mouse location and creates a spline for you to reshape. Any object you design can serve as a snapping guide so that other objects will conform to its shape and location. You can import a scanned photo and incorporate its perspective in a 3-D model, or import text and apply all of Sketch's 3-D tools to it.

Unlike many 3-D packages, Sketch doesn't venture into animation, but it does store a history of every step in creating a design that you can replay; you can also roll back to a point and branch off in a different direction. (continues)

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Sketch has full-featured rendering tools, including Phong and Gouraud shading, texture mapping, bump mapping, and ray tracing. It comes with a RenderMan-like library of surfaces, and Alias plans to publish a spec for developers to create more (it doesn't support RenderMan shaders). Sketch will list for about \$2000.

Alias's first Macintosh product, Upfront,

shares Sketch's one-view, direct-manipulation metaphor, but its tools create walls and solid objects rather than Sketch's lines, planes, and curved surfaces (Upfront models can be incorporated into Sketch designs and rendered). A new version of Upfront will add simulated texture maps and the ability to fly through a model by following an invisible wall. Version 2 has not been priced, but the first version listed for \$895. Alias Research is in Toronto, at 416/362-9181.—**D.L.** 

#### MicroPhone Front-Ends Global E-Mail

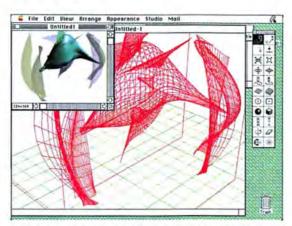


They don't call it telecommunications for no reason: Pacific Bell Telephone is di-

versifying into public electronic mail. The phone company's PB Connection has an X.400 interface that can send messages to most places on the globe and also connects to AT&T Mail and SprintMail.



Pacific Bell's Vincent Lee (left) and Miles Morimoto helped make the company's public E-mail system Macintosh-friendly.



Flexible fish: using Alias Sketch is almost like drawing in the air with a sparkler that doesn't burn out.

Using the forthcoming version 4 of MicroPhone II, Software Ventures is creating a Macintosh front end for PB Connection that hides the E-mail system's command-line interface behind buttons and icons and allows you to perform all mail functions offline.

The MicroPhone interface to PB Connection supports sending to multiple addresses; can batch-search for addresses from a list of names and save them in its address book; and can send and receive mail unattended. PB Connection supports one binary enclosure per message.

The PB Connection front end will not be modifiable, even with a copy of MicroPhone. PB Connection costs about 15 or 20 cents for a letter-size message (X.400 access adds 20 cents per 1000 characters), and there are other charges for the front-end software and a mailbox. For more information, call Pacific Bell at 800/989-9005 (or 800/675-9005 in California).

MicroPhone II version 4 will include Dialoger Pro, a utility that simplifies designing a script's interface and wiring up its buttons and other features. Version 4's System 7 features can call other programs, such as Disinfectant and StuffIt, to operate on downloaded files, or pass downloaded information to other applications, such as Excel. It adds support for the Comm Toolbox's Connection Manager and has VT220 and VT320 emulation, though it can open only one session at a time. The new script editor is nonmodal, so you can open multiple scripts and copy and paste their contents; it may have a much improved debugger as well, but at press time Software Ventures wasn't sure that feature would be included. For experienced scripters, the oldstyle script editor is still available. Version 4 will list for \$295. Software Ventures is in Berkeley, California, at 415/644-3232.—D.L.

#### Iomega Doubles Bernoulli Capacity



Offering twice the capacity of its existing 45MB Bernoulli drive, Iomega Corpo-

ration has introduced the Bernoulli 90, a removable-cartridge drive that stores up to 90MB. The introduction came a few months after rival SyQuest Technology introduced an 88MB version of its 44MB removable drive, which has been the most common removable-cartridge device for the Macintosh. Iomega has long dominated the market for removable-car-



UIS DELGAD

lomega's Bernoulli 90 removable-media drive stores 90MB, about twice the capacity of the company's previous drives.

tridge drives on the IBM PC side and has priced the new drive aggressively to gain share in the Mac market.

Iomega offers the device in two Mac-compatible configurations: the Bernoulli 90 Transportable, a single-drive subsystem, and the Bernoulli 90 Dual, which contains two of the drives in one case for easier disk copying and backing up. The Bernoulli 90 has a better average access time (19ms) and higher maximum data-transfer rate (2.5M per second) than the previous Iomega removable.

All the Iomega drives use the Bernoulli effect (from the air flow pro-(continues)

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duced by the spinning of the disk) to bring the flexible disk and the read/ write head closer to each other during operation. If shock or a dust particle interrupts the air flow, the disk and head move apart, making a head crash extremely unlikely. Once the shock or particle is past, the disk and head move back and operation resumes. As a result of this design feature, Iomega says, the drives have very high reliability.

Iomega is currently shipping both the Bernoulli 90 Transportable and the Bernoulli 90 Dual. The Transportable carries a suggested retail price of \$1149; Dual goes for \$2249. For more information, call Iomega Corporation in Roy, Utah, at 801/778-1000 or 800/456-5522.—T.M.

#### **Exploring Data**



Exploratory data analysis (EDA) is a tool for making sense of numbers by look-

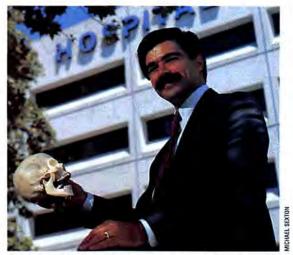
ing at them displayed as interactive graphics. The field continues to generate news on the Mac.

Data Desk's new publisher, Data Description, says the next version of its EDA package will take advantage of System 7 to access numbers stored in databases and spreadsheets and to communicate with other applications such as GeoQuery. Although Data

Desk and GeoQuery have each left Odesta's nest for separate companies, System 7 lets the two applications pass data and analyses back and forth. At press time, no price or shipping date for the Data Desk upgrade was set. The current version, Data Desk 3.0, lists for \$595.

D<sup>2</sup> Software has turned the marketing of its EDA pioneer, Mac-Spin, over to Abacus Concepts, the developer

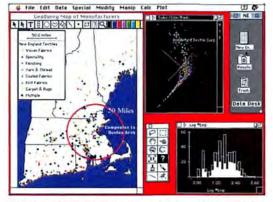
of StatView. The greatly expanded MacSpin 3.0 provides, besides MacSpin's trademark rotating 3-D scatterplots, a variety of interactive 2-D charts with data-masking and data-slicing, and support for changing vari-



Bryan Dieter thinking about brains—past and future. He uses BrainMaker to solve complex problems for hospitals.

ables and scale on the fly. Abacus Concepts claims that interapplication communication means users will find several smaller applications like MacSpin and Abacus's own StatView more effective than a big all-in-one program. MacSpin 3.0 lists for \$295.

Other important EDA vendors are sticking with the large-function-set approach. The SAS Institute's new System 7–ready version 2.0 of JMP is almost twice as big as the original release. The first version of JMP depended mainly on exploratory data graphics, while the new version responds to users' requests for additional standard tests, including capa-



If Data Desk's 3-D spinning scatterplots aren't enough for you to grasp your data, try mapping it in GeoQuery.

bility analysis; repeated measures and multivariate analysis of variance; random effects; nonlinear regression with exact likelihood-based confidence intervals; multiple comparisons; homogeneity of variance tests;

nonparametric tests; normality tests; statistical power and sample size calculations; and correspondence analysis. Version 2.0 also has more chart types, including real-time Shewhart control charts for quality analysis, Pareto charts, profile plots, and overlay plots. JMP's strength in quality control takes advantage of System 7: JMP can now monitor manufacturing-inspection processes in real time, summariz-

ing and charting results. JMP 2.0 is shipping now and lists for \$695.

Data Description is in Ithaca, New York, at 607/257-1000; Abacus Concepts is in Berkeley, California, at 415/540-1949; SAS is in Cary, North Carolina, at 919/677-8000.—Charles Seiter

#### **Software Brains**

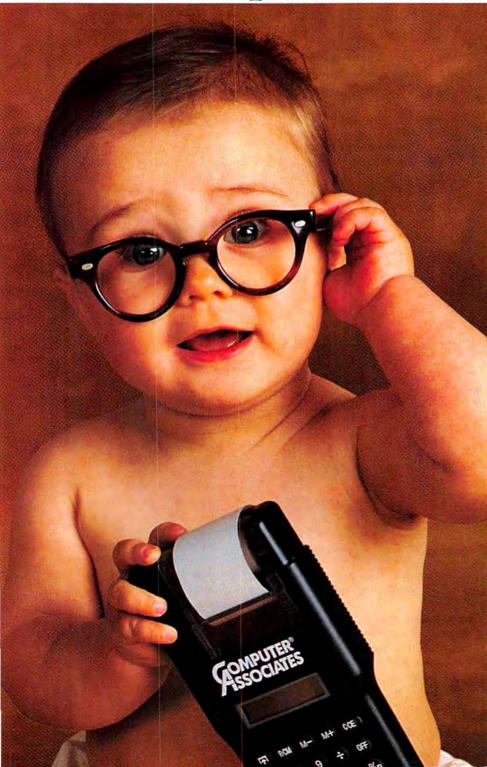


California Scientific Software claims its BrainMaker neuralnetwork software is so smart

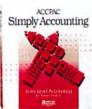
it can design its own brain. All you do is feed it lots of data about a problem and give it some examples of correct answers, and BrainMaker performs something like a massive regression analysis to figure out how to make the jump from the data to a right answer.

Neural-network software is a mysterious technology. In standard procedural programming, the programmer knows every step that the software takes to compute a solution. A neural network, by contrast, gets no math and no rules to follow. It passes data into an inscrutable hidden layer, where dozens or hundreds of interconnected neurons—the neurons can be chips or simulated in memoryadd, multiply, and otherwise combine their signals until an answer pops out the other side. While training itself, the system compares the result to the answer it is trying to match and then repeats the process until it homes in on the target. When it gets pretty ac-(continues)

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curate, the network is ready for use on live data with no preset answers.

At the Decision Support Group in Oakland, California, Bryan Dieter feeds hospital databases—medical records, patient billing, test results—to BrainMaker to help doctors identify optimal treatment for a wide range of medical conditions. "There are hundreds of variables," Dieter says. "One of the nice things about BrainMaker is that . . . it will figure out which ones make a difference and which don't."

Dieter's background is in health care, not computers, but he says BrainMaker is easy to use. "The hard part is getting the data into a [format] that BrainMaker can read. . . . Hospitals have not done a good job of generating information."

BrainMaker is shipping now at a list price of \$195. For further information, contact California Scientific Software in Grass Valley, California, at 916/477-7481.—D.L.

#### High-Speed Hard Drive Stores 1.3GB

Aiming at applications that require very high speed and massive storage capacity,

Storage Dimensions has introduced a line of 1.3GB hard drives that work with two Data Cannon boards that hook directly into the NuBus or into the IIfx's PDS slot instead of through the Mac's SCSI port. Called the MacinStor Series 1300, the drives come individually or with two drives or four drives combined in one case.



The MacinStor Series 1300 hard drive can use one of the Data Cannon boards (shown) to transfer data very fast.

The Series 1300 has an average seek time of 11.5ms and comes with a SCSI-2 interface for faster transfers. However, the drive really takes off when used with one of the Data Cannon boards. Both boards contain high-speed SCSI interface chips that mediate between the Series 1300 and the Mac's NuBus. The sustained transfer rate of the Data Cannon NuBus is up to 5MB per second, while the Data Cannon PDS for the Macintosh IIfx can reach a sustained data rate of 10MB per second.

The Series 1300 list prices start at \$8449 for one drive, and range up to \$32,599 for the four-drive configuration. All the drive configurations began shipping in June. The Data Cannon PDS and Data Cannon NuBus both list for \$859 and are currently shipping. For further information, contact Storage Dimensions in San Jose, California, at 408/879-0300.—T.M.

#### E-Machines Shows 16-Inch Color Monitor, Upgradable Adapters



E-Machines recently introduced a low-cost 16-inch color monitor and a pair

of user-upgradable accelerated graphics-adapter boards for NuBus Macs. The monitor, called the Color-Page E16, lists for \$1595. It can display at 640 by 480, 832 by 624, or 1027 by 768 pixels, and works with E-Machines' NuBus boards or with the built-in video on the Mac

LC, IIsi, or IIci.

The two new boards are the XL8, an accelerated 8-bit graphics adapter, and the Futura/24, an accelerated 24-bit board. Both boards offer panning (in hardware), 200-percent zooming, and virtual screens, and both can also produce PAL and NTSC video output. The XL8 starts out supporting 640 by 480 resolution on 16-inch monitors, but the user can upgrade the board to 24-bit color at 832 by 624 resolution. The XL8 is also compatible with 12- and 13-inch monitors.

The Futura/24 begins at 24 bits, supporting only 12- or 13-inch monitors. With the user upgrade, it can drive a 16-inch monitor at 832 by 624 resolution.

The E-Machines XL8 board lists for \$995, and its 24-bit upgrade is \$500. The Futura/24 board also has a list price of \$995, and its upgrade is also \$500. For more information, contact E-Machines in Beaverton, Oregon, at 503/646-6699.—T.M.



DHN WILLIAM LUND

The ColorPage E16 monitor works with Nu-Bus display adapters or the built-in display controllers on the LC, Ilsi, or Ilci.

#### Synthetic Motion

X

George Lucas won't be the only one directing the digital actors of the future. Life

Forms, a new software package from Kinetic Effects, already enables Mac animators to create 3-D characters that can walk, dance, play sports, and move like real people.

Life Forms includes a body-shape editor that allows you to position a human figure on the screen, a time-line editor that takes care of tweening (moving between user-defined positions), and a stage for playing back animations. Early advocates of the package include the renowned choreographer Merce Cunningham, who used Life Forms to choreograph his recent work *Trackers*.

Life Forms models are fairly simple, like sleek modern manne-(continues)

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# VIRUS X WATCH

Current viruses, Trojan borses, and worms affecting the Macintosh community.

# ZUC C

Type: Virus

First listed in Virus Watch: 10/91

Info: A ZUC clone.

Impact: Nondestructive; infects applications and system files; renders cursor inoperable.

#### HC

Type: Data Virus

First listed in Virus Watch: 6/91

Info: Infects HyperCard stacks.

Impact: Causes the Mac to hum oddly.

#### nCAM

Type: Virus

First listed in Virus Watch: 5/91

Info: An nVIR clone.

**Impact:** Nondestructive; infects applications and system files; can cause crashes.

quins, but you can modify their proportions, call a rendering program to color and texturize them, or animate more realistic figures constructed in products like Paracomp's Swivel 3D. You can play back Life Forms animations in HyperCard or include them in MacroMind Director animations.

Two teams developed Life Forms

-one working on the Mac and one on Silicon Graphics (SGI) machines. Though the SGI team had the advantage of those platforms' greater power, the Mac team arrived at features unique to its version. These include automatically detecting collision with the floor and the ability to view a figure from three angles at once. The SGI version simulates gravity and enables users to synchronize animations with camera motions

and MIDI sequences. Future versions of Life Forms, which will include inertia and the ability for models to detect collisions with other models, are being developed for both machines.

Life Forms requires a Mac with 2MB of RAM and a 13-inch color monitor, but does not require a math chip. Kinetic Effects distributed a prerelease version of Life Forms for \$1200,

but a final price was not set at press time. Kinetic Effects is in Seattle at 206/283-6961.—Ann Garrison

# File Edit Text Records Forms Window Franker High School Geometry, tex period and Quarter Perst Name: Smith | Double |

A database document in GreatWorks. Integrated software for the Mac is suddenly becoming a hot market.

# Down at the Works



There are two ways to design integrated software: the Rag-Time way and the Microsoft

Works way. The RagTime way has spreadsheets, word processing, graphics, and database windows living side by side in frames on the same page. The Microsoft Works way keeps each kind of data in a separate document, almost as if the package were several different applications.

A while back, TML Systems announced but never shipped a Workskiller, code-named Zebra, that was

AND AMASER

Merce Cunningham at work on his Silicon Graphics machine, using Life Forms to choreograph Trackers.

clearly based on the Microsoft model. Symantec recently acquired the company and renamed Zebra as Great-Works. Great-Works outdoes its rival by several steps, with eight modules that include a word processor, database, spreadsheet, charting, outliner, draw, paint, and telecom (Works has neither outliner nor paint).

The modules share many tools. For example, the text tools you use in the word processor are available in the spreadsheet and database, including the dictionary and spelling checker, and the spreadsheet's functions are also available in the database (the spreadsheet module implements the same formulas and functions as Excel, but it has no macros or array capability). The outliner is more like Acta than More, but you can set text styles for each level. The word processor supports snaking columns and headers and footers, and provides a list of fields from a database to create mail merges, but lacks true style sheets. The draw window is color, but the paint window is black and white. There is no hot-linking between modules, so changes in one won't be automatically reflected in another.

Other integrated packages are coming to the Macintosh (look for one from Claris to be frame-based); maybe some competition will get Microsoft to rework Works. Symantec plans to ship GreatWorks before this issue goes to press. It lists for \$299. For further information, contact Symantec in Cupertino, California, at 408/253-9600.—D.L.

(continues)

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# Articulate Systems Unveils Sound Recorders

.

To provide advanced sound capabilities from within standard application software,

Articulate Systems has upgraded its Voice Record sound-editing software and bundled it with two new sound recorders, the Voice Impact and the Voice Impact Pro. Voice Record version 2.0 has an improved, one-window interface that works as a DA or can be used to record and edit sounds from inside most applications that are compatible with Articulate Systems' Sound Manager or the Apple Sound Manager.

The software also works with the built-in sound capability of the Macintosh LC and the IIsi, or with Farallon's MacRecorder sound re-

corder. Some of the compatible applications are Excel 3.0. Microsoft Mail 3.0, QuickMail 2.2.3 and later versions, Full-Write Professional. Mathematica, WordPerfect Office. Users can edit sounds and change the compression ratio at which the sounds are stored. Voice Record bundled SoundWave, a \$69 stand-alone application that creates multiple editing windows, and mixes, filters, and adds effects to sounds.

The Voice Impact sound recorder includes a microphone, some other electronics that provide automatic gain control, and the Voice Record 2.0 software, but without the SoundWave application. Slated to begin shipping in early August, the Voice Impact lists for \$119 and is available at a discount in packs of five and ten units. The Voice Impact Pro adds a digital signal processor for advanced features, including on-board compression. The DSP allows the Voice Impact Pro to record or compress without tying up the Mac's CPU. Also scheduled for August shipping, it lists for \$249, including Voice Record 2.0 and SoundWave. For more information, contact Articulate Systems in Woburn, Massachusetts, at 617/935-5656.-T.M.



Two sound recorders from Articulate Systems: the Voice Impact (below) and the Voice Impact Pro.

# Reader Survey: Online Services



This month's survey takes us into the realm of online services, with 41 percent of re-

sponding readers saying they are currently registered users of at least one online service. CompuServe was the most frequently mentioned service, cited by 50 percent of registered customers. AppleLink was next at 31 percent, with America OnLine following at 28 percent, local bulletin boards at 25 percent, Prodigy at 24 percent, and GEnie with 20 percent of registered customers saying they used it. Other services mentioned include Connect at 8 percent, MCI Mail at 7 percent, Usenet at 3 percent, The WELL at 2 percent, and BIX and Delphi at 0.8 percent each. Figures add up to more than 100 percent because this question allowed for multiple answers.

Apparently the difficulty of using an online service has been overstated, since 15 percent of *Macworld* readers who are registered users say that the service they use most is extremely easy to use, 46 percent say it is very easy, and 29 percent say it is somewhat easy to use. Only 7 percent of those readers said their online service was not very easy to use, and a mere 1 percent said the service was not at all easy to use.

Responding readers who are registered users said the features they accessed were general information (80 percent), electronic mail (59 percent), technical support (59 percent), research (55 percent), special-interest groups (46 percent), instant communication with others online (39 percent), shopping (23 percent), games or entertainment (20 percent), and other (13 percent).

Most readers who subscribe to online services said they have a 2400-bps modem (60 percent), while 9600-bps and 1200-bps modems are each owned by 13 percent. Of those readers, 7 percent said they connected less than an hour a month, 48 percent said 1 hour to less than 5 hours, 20 percent said 5 hours to less than 10 hours, 11 percent said 10 hours to less than 15 hours, and a small percentage responded in each of five higheruse categories.—T.M.

# Tomorrow's Upgrade For Your Mac Is Only

A MacWarehouse Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable overnight service will have your Kit in your hands tomorrow!

# MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spread-sheet. Install extra memory and you can leave your letter open while you refer to last month's sales figures. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

# PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. Just open your Mac, slide out the main circuit board and plug in your SIMMS. Our FREE video will give you STEP-BY-STEP installation instructions. Every type of Mac is covered and we think we've made it a breeze.



# WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs - (2 @ \$59 ea.).

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

To upgrade a 4-socket Mac Plus or SE to this amount of memory.	Do this: (Install in multiples of two only)	
2 MB	Remove all four existing 255K SIMMs, install two 1 MB SIMMs, leave two sockets for future expansion.	
2-1/2 MB	Remove only two 256K SIMMs, install two 1 MB SIMMs.	
4 MB	Replace all four 256K SIMMs with four 1 MB SIMMs.	
To upgrade an 8-socket Mac II, IIx, IIcx, oe SE 30 to this amount of memory.	Do this; (Install in multiples of four only.)	
4 MB	Remove all four existing 256K SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.	
5 MB	Keep existing 256K SIMMs, install four 1 MB in remaining sockets.	
8 MB	Remove all four 256K SIMMs, install eight 1 MB SIMMs.	

To open your Mac Plus or SE, you'll need a specially designed tool - it's available from us as part of a handy tool kit for just \$9.

#### WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMS (Single Inline Memory Modules). Each one megabyte SIMMS card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.

Prices can vary a lot, based on quality, speed and demand. At press time our price for

help you make your choice an easy one.

1MB, 100ns SIMMs is \$59. Please call for the

very latest prices and availability. Our sales

staff will tell you what you need and

#### SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100 ns chip. The original Mac used relatively slow 150 ns memory chips. The 68020 processor reads 120 ns (or faster) chip, and the 68030 Macs like the speedier model.

# OVERNIGHT DELIVERY

Place your order by 12:00 am (E), weekdays and we'll deliver overnight for just \$3.00. There's never been a better time to consider a memory upgrade. Call our toll-free number now and tomorrow morning your Mac will be off to a brand new start.

# MacWare House 1-800-255-6227

Call toll-free Twenty-four hours a day, seven days a week. Inquiries: 1-908-367-0440 Fax: 1-908-905-9279

# MACWAREHOUSE 30-DAY MONEY BACK GUARANTEE

If, for any reason, you are dissatisfied with your MacWAREHOUSE Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return this product, postage paid, in its original condition, with the original packaging and documentation.

**ONE YEAR WARRANTY.** MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion.

SIMMs prices vary: Call for latest information

<sup>\*\*</sup> Limited Offer! Free video with purchase of 2 or more SIMMs.

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Item #DTP 0049 FaxFACTS 2509 Publisher: Quark, Inc.

# MacWarehouse Low Price .. \$529

System Requirements: The enhanced QuarkXPress 3.0 requires a Macintosh Plus, SE, or II series with a 6.0 or later operating system, 2 MB of RAM (extra memory required for color or graphics-intensive applications), a hard drive, and LaserWriter 5.2 or 6.0 printer.

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Whether you create brochures, advertising, magazines, newsletters, newspapers, or books, QuarkXPress\* provides all the tools you need to realize even your most sophisticated designs. With QuarkXPress you can:

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- Apply color to text, backgrounds, pictures, frames, and lines
- · Precisely control color trapping
- Separate spot colors and print process color separations without add-on programs
- Use full-featured word processing power or import text from other programs into QuarkXPress page layouts
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No other program compares in precision, power, and ease of use for typography, graphics, layout and color. That's why QuarkXPress is the choice for publishing software worldwide.

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Because more than 40 new features and capabilities will be introduced in QuarkXPress 3.1, the suggested retail price for the program will increase by \$100. But you can receive a 3.1 upgrade package free when you buy and register your copy of Quark XPress 3.0 by October 31, 1991!

guarantee, if you are not completely satisfied. r details when you place your order.



System 7 Compatibility: • indicates that the product will run under System 7.

OVERNIGHT DELIVERY

• The perfect choice for powerful yet compact Mac communication. This 2400 baud modem with MNP5 data compression packs Hayes compatibility and error-free communication. TelePort plugs into your mouse (ADB) port and provides a pass-through connector for other devices. It uses no external power supply, and leaves your serial port free for other uses! port free for other MOD0049 \$139.

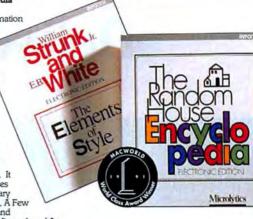
TelePort, the ADB Modem (Global Village

Communication)

Also, TelePortFAX includes SendFAX 9600 baud modem software. Hold OPTION as you drag FILE-PRINT to easily send Faxes worldwide. MOD0058 \$185.

Random House Enclyopedia (Microlytics) Delivers a wealth of information to you through your Mac. Need a quick overview of the history of Peru? What are the principal agricultural products of Romania? How does a nuclear power plant work. Whenever you need to look up factual information, you can find it fast. EDU0217 \$68.

The Elements of Style The classic handbook on writing comes to the Mac. It covers five major categories (Rules of Usage, Elementary Principles of Composition, A Few Matters of Form, Words and Expressions Commonly Misused, and An Approach to Style). EDU0242 \$35.



# **ACCESSORIES**

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	eeds, Inc.	
ACC0356		
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ACC0348	(grey nylon)	. 17.
ACC0347	HardTops Mac Extended Keyboard Cov	er16.
ACC0346	HardTops Mac Standard Keyboard Cov	er 15.
ACC0466	MacIlcx/ci Monitor Stand	49.
ACC0351	Utility Pac	
B.A.S.F.		
MED0030	Disks - DS/HD 1.44 Meg (box of 10)	22
MED0029	Disks - DS/DD (box of 10)	
Curtis		
ACC0469	Command Center	89.
Ergotron	1	
ACC0344	MacTilt II - 13* Color RGB	75
ACC0128	MacTilt Plus/512 - Platinum	68.
ACC0009	MacTilt SE, SE/030 - Platinum	58.
<b>Famous</b>	Engineering Brand	
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I/O Desig	gn, Inc.	
ACC0028	MacLuggage™ Plus Carrying Case	64.
ACC1070	MacLuggage" SE Carrying Case	
ACC0327	Monitorware Apple RGB Case	
ACC0427	Ultimate Classic/SE Ext. Carrying Case -	
	Black	85.
ACC0440	Ultimate Classic/SE Ext. Carrying Case -	
1.00	Navy	85
ACC0529	Ultimate Classic Carrying Case - Black	- 68
ACC0528	Ultimate Classic Carrying Case - Navy	
Kensing		
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1000001	Olerania Anti Oleran Filman	

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Keyboard Slideaway42.
LaserStand 129
SE Anti-Glare Filter
MasterPiece MacII105.
Power Tree 5054.
System Saver Mac - Platinum
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Fanny Mac QT
SE Silencer
Glare/Guard Plus Portrait85.
Glare/Guard Plus 13"85.
and the state of t
Disks - 1.44 Mb High Density (3.5) 24.
Disks - DS/DD (box of 10)
Ltd.
MacIlcx/ci Carrying Case (black)
MacPlus/SE Carrying Case (black) 65.
MacPlus/SE-Ext Keyboard Carrying Case 79.

**Utilities Family** 

(Microcom)

The Virex application program detects and repairs files infected by Macintosh viruses. The Virex 3 INIT repairs damaged files instantly before a virus can spread. **911 Utilities**, a collection of disk and file recovery tools, protects computer-based information from loss or damage so you'll never have to worry when your Mac goes down. Complete Undelete

maintains a "Delete Log" of files thrown in the trash and recovers them if they were accidentally thrown away. Citadel with Shredder, a security tool box, protects your computer from unauthorized access

Virex 3.0 UTI0093 \$59. 911 UTI0191 \$89. Complete Undelete UTI0140 \$49. Citadel UTI0233 \$93.



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OFIN0068 WealthBuilder (Mac)

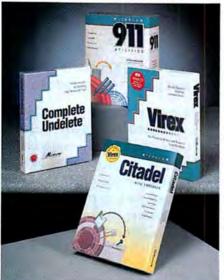
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OFIN0048 Accountant Inc. 99. Teleware, Inc. @FIN0087 M.Y.O.B. 2.0 TimeSlips Corp.

OFIN0129 TAL 55

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@STA0010	StatView SE+Graphics 1.03	199
	SuperANOVA (MacII Family)	
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AFC Man	agement Systems	
BUS0129	FastTrack Schedule 1.5	139
	AEC Information Manager	
After Hou		
@DAT0076	TouchBASE	89
Aldus		
BUS0066	Persuasion 2.0	329
	ware Inc	annount out of
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BUS0146	Planisoft - 5 pack	579
BUS0147		
Ashton-T		
DAT0042	dBase MacS	PECIALI 59
	Full Impact 1.1S	



OFIN0039 Andrew Tobias' Managing Your Money 4.0 99.

MacPro Plus

(Key Tronic) Key Tronic's new MacPro Plus keyboard is compatible with all Macintosh computers. The enhanced 105-key layout

includes Period/Comma lock capability, an

The "ULTIMATE" SE Carrying Case (I/O Design, Inc.)
The "ULTIMATE" SE Carrying Case is designed with the same high quality standards as other MacLuggage products This case offers internal, padded compartments for ANY Macintosh keyboard, mouse, external hard disk and cables, also holds the new Macintosh Classic It features two additional exterior pockets for everything from disks to umbrellas. Combine these features with sturdy Dupont Cordura nylon and 1/2 inch high density foam padding and you'll see why this is the "Ultimate" carrying case for your Mac. Available in black and navy blue. Black: ACC0427 \$85. Navy: ACC0440 \$85.



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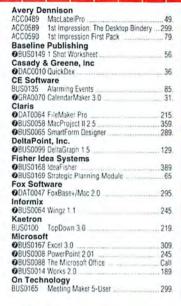
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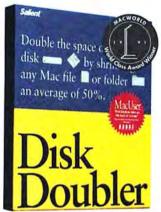
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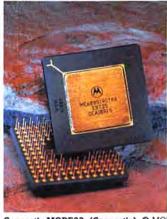




DiskDoubler 3.7 (Salient Software)

◆ Disk Doubler 3.7, the system 7 savvy version, compresses your files when you version, compresses your lies when you save them and expands them when you open them. It doubles your hard disk and floppy disk storage capacity. Works transparently within any application, and operates in the background under MultiFinder. Disk Doubler works with documents, applications, plus sound graphics, and scanner files. UTI0179 \$49.

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BUS0166	Meeting Maker 10-User	559
	Systems	
	Dynodex - The Instant Address	Book 72
<b>O</b> DTP0055	DупоРаде	72
Power U	D	Toomstander A. Co.
<b>Ø</b> BUS0073	Calendar Creator	35
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<b>O</b> BOK0007	LetterWorks	59
<b>⊘</b> BOK0016	Sales LetterWorks	59
Satori		
<b>⊘</b> BUS0025	Bulk Mailer 3.2.5	75
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BUS0125	Informed Designer	159
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	if:X Expense Reports	ea. 49
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<b>OBUS0176</b>	GreatWorks	209
<b>O</b> BUS0055	More 3.0	265
Synex		
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BUS0145	MacPhoneBook 3.0	32
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<b>O</b> BUS0043	Timeslips III 2 0	195
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	SmartBundle	215
	Solutions	
BUS0113	FastFovelope	45





Connectix MODE32 (Connectix) • MODE32 software allows any Mac II, Ilx, Ilcx or SE/30 to use standard System 7.0 32-bit addressing. Now these models can use up to 128 MB of RAM, and 1024 MB of Virtual Memory like the current machines. Make your dirty ROMs 32-bit clean, get MODE32. UTI0222 \$99.

MC73 PMMU © The MC73 PMMU chip lets your original Mac II use Sytem 7's standard Vitual Memory. Mac IIs lack the PMMU bulit into other machines, but have the socket for one. Includes detailed instructions and grounding strap. DRI0385 \$159.

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All orders add \$3.00 per order. We ship Airborne Express overnight unless UPS Ground delivers overnight. (Some rural areas require an extra day.)

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\*Defective software replaced immediately. Hardware replaced or repaired at our discretion, \*\*We regret that we cannot be responsible for typographical errors.\*

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#### DavnaPORT

DaynaPORT Ethernet adapters allow users to connect all mod-els of Macintosh computers to any type of Ethernet cabling, including 10BASE-T. New Dayna PORT E/Z offers the easiest Ethernet connection for the Plus, Classic, SE and Portable. NET0125 \$285.



# Publish It! Easy with FILE IT! 2.1 All-in-one desktop publisher in-

cludes: easy page layout, drawing and painting tools, rotate text in one-degree increments, slide-show feature, Quick-Start Mini-Manual, File It!, advanced built-in database and mail merge program lets you edit. search and sort files or custom-ized form letters without leav-ing Publish It! Easy. Eddy Award Winner. DTP0048 \$139.



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DayStar's RAM PowerCard

Expand to 256 MB of true RAM per card. Chain multiple cards together for even larger amounts of RAM. Create a large RAM disk which allows disk intensive work such as photo retouching, database sorts, or 3-D renderings to fly! System 7's virtual swap file can be stored in RAM, providing real-time virtual memory. DRI0416 \$779.



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Play a rubber of Bridge 6.0 with the Mac's three players. Bid with either the Stayman or Blackwood conventions. Bridge 6.0 handles all the bookkeeping and tactfully informs you of any mistakes in bidding or play. It saves hands for later replaying and analysis. ENT0303 \$29.



#### QuickSCSI

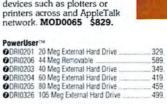
Boost the SCSI performance of your Mac and maintain realtime mirror image backups. Allows your hard drive to work at it's maximum speed as high as 4.4 MBytes per second.
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multiple SCSI ports. DRI0406

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<b>ODRI0338</b>	Video MacPac	349.
Compute	er Friends	
<b>O</b> GRA0251	ColorSnap 32 Plus	649.
Dayna C	ommunications, Inc.	
DRI0174	DaynaFile dual 360K (5.25) &	1.44 (3.5)739
IDS		
DRI0408	Pro 40 40 Meg Drive	349.

V-Series Ultra Smart Modem (Hayes) Bundled with Hayes award winning Smartcom II software. RS232 cables and HayesConnect network server software. Offers the best combination of connectivity and data throughput available in a high speed modern such in a night speed modern such as 100% error control using both the V.42 standard and MNP protocols and the option of wither 4 to 1 data compression with v.42bis or 2 to 1 with MNP5 error control. HayesConnect allows users to share modems or other serial devices such as plotters or printers across and AppleTalk network. MOD0065 \$829.



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<b>OHYP003</b> 5	5 HyperBible King James Version 2.0 125
Broderb	und
GRA0268	Kid Pix29
EDU0170	The Playroom29

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(Softsync/BLOC) @ "Accountant Inc. is the most complete intergrated accounting and financial management package for the Mac" says MacUser Magazine 3/91. Starting up with Accountant Inc. is quick and easy. Combines exceptional power with an elegant user interface to provide more flexibility and better reporting with less work. Unlike other packages, Accountant Inc. will grow as your business grows. Package includes Invoicing, Inventory, Receivables, Payables, Check Writing, Job Cost, Payroll, Integrated General Ledger and Financial Reporting. FIN0048 \$339.



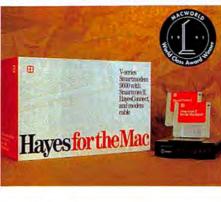
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Converting to System 7-part 2

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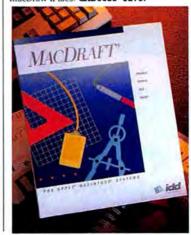


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(Innovative Data) Provides the tools you need to create accurate drawings on your Mac. It supports PostScript output, has a removeable geometric drawing tool palette, multiple layers (limited only by available memory), on-line symbol libraries, 44 different scales, custom line styles, dimension lines, Bezier and spline curves, automatic area calculation, and smoothing of freehand shapes. MacDraft supports 32-bit QuickDraw and custom fill patterns in both black and white and color. Reads TIFF and MacDraw II files. CAD0039 \$279.



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 Tempo II Plus macros can dramatically simplify your work. Some examples: "Batch-process" hundreds of files with one command. Perform a dozen find/change operations as one step. Check disk space before starting a download, then wait for completion to log off and shut down. text, window names, etc., out loud. Play macros from a custom dialog box or a pulldown menu. In short, Tempo II Plus can perform practically any task you give it, instantly, accurately, and automatically. NEW-version 2.1 works with System 7, too! UTI0198 \$105.

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	Mercury 16MHz 68030 - Plus	
<b>O</b> DRI0297		
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Retrospect 1.2 & Retrospect Remote (Dantz Development)

Use your AppleTalk network for fast. automatic, unattended backup. At any time of the day or night your choice. Retrospect Remote goes from Macintosh to Macintosh and scans every hard disk performing an

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(Kennect Technology) Plug Kennect's New 5.25" Drives, Drive 1200 and Drive 360 into Rapport to read, write & initalize 1.2 MB or 360K MS DOS 7 Apple II 140K ProDOS. Drive



2.4 plugged into Rapport, is a 3.5" Diskette Drive which reads, write & initalizes all Mac & IBM formats expands 800K diskettes to 1.2 MB & High Density Diskettes to 2.4 Mb. Rapport alone enables older Macs to read 720K MS-DOS on the internal floppy drive or read & write 720K on an external Apple 800K Drive.

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<b>O</b> UTI0120	DiskLock	118
Kensing	ton	
ACC0235	Apple Security Kit	34
	PassProof	еа 69
Kent Mai	rsh	
<b>O</b> UTI0028	MacSafe II	107
<b>O</b> UTI0064	NightWatch 1.03	86
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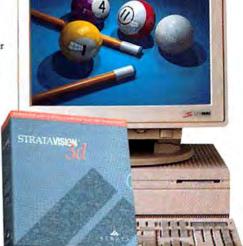
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<b>O</b> UTI0113	CanOpener	62
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<b>O</b> UTI0192	Intouch	39.
Affinity		
<b>Q</b> UTI0198	Tempo II Plus	105.
	Systems	
UTI0145	Stuffit Deluxe 2.0	62.
ALSoft		
<b>O</b> UTI0132		
UTI0110	MasterJuggler 1.5	55.
Baseline	Publishing	
UTI0182	Exposure Pro	78
	INIT Manager	
<b>O</b> UTI0190	Personality	49.
UTI0183	ScreenShot	34
Berkeley	System Design	
OUTI0119	After Dark 2.0	29
		STREET, SQUA

StrataVISION 3d 2.0 (Strata) © StrataVISION 3d turns that vision in your mind's eye into a finished 3d rendering. You'll be able to create scenes with props, depth, shadows, textures, and reflections. You can adjust the three different types of lighting (directional, spotlight and point source), move the camera, and rotate objects to set up the perfect rendering of your concept. StrataVISION 3d takes full advantage of 32-bit Color QuickDraw. It prints on PostScript printers, film recorders, and video recorders.

GRA0274 \$469.



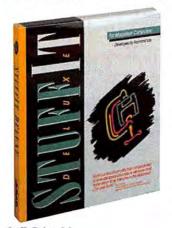
the **Electronic Mall** on CompuServe. The **MacWAREHOUSE GO code** s **GO MW**. As always, you'll get fast, dependable overnight service and you can leave messages for Kerry or any of our support staff.

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Accelerators, you not only get the computing power to process large spreadsheets and complex graphics, but you can add the optional video adapter and a larger monitor to display them as well. See line listings for prices.



<b>O</b> UTI0230	More After Dark	25
<b>O</b> UTI0231	More After Dark/ After Dark 2.0 Bundle	45
<b>O</b> UTI0074	Stepping Out II 2.02	55
<b>CE Softv</b>	vare	
<b>O</b> UTI0188	Quickeys 2 v.2	97
Connect		
UTI0148	Hand-Off II 1.1.3	56
	Applications	
<b>O</b> UTI0136	Freedom of Press 3.0.1	. 255
<b>O</b> UTI0185	Freedom of Press Light 3.0.1	55
Dantz De	evelopment	
	Retrospect 1.2	
<b>O</b> UTI0196	Retrospect Remote	. 269
OUT10200	Retrospect Remote 10-Pack	. 159
Dariana :	Software	
<b>Q</b> UIT0218	MacSlueth	89



Stuffit Deluxe 2.0 (Aladdin Systems) Stuffit Deluxe is faster, and offers new choices in compression methods. Containing optimizers for text and MacPaint files, Stuffit Deluxe also has the ability to create Self-Unstuffing files that you can send to others. It includes HyperCard XCMDs and DAs for compressing and expanding files from within applications, plus QuicKeys 2 and Microphone II extensions. UTIO145 \$62.

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UTI0194	ClickChange	59.
	neration Systems	
	FastBack II 2.5	125.
<b>Q</b> UTI0087	SuitCase II 1.2.1	49.
Incidht D	levelonement	
UTI0098	MacPrint 1.2	95.
Kent Mar	rsh	
<b>Q</b> UTI0212	FolderBoll	79.
Magic So	oftware	
UT10077	Autosave II	26
Mainstay		
	MacFlow 3.5	169
Microcor		
<b>Q</b> UTI0233	Citadel	93
<b>Q</b> UTI0191	911	89
	Complete Undelete	
Microsof	it	
LNG0030	QuickBASIC	64.
Now Sof		
<b>Q</b> UTI0167	Now Utilities 2.0	89.
	Screen Locker	
<b>ON Tech</b>	nology	
UTI0142	ON Location	75.
Salient	21. 44. 65. 67. 67. 67. 67.	
	DiskDoubler 3.7	49.
SNA		
UTI0207	Offline 2.0	65.

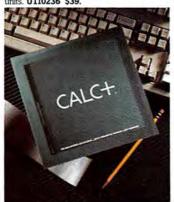
SuperMa	c	
UTI0203	DiskFit 2.0	65.
Symante	c Corporation	
UTI0151	Norton Utilities for the Mac	89.
UT10078	Symantec Utilities for Mac II (SUM)	96.
@LNG0051	THINK C 5.0	209.
LNG0002	THINK's Pascal 3.0	165.
Zedcor		
@LNG0031	ZBasic 5.0	99
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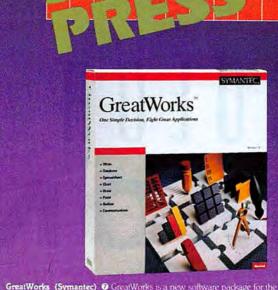
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Baseline		
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Claris		
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DeltaPoi	nt	-
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Microso	ft	
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	American Handbook of Business	
	Instant Library of Quotations	
	English Writing Guide	39
Paragon		
	9Nisus 3.05	245
Referen	ce Software	
@SPL0023	Grammatik Mac 2.0	59
	Software	
	Sensible Grammar	51
SNA, Inc		
WRD0033	Stylist	51
T/Maker	Co	
	8WriteNow 2.2	119
WordPe	rfect	
	1WordPerfect 2.0	279
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SPL0028	Correct Grammar 2.0	55

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# Despite marketing claims, color monitors are pretty much alike

# COLOR MONITOR

# MIRAGE

by Charles Seiter

Since the last time we reviewed 8-bit color monitor systems ("Color Monitors Put to the Test," *Macworld*, July 1990), video boards have dropped in price, a dozen vendors have introduced new big-screen monitors, and Apple, in its own often contrary fashion, has brought out a monitor that's *smaller* than anyone else's. Most items in this market are headed toward commodity status—you can buy generic 8-bit color boards from

one vendor to drive generic 19-inch monitors that are from another, for example. And while the Big Three Macintosh monitor vendors (Radius, RasterOps, and SuperMac Technology) are still leaders in terms of sales and development effort, they now face competition from nearly a dozen other companies.

Sources for monitors have also expanded. In addition to Sony, the dominant supplier of color monitors, Ikegami, Hitachi, Seiko, and Toshiba also sell monitors. This profusion of sources brings up at least one strategic question: Should you pay more than \$5000 at your friendly local dealer for a system from one of the Big Three vendors, or are you better off buying an under-\$3000 monitor from a vendor that sells direct or from a mail-order firm?

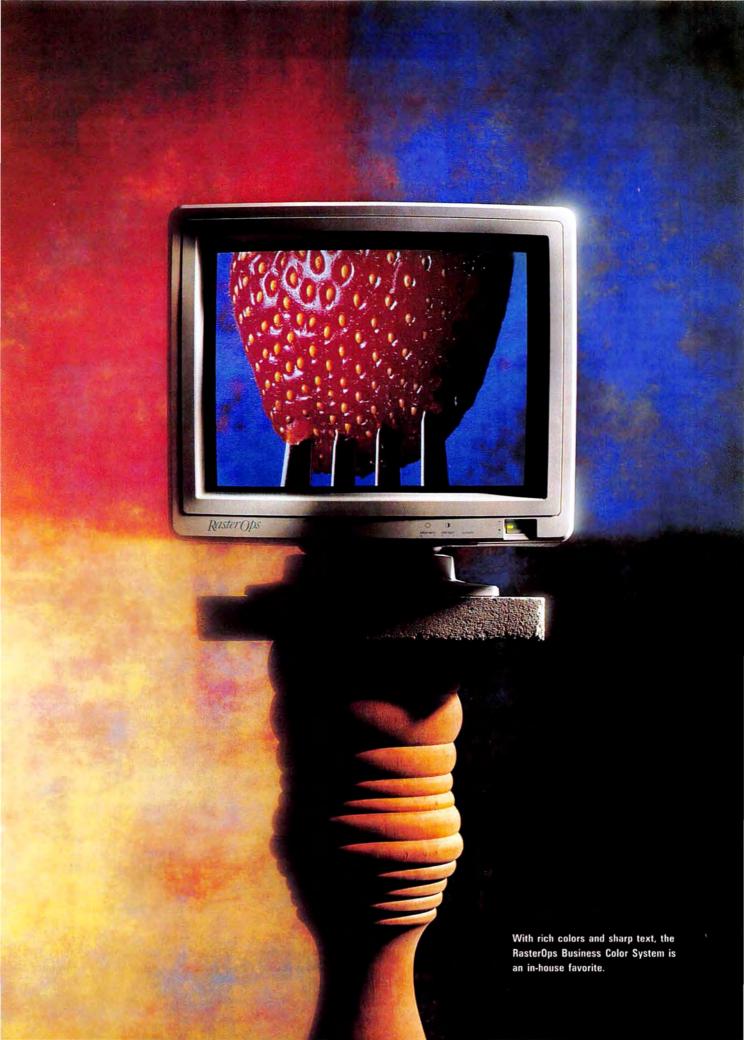
Two more basic questions you should consider before purchasing a color monitor system are: How much brightly lighted real estate do your eyes really need—can 16 or even 14 inches take care of you as well as a bigger monitor can? And do you need more than 8 bits of color? We'll look at these questions and others as we survey monitor options.

# **Spec Specifics**

In order to fully understand the Macworld Lab test results, you need to review two mildly technical subjects: first, the way a color monitor puts a signal on the screen; second, how the Mac sends a signal through a video board to the monitor.

The traditional RGB (red-green-blue) cathode-ray tube (CRT) has three separate electron guns, which fire beams of electrons at sets of color phosphor dots on a monitor's screen, generating spots of light. On the way to the screen, the beams from the guns pass through a *shadow mask*—a metal plate with precisely spaced tiny holes. The shadow mask ensures that only nice thin beams hit the screen and that the beams strike only the correct phosphor dots. Since this precision can be upset if heat generated by the monitor expands the metal shadow mask even slightly, the best monitors (in this review set, those that use the Hitachi CRTs) use shadow masks of Invar, a special alloy with minimal thermal expansion.

Unlike the Hitachi CRT, the Trinitron CRT developed by Sony uses a single electron gun, a screen painted with narrow color-phosphor stripes, and a grid of fine vertical slots in place of a shadow mask. This design offers three potential advantages: it gives better vertical resolution than the traditional design does (see "Two Kinds of Screens: Close Up"); it lets more energy through to the phosphor, creating more screen brightness (the grid blocks the



# COLOR MONITOR MIRAGE

electron beam less than a shadow mask does); and a single beam is easier to focus and align than three beams. These advantages have made the Trinitron CRT a consumer favorite. Of the 28 monitors we tested, 20 use Trinitron CRTs, and more than 85 percent of color Macintoshes in use today have Trinitron-based monitors.

Despite the differences, both types

of monitors must accurately throw an electron beam at very tiny dots on a screen that, in the case of large monitors, is more than a foot away. At these distances. the earth's 1-gauss magnetic field can produce slight misalignment of the final beam position. If the electron beams are knocked too far out of alignment, you see misconvergence-that is, the screen looks out-of-focus and you start to see fringes of color around black-and-

white text. For the sake of uniformity, whenever making convergence adjustments, monitor makers position the monitor to face east.

Measurable changes in convergence can occur when magnets are present (in nearby monitors, for example) or someone bumps into a monitor. Fortunately, some monitors-such as the Sony Trinitronshave easily accessible controls for adjusting convergence. These controls make monitors, especially big ones, more pleasant to use. Macworld Lab does not adjust convergence on monitors before taking objective readings. If you buy a monitor and are not happy with the convergence, you can adjust it yourself if the controls are accessible, or you can have the dealer adjust it for you.

# Sending a Signal

The Mac is a digital device while the typical monitor is analog. How does

the Mac translate its set of numbers that characterize each pixel on a screen into a usable signal, like that for a color TV? The Mac sends a digital signal to a video display circuit, which is located either on its own main logic board (as in the LC, IIsi, and IIci) or on a display board. Three high-speed digital-to-analog converters then translate the signal into red,



For a good deal on a 19-inch Ikegami-based monitor system, check out the Mirror ProView/8 and the MacProducts MagicView.

green, and blue levels. Now the monitor is ready to produce any conceivable color—the 256-color limit implied by the designation 8-bit is due to a limit in the display circuit. The circuit allows you to save 256 index values—each value represents a particular combination of red, green, and blue levels. The set of possible combinations gives you access to more than 16 million colors, but the catch is that the 8-bit circuitry (which costs about one-third as much as 24-bit color) only lets you use 256 colors at one time.

For most applications, 256 colors is plenty. You need more if you want to view scanned images and expect them to look like color photographs. Some vendors, anticipating that you might eventually want this capability, offer trade-ins (E-Machines, Super-Mac, MegaGraphics) or upgrades (Radius, Sigma, RasterOps) from an 8-bit to a 24-bit board. The 8-bit ver-

sion of a scanned image looks slightly grainy compared to a 24-bit version, because the software is forced to pick a best fit from a set of colors that aren't an exact match—this means that boundaries can show the color equivalent of black-and-white jaggies.

In the 8-bit world, gamma-correction software can make colors seem more realistic. When you apply

> gamma correction to the monitor's palette of 256 colors, you fix in software the tracking (or electron-gun alignment) problems inherent in monitor design. For a given colorred, for examplethe value 0 in Apple's Color Picker software represents "all the way off" and 65,535 represents "as red as it gets." Each color in a monitor's palette is represented by three numbers-one for the strength of red, one for the strength of green,

and one for the strength of bluewhich are indexed into one overall number. Gamma-correction software takes into account the strength of the color guns at different signal levels, and adjusts the numbers so that the guns track together. This way the monitor can produce a smooth succession of gray levels at intermediate intensity values. In general, transformations that adjust all 256 colors in a set in a way that's mathematically smooth produce realistic colors. Short of invoking the precise but expensive calibration hardware designed for the RasterOps, Radius, and SuperMac units, using gamma-correction software is the only practical way to enhance color fidelity.

# The Differences in Video Boards and Monitors

Having reviewed a bit of electrongun dynamics and color-generation theory, are you ready to pick a monitor from the Macworld Lab test data? Probably not, but in the course of doing cross-comparisons among groups of monitors, I discovered some principles that you should find useful. All you really need to know is this: the importance of video boards, the importance of CRT types, and how these components vary among vendors.

In general, I found that vendors are producing well-designed video boards to drive the monitors, thus making the board a small factor in your purchase decision. For instance, both the E-Machines T19 and the RasterOps 8L systems use Sony's 19-inch Trinitron, but each system uses a different video board. Compare the two systems, and you will find that since both companies have designed competent video boards, there isn't much variation in most of the objectively measurable parameters, and even less in subjective evaluation.

The differences are mainly due to variations in individual monitors. The difference in the monitors' distortion levels (differences that don't significantly affect user satisfaction) shows up as a slight bend in the menu bar at the top of the screen; this bend occurs in a small percentage of 19-inch Sony Trinitrons. Vendors who buy monitors from Sony claim that they present Sony with a unique set of specifications and rigorously screen all monitors they receive; there is simply no way to determine whether



For a smaller monitor, we place the Radius Color Pivot and the E-Machines ColorPage T16 at the top of our shopping list. Both show excellent quality and have a fair price.

Macworld Lab tests. The results are not unique to MegaGraphics products—in general, the 19-inch Sony Trinitron posts better scores than the 19-inch Ikegami.

Ikegami monitors, however, are generally cheaper than Sony monitors. Thus, the hard question to answer is If you can get an Ikegamibased monitor system such as the Mirror Technologies ProView/8 for \$2897 and take care of minor tracking deficiencies with software gamma correction, is it worth about \$1500 more to get a Sony-based system from another vendor? Judging subjectively between the two MegaGraphics products, Macworld found that the Sony unit shows clearer text, espe-

considerable length variations out at the 12-inch marks. How much variation occurs in a set of monitors from the same manufacturer (say Sony) using the same display board? Macworld Lab compared a set consisting of Ikegami monitors from Cutting Edge, Ehman, and MegaGraphics. The video boards shipped with these monitors are from the same source. Comparing these systems suggests the amount of variation you can expect in products the vendors try to make as identical as possible. The monitors show some differences in convergence and distortion, the most delicate variables in the objective evaluation, but strong similarities in tracking, contrast, and brightness. This means, among other things, that vendors can't accomplish much by prescreening the monitors they send Macworld Lab for evaluation. Translating these differences into a buying decision requires that you keep in mind that your vision may not be as acute as professional test equipment at registering small variations. Thus, if one monitor only edges out another in a test, you won't see any real-life differences in quality and should opt for the less expensive or better-supported product.

# In 1989 you paid \$6000 for a good 19-inch monitor; now you can get one that meets the same specs for less than \$3000

or not this screening process allows a vendor to ship a higher percentage of "perfect" monitors.

We compared two monitor types driven by the same board—the MegaGraphics 19-inch Ikegami CT/20 and the MegaGraphics 19-inch Sony Trinitron, both driven by the MegaGraphics 2008 high-resolution video board. In every area except brightness, the Sony posts slightly better scores than the Ikegami in

cially if the user adjusts convergence with the two convenient knobs right up front on the monitor. If you typically work with text or with line drawings, the improved sharpness is worth the extra money.

# What about Variation?

There's variation in every measurable quantity. If you buy ten cheap plastic 1-foot rulers and line up their 1-inch marks, you may be startled to find

# **Buyer's Guide**

These observations lead to some general-purpose monitor-buying advice. First, visit the nearest dealer and try out the software you work with every day to see how much difference screen size makes to you. If a 14- or

# COLOR MONITOR MIRAGE

# **COLOR MONITOR SYSTEM SPECIFICATIONS**

Company	Name of Monitor	Name of Display Board	Price of Board	Price of Monitor	System Price	Picture Tube Manufacturer	Active Screen Area (h x w, in inches)	Diagonal Screen Size (in inches)
Apple Computer	Apple Macintosh 12* RGB Display	LC (internal)	included in Mac LC	\$599	\$599	Sony	8.1 x 6.1	12
Apple Computer	AppleColor High- Resolution RGB Monitor	Macintosh Display Card 4 • 8	\$648	\$999	\$1647	Sony	9.3 x 6.8	13
CalComp	DrawingCard 2-Page Display System	NA	NA	NA	\$5995	Hitachi	15.5 x 11.6	21
Cutting Edge	20" Trinitron 8-Bit Color Monitor	NA	NA	NA	\$4199	Ikegami	14.2 x 10.75	20
E-Machines	ColorPage T16	DoubleColor	\$495	\$2500	\$2995	Sony	8.75 x 11.6	16
E-Machines	E-Machines T19	T19/8	\$1295	\$4200	\$5495	Sony	13.6 x 10.75	19
E-Machines	E-Machines TX	TX/8	\$1295	\$2500	\$3795	Sony	9.28 x 11.75	16
Ehman	20" Trinitron 8-Bit Color Monitor	NA	NA	NA	\$2895	Ikegami	14.2 x 10.75	20
Generation	Designer/8	Designer/8	\$895	\$3695	\$4395	Ikegami	14.25 x 10.75	20
Systems	20" Color Display System							
MacProducts USA	MagicView	MagicView	\$499	\$2312	\$2811	Ikegami	14.25 x 10.75	20
MacProducts USA	MagicView	MagicView	\$279	\$619	\$878	Seiko	9.75 × 7.4	14
MegaGraphics	MegaGraphics 2008/16* Color Display System	2008 (hi-res)	\$1599	\$1996	\$3595	Sony	11.6 x 9.3	16
MegaGraphics	MegaGraphics 2008/16" Color Display System	2008	\$1599	\$1996	\$3595	Sony	11.1 x 8.8	16
MegaGraphics	MegaGraphics 2008/19" Display System	2008	\$1599	\$2199	\$3798	Ikegami	13.6 x 11	19
MegaGraphics	MegaGraphics 2008/19" Display System	2008	\$1599	\$4349	\$5948	Sony	13.6 x 11	19
Mirror Technologies	ProView/8	NA	NA	NA	\$2897	Ikegami	14.3 x 10.7	19
Nutmeg Systems	Nutmeg 19 Color System	NA	NA	NA	\$4899	Sony	14 x 11	19
PCPC	PCPC II 19" Display System	CGC/2	\$995	\$2595	\$3495	Ikegami	14.2 x 10.7	19
Radius	Radius Color Display	DirectColor/83	\$1795	\$4295	\$6090	Sony	14.3 x 10.8	19
Radius	Radius Color Display/21	DirectColor/83	\$1795	\$4495	\$6290	Hitachi	14.4 x 11.3	21
Radius	Color Pivot	Color Pivot Interface	\$795	\$1995	\$2790	Toshiba	7.8 x 10.65	15
RasterOps Corporation	Business Color System	ColorBoard 708+	NA	NA NA	\$36985	Hitachi	14.4 x 10.75	19
RasterOps Corporation	RasterOps 8LC System	ColorBoard 8LC	NA	NA	\$36985	Hitachi	14.3 x 10.6	19
RasterOps Corporation	RasterOps 8XLi System	ColorBoard 8XLi	NA	NA	\$6798	Sony	14.2 x 10.6	19
Sigma Designs	ColorMax 8/24 Display System	NA	NA	\$4295	\$6090	Sony	14.2 x 10.7	19
SuperMac Technology	16" Trinitron Display	Spectrum/8 Series III <sup>7</sup>	\$999	\$2700	\$3699	Sony	11.75 x 8.7	16
SuperMac Technology	19" Dual Mode Trinitron Display	Spectrum/8 Series III <sup>7</sup>	\$999	\$4200	\$5199	Sony	14.25 x 10.6	19
SuperMac Technology	19" SuperMatch Color Display	Spectrum/8 Series III <sup>7</sup>	\$999	\$2800	\$3799	Hitachi	14.3 x 10.75	19
SuperMac	21' SuperMatch Two-	Spectrum/8 si	\$999	\$4400	\$5399	Hitachi	15.15 x 11.2	21
Technology	Page Color Display		144		P. Commission	200		

<sup>• =</sup> yes;  $\bigcirc$ = no. 'B = brightness; C = contrast; D = degauss; Hstat = horizontal static convergence; Vstat = vertical static convergence; Hcent = horizontal centering; Vcent = vertical centering; RGB = RGB adjustment; Hsize = horizontal size; Vsize = vertical size; W = width of image area. 'C = screen capture; E = enlarged menus; G = gamma correction; P = pop-up menus; S = screen saver; T = tear-off menus.

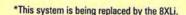
Resolution	Divel Density	Vestical Believe	Walaka	5 Cid-	P-1-2	2.4	
(w x h, in pixels)	Pixel Density (in dots per inch)	Vertical Refresh Rate (in Hz)	Weight (in pounds)	Front or Side Controls <sup>1</sup>	Back Controls <sup>1</sup>	Software <sup>2</sup>	Hardware Pan and Zoom
512 x 384	64	60	35	B, C	none	none	0
640 x 480	72	67	34	B, C	D, Hstat, Vstat	none	0
1152 x 870	72	75	82	B, C, D, Hsize, Vsize, W	RGB	G, application template	0
1024 x 768	72	75	87	B, C	RGB	none	0
832 x 624	72	66.9	60	C, Hstat, Vstat, Vcent	none	C, E, G, S	0
1024 x 808	75	71.3	86	C, Hstat, Vstat, Vcent	none	C, E, G, S	0
1024 x 880	85	72	60	C, Hstat, Vstat, Vcent	none	C, E, G, S	0
1024 x 768	72	78	87	B, C	RGB	none	0
1024 x 768	72	75	85	B, C	RGB	none	0
1024 × 768	72	75	85	B, C	RGB	none	0
640 x 480	72	67	33	B, C	Hsize, Vsize, Hcent, Vcent	none	0
1024 x 826	88	69	55	C, Hstat, Vstat, Vcent	none	none	0
832 x 656	75	69	55	C, Hstat, Vstat, Vcent	none	none	0
1024 x 826	75	69	85	B, C	RGB	none	0
1024 x 826	75	69	80	C, Hstat, Vstat, Vcent	none	none	0
1024 x 768	72	75	90	B, C, D, Hstat, Vstat, Hcent, Vcent, Vsize	RGB	C 2000	0
1024 x 768	72	78	85	B, C, D	none	none	0
1024 x 768	72	75	85	B, C	RGB	none	0
1152 x 882	824	72	84	C, Hstat, Vstat, Vcent	none	C, E, S, T	0
1152 x 882	784	71	81	B, C, D, Hcent, Vcent, W	none	C, E, S, T	0
640 x 870	82	75	48	B, C	none	C, E, S, T	0
1024 x 768	72	75	62	B, C, D, Hcent, Vcent, W	none	none	•
1024 x 768	72	75	62	B, C, D, Hoent, Voent, W	none	none	•
1024 x 768	72	75	86	C, Hstat, Vstat, Vcent	none	none	•
1024 x 768	72	79	85	C, Hstat, Vstat, Vcent	none	G	0
832 x 624	72	75	59.4	C, Hstat, Vstat, Vcent	none	none	•
1024 x 768	72	75	97	none	none	none	•
1024 x 768	72	75	85	В, С	none	none	•
1152 x 870	78	75	71	B, C, D	none	none	•

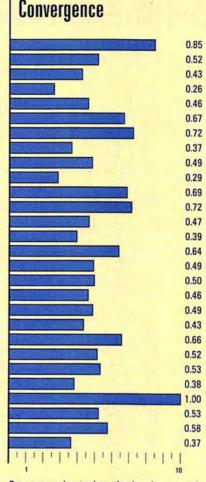
<sup>&</sup>lt;sup>3</sup> The DirectColor/8 can be upgraded to 24 bits. A nonupgradable 8-bit board, the PrecisionColor 8 is available for \$795. <sup>4</sup> A 72-dpi version of the DirectColor/8 is available for \$1895. <sup>5</sup> System with Sony monitor available for \$5198. <sup>6</sup> System with Hitachi monitor available for \$5298. <sup>7</sup> Can also use Spectrum/8 24 PDQ board (\$1399), which includes QuickDraw acceleration.

# **Color Monitor Tests**

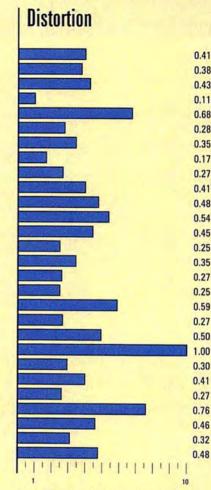
Longer bars are better







Convergence denotes how closely red, green, and blue electrons meet on the same spot on a screen. The better a monitor's convergence, the more accurately the monitor renders color. The SuperMac 16" Trinitron Display had the best convergence and thus received an index rating of 1.00. On average, red, green, and blue were out of alignment by only .15 millimeters. The Cutting Edge 20" Trinitron had the worst convergence—its guns were out of alignment by .56 millimeters. We used a Klein convergence meter to measure convergence.

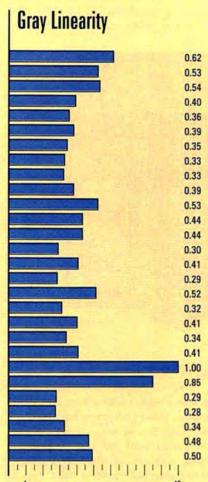


A monitor's level of distortion determines how geometrically correct an object appears on screen. None of the monitors had highly noticeable distortion. We measured (in units of 64ths of an inch) the total amount of distortion displayed in 9 squares at various locations on the screen and totaled the measurements. The RasterOps 8L System had the least distortion at 6.5 and thus received an index rating of 1.00. The Cutting Edge 20" Trinitron had the worst distortion at 61.5—nearly an inch total.

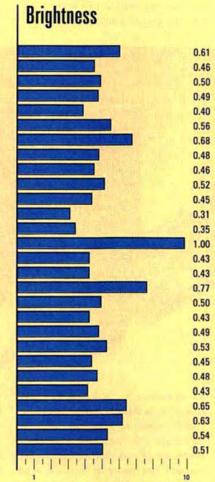
16-inch screen is sufficient, spare yourself the expense and physical nuisance of dealing with a giant two-page display. If you're upgrading from an SE or Classic to a color system, even 14 inches will seem expansive. Second, if absolute sharpness on very small text or fine lines is critical to

you, ask to see the actual monitor you will be buying demonstrated—different units, even those from the same vendor, have enough variation that in the most rigorous resolution tests some are just better than others.

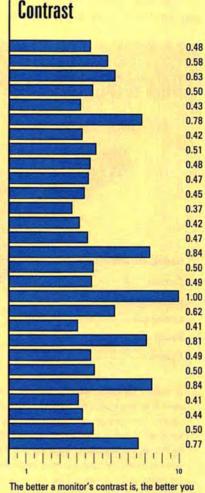
Finally, quality-control standards on all these products are high enough that none we tested was actually bad in any sense—a lower ranking here may mean that a monitor is very slightly less sharp or somewhat less bright, but every one of them was sharp enough and bright enough to be acceptable for day-to-day use. The chances of getting a lemon have been



Gray linearity indicates how accurate colors stay as they lose luminance. To test gray linearity, we used Apple's Color Picker to reduce the luminance of red, green, and blue in increments of 10 percent. We used a Minolta color analyzer to measure the luminance coming from the screen at each percentage drop. The RasterOps 8LC System had the best linearity and received an index rating of 1.00; the SuperMac 16" Trinitron Display had the worst linearity.



In our subjective tests, we found that most people prefer a brighter monitor. For our objective test, we turned the brightness up as high as it could go without showing scan lines on the monitor. We then used a Minolta luminance meter to measure brightness. The brightest monitor was the MegaGraphics 2008/19" Display (Ikegami) at 60.68 footlamberts—it received an index rating of 1.00. The dimmest monitor was the MegaGraphics 2008/16" Color Display (hi-res) at 19.11 footlamberts.



The better a monitor's contrast is, the better you can see details in light or dark areas of an image. To test contrast, we placed several white squares on a black background and then used a Minolta luminance meter to calculate the ratio between the luminance in each of the white squares and the luminance in the black background. We averaged the ratios. The Radius Color Display had the best contrast ratio at 16:1 and thus received an index rating of 1.00; the MegaGraphics 2008/16" Color Display had the worst contrast ratio at 6:1.

whittled to a very low level indeed by diligent engineers at Sony, Ikegami, and Hitachi. You may want to call customer support at a company a few times to see how fast your call gets answered, but if you're a hardy soul who doesn't need reassurance or dealer hand-holding for setup there's

no objective reason to pass up the savings you get by ordering a less expensive system from a price-competitive company or a mail-order firm.

## A Colorful World

All the monitors we tested are of good quality, but we still have favor-

ites. Here are some picks in specific categories.

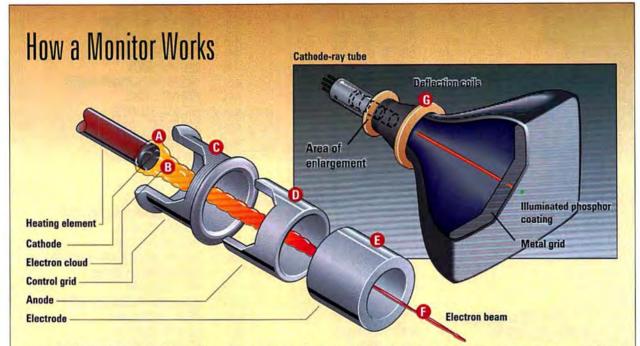
Small but Effective The 13-inch AppleColor High-Resolution RGB Monitor is still a quality monitor, but you can get an excellent bargain by purchasing a less expensive, 14-inch multisync monitor, a popular type of

# COLOR MONITOR MIRAGE

monitor in the MS-DOS world (see "Sync or Swim—Low-Cost Monitors"). For instance, we tested the iDS ColorVue 14" Color Monitor from iDS Systems with Apple's Macintosh Display Card 4•8 to see how multisync

monitors fared. At \$399, the ColorVue is a great bargain. It has sharp text and bright colors. If you don't need more screen than this, get an iDS monitor and buy yourself a CD ROM player with the rest of your funds.

A Monitor with a Twist The Radius Color Pivot is an amazing device. If the Monitor Fairy wants to reward us for all our painstaking lab measurements, she should leave a Color Pivot on our desktop. The objective mea-

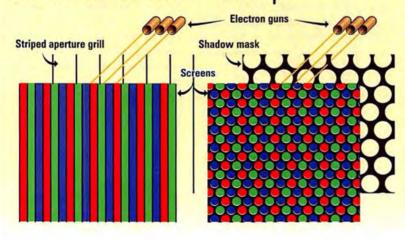


A cathode (A) starts the chain of events that leads to an image being displayed on a monitor's screen. When heated, the cathode produces a cloud of electrons (B). A control grid (C) determines the number of electrons that can pass—the more electrons that pass, the brighter the image on the screen will be. An anode (D) then accelerates the electrons, sending them

into an electrode (E) that focuses them into a beam (F) that is the same width as a pixel on the monitor's screen. All of these elements—from the cathode to the electrode—are housed in a monitor gun. A monochrome monitor has only one gun; a color monitor has three—one for red, one for blue, and one for green. Once the beams are focused in the guns, deflection coils (G)

generate a magnetic field that forces the beams to zig-zag back and forth across the screen at a rate of over 60 times per second (this is called the monitor's refresh rate). When the electron beams collide with the screen, the phosphor coating glows and produces a visible image.

# Two Kinds of Screens: Close Up



All monitor screens have an internal phosphor coating backed by a fine metal grid. The grid determines how the monitor's screen appears on close inspection. The Sony Trinitron guns shoot red, green, and blue beams (left). A striped metal grid (called an aperture grill) separates the colors. Each gap in the grill is large enough to let a red, green, and blue beam pass. This setup gives Sony Trinitrons sharp resolution, but also—upon close inspection—noticeable vertical lines. Other monitors use a metal grid of staggered round holes (called a shadow mask). Each hole lets a red, green, and blue beam pass. The vertical resolution of these monitors is not as sharp, but you don't see any lines.

surements were not outstanding, and the screen does not really give you much more area than a 14-inch monitor, but the colors on the Pivot are particularly vivid, and the ability to change this monitor's orientation from landscape to portrait and back again makes the Color Pivot more flexible than a standard 14-inch monitor.

Sweet Sixteen We processed all the objective tests through SYSTAT 5.1, looking for correlations between quality factors. One result that emerged was that even Sony provides more-precise red-green-blue gun tracking on a 16-inch screen than on a 19-inch one. And the star among the Sony 16-inch monitors is the E-Machines ColorPage T16. If you work with line art or CAD drawings or just big spreadsheets with color highlights, the ColorPage T16 is the best monitor you can choose. All these monitors look good displaying color fish tanks; the ColorPage T16 looks good even when displaying green numbers in 9-point Times way off in the upper-right corner.

Big and Beautiful In the largest monitors, RasterOps has something for everyone: the Sony-based Raster-Ops 8L System won the greatest number of objective tests, and the Business Color System (a Hitachibased package listed for \$2500 less) was an in-house favorite for its richness of color and sharp text. Of the two monitors, we would opt for the Business Color System.

Real Deals If you need a big monitor and have budget constraints, you should go with the Mirror Pro-View/8 or the MacProducts Magic View. Within the specifications of Ikegami quality control, these systems are identical. The ProView/8 comes with some handy software utilities, although many similar utilities for large screens can be obtained as shareware. At the time this was written, these two firms were trading places as the "best buy" during a series of small price cuts; you should be able to get a 20-inch Ikegami-based 8-bit color system from one of these vendors or their competitors for around \$2500 before the end of the year. In objective tests, Ikegami monitors performed somewhat worse

# SYNC OR SWIM—LOW-COST MONITORS

he lowest-cost color monitors for a given screen size are multisync systems. That's because these monitors, which can lock in on a range of vertical and horizontal scan rates, are produced in huge volume for the IBM PC market, where video boards follow a variety of standards. The iDS ColorVue 14" Color Monitor is one example; at \$399 it's the cheapest monitor we tested, but it performed well with the standard Macintosh Display Card 4\*8 video board.

Most other vendors in the multisync market are large firms from Japan competing in the 14-inch market, Some representative examples are:

- Nissei Sangyo America's CM148M, at \$895, a monitor specially designed to conform to European standards for lower electromagnetic emissions;
- the Mitsubishi Diamond Scan 14, an \$839 monitor that can support up to 800 by 600 resolution:
- the Ultra 1400, at \$899 from Princeton Graphics Systems, is another lowpriced 14-inch system;
- the MultiSync 3D and 3DS, \$699 14-inch monitors from NEC Technologies that offer a 0.28mm dot pitch.

If you require color and are pressed for funds, you should know that every major monitor maker offers a multisync model that is compatible with the Macintosh II. Quality, particularly of text sharpness, varies from model to model. You should therefore examine a monitor demonstrated by a dealer before buying—the best multisyncs are very good indeed, but some simply are not as good as Apple's venerable Trinitron-based AppleColor High-Resolution RGB Monitor.

as a group than Sony monitors at convergence and tracking, and in subjective tests a bit worse than bigscreen Hitachi monitors in color richness. But you would be hard put to justify several thousand dollars' difference in price between these units and their competitors—looking at a discounted, mail-order Ikegami on your desk without other monitors around for detailed comparison, your opinion is going to be "Wow, what a great monitor!"

# Reality Check

Bigger things cost more. Better bigger things cost more still. Apart from these observations, which were probably true for spear tips in the late Pleistocene, we can give you some new information. A vertical refresh rate over 65Hz means the screen doesn't flicker. It helps greatly to have horizontal and vertical static convergence knobs on the front of a monitor. Almost all the sources for 8-bit video boards seem equally competent. The quality control within given

manufacturers' lines appears tighter than it was two years ago, especially for larger monitors. The new wave of monitors from Ikegami and Hitachi will force down prices, even on Sony systems.

When Macworld reviewed color monitors in August 1989 you had to pay \$6000 for a good 19-inch monitor; now you can get one that meets the same specs for less than \$3000. You can, of course, save lots of money if you can live with a smaller screen, and it helps to look at several types of monitors close up before you buy. But 8-bit color monitors, at least, unlike software or networks or giant hard drives, have become an area in which it is hard to make a serious buying mistake.

See Where to Buy for contact information.

Macworld contributing editor

Charles Seiter works on problems in
color-image analysis and compression
for a San Francisco electronics firm.

# SEEKING

# Efforts to reduce extremelylow-frequency magnetic fields begin to pay off



RELIEF

by Rory J. O'Connor

To computer users who worry about the possible health dangers of exposure to the low-level magnetic fields emanating from their monitors, the issue seems clear: manufacturers should get rid of the offending emissions.

But monitor makers see shades of gray when it comes to emissions. Most say that they want to address public concern over the possible dangers of extremely-low-fre-

quency (ELF) magnetic emissions. Indeed, some see reducing emissions as a way for their product to stand out in a crowded and competitive marketplace—and as the only way to succeed in the booming European market, where consumers and labor unions may demand reduced-ELF products. Vendors complain, however, that because there is no scientific consensus on what level of magnetic emissions—if any—affects health in humans, they can't know just how far to go in reducing the emissions. "We don't know how low is low," says Stu Roberson, a product manager at Radius.

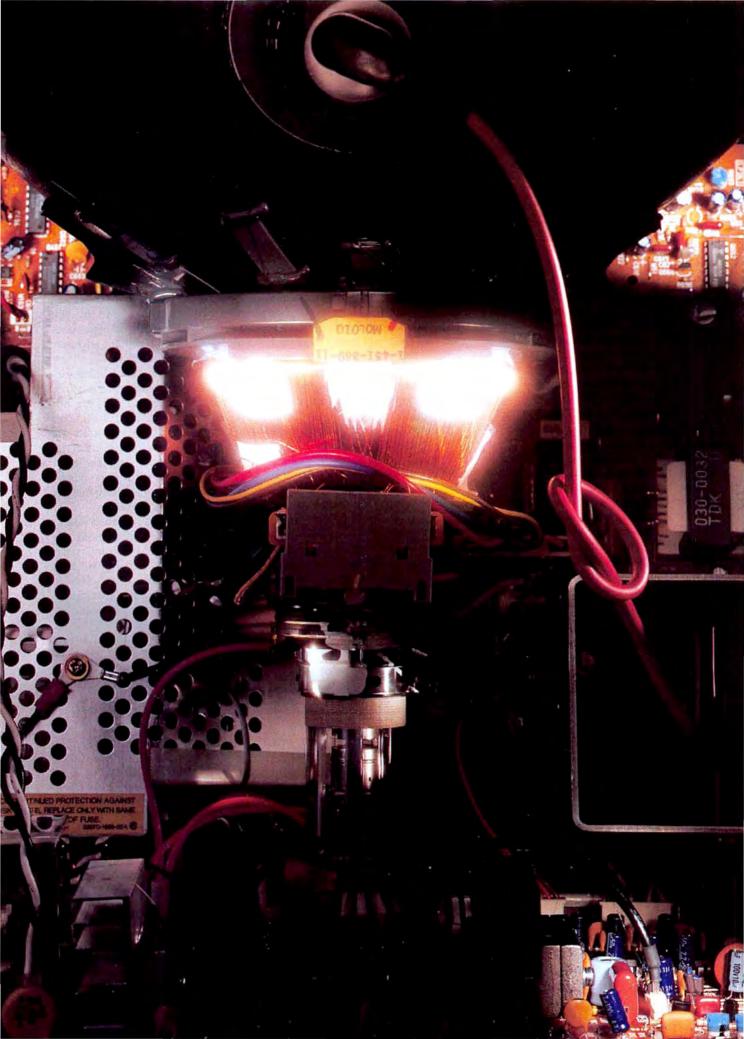
As long as monitors use cathode-ray tubes (CRTs), manufacturers can't easily eliminate all magnetic emissions—at least, not without making the devices far too costly. A CRT works by deflecting a beam of electrons with precise magnetic fields generated by wire coils wrapped like a yoke around the neck of the tube. Without sufficiently strong magnetic fields to move the electron beam, it would simply shoot straight ahead, never sweeping across the screen to draw the image you see.

Nonetheless, many leading monitor vendors are delivering, or say they are designing, new monitors with sharply reduced ELF magnetic emissions, using one or two well-understood techniques. Which engineering method is required, says Brian Berkeley, manager of display technology for Apple, "depends on the size of the screen and whether it is monochrome or color." Larger screens require higher current peaks to operate, and tend to generate more intense magnetic fields—thus requiring more stringent reduction techniques.

# **Coils Affect Emissions**

ELF magnetic emissions can be reduced by changing the kind of wire coil used on the CRT yoke. Coils are often wound in a *saddle-toroidal* pattern, in which one coil surrounds a ferrite band that covers another central coil and directs the magnetic fields generated by the coils. Switching to a *saddle-saddle* method of winding the yoke coil—in which all the windings are inside a ferrite band—can reduce ELF emissions significantly, says Roberson (see "New Monitor Designs to Reduce Electromagnetic Emissions"). "On displays that have a saddle-saddle yoke, the ELF [emissions] are quite low," he says.

Macworld Lab tests of 32 color monitors confirmed that those with a saddle-saddle design uniformly emitted weaker ELF magnetic fields than monitors using a saddle-toroidal design (see "ELF Magnetic Emissions").



# SEEKING ELF RELIEF

Monitors from several vendors showed dramatic improvements over monitors from the same companies tested by Macworld Lab last year. And in all but three cases (monitors with saddle-toroidal coils) emissions drop off to below 1 milligauss (1/1000 of a gauss, a unit of magnetic-field strength) at 28 inches from the front of the monitor. Users can reduce their exposure to ELF magnetic fields by simply staying this far away from the screen (and slightly farther from the sides and back of the monitor) whenever possible (see "The Magnetic-Field Menace," Macworld, July 1990).

Some monitor makers have avoided saddle-saddle coils out of concern that they don't deliver as crisp an image as the standard, saddle-toroidal coils, according to Carlo Infante, senior consulting engineer at Digital Equipment Corporation (DEC). But Infante calls the difference in image quality slight. In Macworld Lab tests, coil design was not a factor in image quality (see "Color Monitor Mirage," in this issue).

Gary Baker, display engineering manager at SuperMac Technology, says that the saddle-saddle design allows greater control over magnetic fields, actually improving consistency in image quality. Apple's Berkeley agrees that properly wound saddlesaddle coils can sharpen the image in the far corners of the big screen. But he adds that the saddle-saddle coils are more difficult for manufacturers to wind, increasing production costs.

# **Canceling-Coil Solution**

Some vendors favor an alternative emissions-reduction approach, one that counteracts magnetic fields generated by the yoke coil. This method involves installing near the yoke another series of wire coils that generate a canceling magnetic field.

The theory is straightforward, says DEC's Infante. "You induce an equal and opposite field in the canceling coils." The laws of physics dictate that the two fields will then cancel each other. "There is absolutely no question; the technique works," says Michael Mason, a computer consultant for the nonprofit Fund for the City of New York.

SuperMac combined saddle-saddle and canceling-coil technologies for a new 19-inch color monitor (which should be shipping by the time this article appears) with impressive results. Macworld Lab tests on a prototype of that unit showed lower ELF magnetic emissions than with any other monitor tested (see "ELF Magnetic Emissions"). Super-Mac wound canceling coils directly around the saddle-saddle coils surrounding the widest part of the yoke.

MegaGraphics expects to use canceling coils to modify some of its older monitor designs, as well as some newer ones. "We're putting on a coil that looks like a wing in two places around the yoke," says Brian Girvin, director of engineering for MegaGraphics. The 4-inch-long wings are electrically connected to the yoke coil, and also require some changes to the deflection circuit board that controls the electron beam. Girvin claims that this design reduces the magnetic fields to "pretty far below" levels recommended in the influential MPR-2 guidelines issued by the Swedish National Board for Measurement and Testing, without adversely affecting image quality.

But Infante says that adding canceling coils to monitor designs is not easy. If the canceling coils are not placed precisely in the correct spot, the canceling fields they generate will not properly oppose the fields of the yoke coil. The result: magnetic emissions that are weaker at some points, but even stronger than those from an unmodified monitor at others.

"Some of these countervailing fields cancel the emissions at the operator's location, but [can] create larger fields at other points," says Louis Slesin, editor of *VDT News*, a newsletter specializing in electromagnetic emissions issues (for subscriptions, write to P.O. Box 1799, Grand Central Station, New York, NY 10163; or call 212/517-2802). The canceling coils must also be placed so that they reduce the magnetic field enough to meet the Swedish guidelines without adversely affecting the magnetic fields that push the electron beam around.

And like the saddle-saddle method, canceling coils are not cheap. MegaGraphics CEO Diane Scott estimates that adding canceling coils will increase the company's production costs per monitor on its monochrome Rival line by 10 to 15 percent (although the added expense may not affect retail pricing). For some manufacturers, adding canceling coils to older designs isn't worth it. "We looked at it, and it was an expensive aftermarket fix," says Roberson of Radius.

Smaller monitors, such as the one in the Macintosh Classic, do not re-

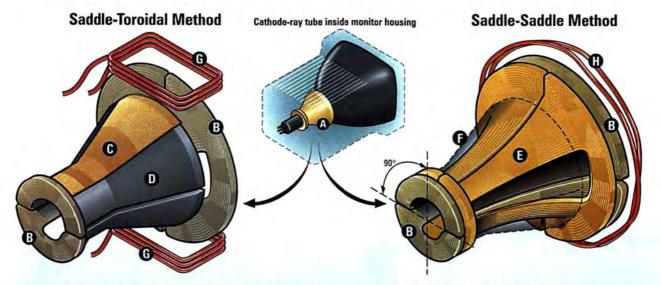
#### SHIELDING OLDER MODELS

s consumer concerns about CRT emissions have grown, so has the search for ways to shield the millions of monitors designed and sold before the potential hazards of ELF fields were widely known. Several companies market glare screens or shields that they say reduce ELF fields. E.L.F. Armor from Fairfield Engineering is one of the few that actually work. Macworld Lab verified that this steel-alloy cylinder, which fits over the CRT's yoke, reduces ELF magnetic emissions significantly (see *Conspicuous Consumer, Macworld*, February 1991). Some industry sources contend that this type of shield causes a buildup of heat that, over time, could damage monitor components. But no studies have confirmed those concerns. E.L.F. Armor costs \$79.95 for compact Macs and \$89.95 for 13-inch monitors.

Mag-Not, a \$49.95 product from TYV, consists of a pair of metal bands that fit on the outside of the monitor. In Macworld Lab tests, Mag-Not reduced ELF magnetic emissions between 17 and 69 percent, depending on the measuring points.

The best material for shielding is an alloy of 80 percent nickel, 15 percent iron, and 4.2 percent molybdenum. Called *mu metal*, the substance has been used for decades, primarily by the Department of Defense, to shield sensitive electronic components from stray magnetic fields. But mu metal is difficult and expensive to make, and it must not be reworked or dropped. At an estimated \$200 to \$300 per monitor, the heavy mu metal shields have not been widely adopted as a practical solution to ELF emissions.

# New Monitor Designs to Reduce Electromagnetic Emissions



Variations in the design of monitor components significantly affect electromagnetic emissions. Images on a computer screen are created by an electron beam that sweeps from top to bottom and from left to right. That sweeping motion is controlled by magnetic fields generated by deflection coils within an assembly that looks like a yoke around the neck of the cathode-ray tube (A). Electromagnetic fields generated by the coils also emanate from the monitor.

There are two methods for winding deflection coils: saddle-saddle and saddle-toroidal. Both methods begin with an inner coil, shown in green (B), which controls the horizontal movement of the electron beam. In the saddle-toroidal method (left), a second coil, shown in gold (C), which controls the beam's vertical movement, is wound directly around a gray ferrite band (D) that encircles the central coil and helps concentrate the magnetic fields. In the saddle-

saddle method (right), the second coil, shown in gold (E), is placed on top of, and rotated at 90 degrees in relation to, the inner coil. A ferrite band (shown in a ghosted image at F) wraps over the middle section of the coil assembly. Macworld Lab tests indicated the saddle-saddle method to be clearly superior, showing lower ELF-magnetic emissions than the saddle-toroidal method.

To reduce electromagnetic emissions, some manufacturers are using or intend to use canceling coils whose electromagnetic fields operate in opposition to the fields of the main coils. MegaGraphics is working on canceling coils (shown in red at G), positioned above and below the main coils of its monitors that use the saddle-toroidal method. SuperMac has used a canceling coil (shown in red at H) that wraps around the largest section of the saddle-saddle coils. The SuperMac machine showed a lower level of ELF emissions than any other monitor tested.

quire a coil change, says Berkeley. Instead, a reduced-current saddle-toroidal yoke was developed for the Classic, and the Classic's various components partially cancel out one another's magnetic fields. (Macworld Lab tested the Classic and found that it emits relatively high levels of ELF magnetic emissions; but because the computer and the monitor are a single unit, and both components generate ELF emissions, the monitor alone could not be evaluated.)

# **Quality Control**

While reduced-emissions monitors can certainly be produced, there is some doubt about whether they can be manufactured reliably, without significant variation from one unit or factory to the next. In one study, several identical models of an IBM monitor were found to vary in ELF emissions by as much as a factor of three, according to Slesin. Vendors agree they must impose stringent design and

# THE EVOLVING SWEDISH GUIDELINES

he first Swedish guidelines governing electromagnetic emissions from CRTs, known as MPR-1, were released in 1986 and covered electrostatic emissions, x-radiation, and VLF magnetic emissions (defined as the frequencies between 2kHz and 400kHz, in cycles per second). In response to new research and concern voiced by consumers, workers, and labor unions, updated guidelines were released in 1990. The new guidelines, MPR-2, include added coverage of alternating electric fields and ELF magnetic fields. MPR-2 restricts ELF magnetic fields (5Hz to 2kHz) to an intensity of no more than 2.5mG at half a meter from the monitor. The Swedish National Board for Measurement and Testing, which established these guidelines, can be reached at 011 46 33-16 55 50 (phone) or 011 46 33-10 13 92 (fax).—Charles Piller

production standards to ensure that all units meet performance guidelines.

In the absence of U.S. standards, most monitor vendors look to the Swedish MPR-2 recommendations. While claiming that their products meet or improve upon the Swedish limits, monitor makers are reluctant to

release specific ELF figures to consumers. Radius and most other vendors want to treat the MPR-2 specifications much like an Underwriters Laboratories sticker—a statement to consumers that the product passed the test. Some companies pointedly say that without proof that a certain

# SEEKING ELF RELIEF

level of emissions is harmful, they don't want a specific level of emissions to influence buying decisions.

Companies fear that with five kinds of emissions generated by every monitor—very-low-frequency (VLF) and ELF electric and magnetic fields, plus an electrostatic field—specific numbers will confuse consumers. (Some vendors add to consumer confusion, however, by advertising

products as having "reduced electromagnetic emissions," without clearly specifying that VLF, but not ELF, emissions have been reduced.)

ELF magnetic fields have generated more concern than the other fields because they are more difficult to control and have been more directly linked to biological effects in research studies. Although light fixtures, laser printers, hair dryers, coffee makers,

and even the electrical wiring in walls all produce ELF magnetic fields, CRT monitors have caused the most concern for two reasons: tens of millions of people sit directly in front of their monitors many hours every day; and researchers have linked biological effects in animals more closely to the pulsed waveform produced by CRTs than to the ELF magnetic waveform produced by other devices (see "The

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opleColor High Resolution RGB Monitor (S4)	ST	25,8	5.3		34.8	6.7	227	69.0	13.6	2.2	72.4	13.9	2.
ople Macintosh 12" RGB Display (M)	SS	7.8			6.0	110-1		16.1	3.1		17.1	3.1	10
elComp DrawingCard 2-Page Display (H3)	SS	3.4			7.2			9.3	2.2		9.0	2.2	
rtting Edge 20" Trinitron 8-Bit Color Monitor (I)	SS	4.9	S	No.	4.9	4		12.2	2.8		12.8	2.9	
Machines ColorPage T16 (S1)	SS	8.1			8.7			19.3	3.7		8.8	2.5	
Machines T19 (S3)	SS	5.2			3.6			12.0	2.8		8.9	2.2	
Machines TX (S1)	SS	8.2			9.3	2.1	700	19.3	3.8	643	10.8	2.8	
man 20" Trinitron 8-Bit Color Monitor (I)	SS	5.0	3		5.0	200	DO THE	12.9	3.0		12.7	3.0	
eneration Systems Designer/8 20" Color (I)	SS	4.9			4.8			12,0	2.9		12.5	3.0	
S ColorVue 14" Color Monitor (G)	ST	29.9	6.7		48.8	8.9		93.4	18.4	2.8	100.9	18,9	2
acProducts USA MagicView (I)	SS	5.2			5.3		-	13.2	3.1		13.3	3.1	
acProducts USA MagicView (SE)	ST	21.5	4.9		30.0	6.1	-	85.9	14.3	2.2	84.5	14.3	2
egaGraphics MegaScreen 2008/16" Color (S1)	SS	8.2		-	9.8	2.1	Man	20.1	4.0		11.3	2.8	
egaGraphics 2008/19" Display System (I)	SS	5.3	Marie Land		5.6			13.6	3.3		13.8	3.3	
egaGraphics 2008/19'Display System (S3)	SS	5.4	a 300		3.3		THE STATE OF	12.1	2.9		9.2	2.3	
irror Technologies ProView/8 (I)	SS	5.1			4.8			12.9	3.1	- 0	12.3	3.0	
EC Multi-Sync 3D <sup>†</sup> (N)	ST	26.3	5.7		31.8	6.4		81.1	15.3	2.4	84.9	16.5	2
CPC II 19" Display System (I)	SS	4.9			5.1	THE PARTY		12.5	3.0		12.3	3.0	
edius Color Display (S3)	SS	5.4			3.4			12.4	2.9		9.2	2.3	
edius Color Display/21 (H3)	SS	3.3			6.3		1	9.4	2.3		8.9	2.4	
adius Color Pivot (landscape mode) (T)	SS	10.1			55.34		5 - 19/8	12.0	2.3	-	14.1	2.5	
adius Color Pivot (portrait mode) (T)	SS	9.9			5.2			23.6	4.2	1	20.1	3.9	
esterOps 8L System <sup>‡</sup> (S3)	SS	5.0			3.3	E LOS		13.1	2.9	and Fall	8.7	2.2	
esterOps Business Color System (H1)	ST	15.2	4.5		32.6	6.8		54.8	13.5	2.3	57.8	13.4	2
gma Designs ColorMax 8/24 Display (S3)	SS	5.2			3.6			11.8	2.8		9.1	2.3	圖
perMac 16" Trinitron Display (S1)	SS	8.0			8.6	2.0		18.3	3.8		10.1	2.7	
perMac 19" Dual Mode Trinitron Display (S2)	SS	5.0		1	8.9	7/10/2		15.0	3.3		10.4	2.7	
perMac 19" SuperMatch Color Display (H4)	ST	15.2	4.4		34,0	7.0		58,4	13.4	2.4	57.3	13.6	2
uperMac 21" SuperMatch Two-Page Color (H2) rototypes	SS	3.7			5.2			9.1	2,5		8.4	2.1	
pple 13" high-resolution prototype (S6)	SS	5.0			6.6			11.4	2.4		13.0	2.6	-
pple 21" high-resolution prototype* (F)	SS	5.0			3.8			10.8	2.9		10.3	2.5	

Manufacturer Key: F = FIMI (CRT supplied by another manufacturer, whose name Apple would not disclose); G = GoldStar 1450 Plus; H1 = Hitachi CM2086A3UX; H2 = Hitachi CM2186 A3UY; H3 = Hitachi HM-4320-D; H4 = Hitachi STD 9782 (SuperMac custom); I = Ikegami C/T-20H/A; M = Mitsubishi (Apple custom); N = NEC; S1 = Sony GDM-1602; S2 = Sony STD 9750 (SuperMac custom); S3 = Sony GDM-1950 (Trinitron); S4 = Sony M0401 (Apple custom); S5 = Sony STD 9751 (SuperMac custom); S6 = Sony (Trinitron); SE = Seiko CM 1445; T = Toshiba E8290B22.

\*SS = Saddle/saddle; ST = saddle/toroidal; CC = canceling coils attached. <sup>1</sup>The Multi-Sync 4Ds model, which was not available at the time of our tests, reduces ELF emissions, according to NEC. <sup>1</sup>This machine is gradually being phased out in favor of the 8XLi. <sup>1</sup>This measurement was taken at 4.5 inches due to position of cables. <sup>1</sup>Not being sold at press time, but should be available by the time this article appears. "Will not be sold in the United States, but should be available everywhere else by the time this article appears. "Not being sold at press time, but should be available by September 1991.

Magnetic-Field Menace," *Macworld*, July 1990, and *Conspicuous Consumer* in this issue).

#### **Testing Procedures**

The difficulty of accurately measuring ELF emissions makes numerical comparisons difficult, argues John Chubb, low-emission manager at Apple and a leading expert on electromagnetic emissions. If background *noise*, or

ambient emissions—ELF magnetic fields produced by electrical wiring, light fixtures, and the like—are too high, he notes, an accurate reading of monitor emissions can't be made. "A lot of people are using the [MPR-2 guidelines] document and [measuring] equipment without the proper training," says Chubb. Apple is building a special emissions-measurement room with low-voltage DC lighting

and specially routed electrical cables.

The Swedish guidelines—which require 48 separate measurements on each monitor—are too costly for manufacturers to employ, Chubb says. Apple favors a new set of guidelines being developed by the Institute of Electrical and Electronics Engineers (IEEE). The IEEE guidelines, says Chubb, will specify the same levels of ELF magnetic emissions as the MPR-2 guidelines but will require only half as many measurements.

Both the MPR-2 and IEEE guidelines recommend that testing points be made in a circular pattern around each monitor in three planes, corresponding to the top, middle, and bottom of the screen, with all measurements taken from a distance of half a meter (about 20 inches). These configurations are well suited to an automated testing process. Macworld Lab used 23 measurements, but at varying distances from the monitor, including 4 inches and 12 inches. These points were determined without regard to engineering for massproduction testing, but they reflect a realistic range of distances at which users are exposed to ELF fields.

The IEEE guidelines, like MPR-2, will not be legally binding. Without government-mandated standards, manufacturers must decide whether to reduce emissions in their entire product line (as Radius says it will do by the end of the year), thereby raising their expenses, or to offer some less-expensive, unmodified monitors to compete with companies whose products cost less.

"It's getting to be a vicious market," says MegaGraphics' Scott. Her company will continue to sell older, less-expensive monochrome designs that do not reduce ELF magnetic fields, along with its lower-emissions color and monochrome models. "I am not totally convinced there is a problem with the [emissions]. But I don't want to stay awake nights wondering if I'm causing anyone harm."

See Where to Buy for contact information.

Rory J. O'Connor is computing editor of the San Jose Mercury News in California.

Тор	1		Botton	
4"		28"	12"	28"
50.2	9,2	-	8.8	
26.4	2.7		2.3	
17.5	2.5		-	
9.9	2.0		20	
12.0	2.6		2.0	
12.0	2.8		2,1	
10.7	2.0		4.1	
9.9	2.0			
108.6	13.8		8.5	
11.2	2.2			
65.9	10.1		7.2	
15.3	2.5		2.1	
11.6	2.3			
11.2	2.0			
10.3	2.0			
67.0	9.8	100	8.3	
10.9	2.1			
11.8	2.1			
16.6	2.4			
21.8	4.2		3.8	
12.5	2.3		-	
10.3	2.1			
73.2	11.0		8.3	
10.9	2.0			
15.2	2.5		2.2	
13.2	2.4			
68.4	10.7		6.6	
6,6				
-	-			-
15.0	2.7			
7.4				

To determine the strength of ELF magnetic fields, Macworld Lab used the Combinova Magnetic Field Meter (MFM) 10. ELF emission levels normally are similar within a model line and across models that use the same CRT. But because the strength of magnetic fields may vary, even in those cases, these figures should be viewed as an indication of ELF emissions by like machines—not the final word.

All electrical appliances and wiring emit magnetic fields. The tests were conducted, therefore, in a room of the Macworld offices that had the lowest background ELF magnetic fields—varying between 0.41 and 0.56mG over the course of testing (this is a lower background reading than typically exists in office settings). We do not present specific numerical readings for ELF emissions below 2mG because current testing technology cannot reliably measure differences at levels below 2mG, given the background levels. Due to background emissions, results in the 2 to <5mG range are subject to a 10 percent error; results above 5mG are subject to a 5 percent error.

The strongest emissions were from the sides and top of the monitors—more than 100mG from the right and top of the iDS ColorVue 14" Color Monitor, the most extreme case. But for all monitors, emissions dropped to below 2mG at 28 inches from the front, back, top, and bottom. Every saddle-saddle monitor showed emissions below 2mG at 12 inches from the front.

We found that every monitor with a saddle-saddle coil configuration emitted weaker magnetic fields than every saddle-toroidal monitor. The one monitor that combined saddle-saddle and canceling-coil technologies, Super-Mac's 19" prototype, on the whole emitted significantly weaker fields than any other monitor tested.

Measurements were taken from 4, 12, 28 (arm's length), and 36 inches from the center of the front, back, left, right, top, and bottom of each monitor. (In most cases, monitor design prevented measurements at 4 inches from the bottom, so that measurement has been omitted.) Because emissions dropped to below 2mG at 36 inches from every position tested for every monitor, those measurements are not shown.

No one knows what level of ELF magnetic emissions, if any, is harmful to human health. But some studies have correlated cell mutation and cancer in humans with ELF magnetic fields at or below emission levels seen at 4 inches for every monitor tested.



# TOP-NOTCH



# The tools and techniques behind fine typography



HIS IS THE LAST IN A FOUR-

PART MACWORLD SERIES ON

DIGITAL TYPOGRAPHY. THE

FIRST, "TYPE RENAISSANCE,"

WAS A PRIMER ON THE

HISTORICAL EVOLUTION OF

PRINTING TECHNOLOGY AND

THE PRINCIPLES OF DIGI-

TAL TYPOGRAPHY (JULY 1991).

IN THE SECOND ARTICLE,

"DESKTOP FOUNDRY," WE

EVALUATED TODAY'S TOOLS

FOR TYPE DESIGN AND SPOKE

WITH LEADING TYPE DESIGN-

ERS (AUGUST 1991). THE

THIRD, "POSTSCRIPT VERSUS

TRUETYPE," COMPARED TWO

KEY OUTLINE-FONT TECH-

NOLOGIES FROM A CON-

SUMER'S PERSPECTIVE (SEP-

TEMBER 1991).

BY JIM HEID

Some of the most powerful typographic tools in existence are available on the Mac. But ask a professional typesetter about the Macintosh and desktop publishing, and you'll hear at least as much criticism as praise.

Having tools and knowing how to apply them are two different things. Fine saws don't make a fine cabinetmaker, nor can cutting-edge font technology make you a skilled typographer. Even professional designers are turning out substandard type that would never make it past the proofreaders at a fine type house. For that matter, most typographic flaws found in desktop publications are ones typesetters learn to avoid in their first week on the job.

What sets fine typography apart from ordinary typesetting is the extra care given to the appearance of every line. Beautiful type has an even color across the page: the spacing between characters, words, and lines is consistent and judiciously used—never too much, never too little. Lines end at logical stopping points, such as after commas and periods. The spacing of headlines and other large type is meticulously adjusted, each character coming within a hair's width of its neighbors.

Photograph by Geof Hern

To a fine typographer, every word, every line, and every paragraph is a design element unto itself. A typesetting house is the domain of specialists who adjust the spacing of characters and words with an interior decorator's eye.

But desktop publishing replaces the typographer with a Get Text or Place command. More and more, type is being set by designers and production artists who may lack a typographer's degree of training, or who don't have the hawk eyes of a proofreader, or who simply don't have the time or inclination to sweat the details that



Typographer Sandra
Tollefson at The
Type Gallery in
Seattle uses the
time-honored tools
of the trade to
make sure that type
is correctly spaced.

go into finely crafted type. "It's not reasonable to expect to find in one body a typographer, a designer, and a production person," says Betty Handly, a veteran typographer and president of Type Gallery, a Seattle-based type house. Kenneth Sahs, president of Shore Typographers in Chicago, agrees: "The bulk of our clients have good designers, good creatives, and good thinkers," he says, "but they don't have typographers."

## Typography 101

The first dead giveaway of desktop publishing is bad punctuation style. Most people learn to type on typewriters, and unnecessarily bring those typographic restraints to the Macintosh (see "Punctuation Primer").

One of the most basic typographic decisions involves establishing the proper relationship between point size, *line length*, and *leading* (see "An Illustrated Glossary of Typography" for definitions of typographic terms; for definitions of character elements, see "Type Renaissance," *Macworld*, July 1991). When you read, your eyes establish a pattern of movement, recognizing groups of three or four words at a time. If too many words are on each line, the eyes tire more quickly and get distracted by adjacent lines. If too few words are on each line, the flow of the text is disrupted as the eyes are forced to jump

from right to left every few words. Short line lengths are especially troublesome with justified text, and lead to excessive hyphenation and wide spaces between words.

As with most things typographic, there is no cast-in-stone law of line length. But there are rules of thumb. One states that a line should be wide enough to accommodate two and a half lowercase alphabets in the desired type size and style. Another says you should strive for an average of 8 to 11 words per line. Both yield similar results.

As for leading, most publishing programs and word processors provide an autoleading option that adds 20 percent of the type size-10-point text, for example, has 12-point leading. That works for body text (text in sizes between 8-point and 12-point) in average line lengths, but not with display type, such as in headlines, and unusual line lengths. Headlines look better with no extra leading (for example, 18-point type with 18-point leading) or even with some negative line spacing (such as 16-point leading with 18-point type), provided one line doesn't touch the next. And longer line lengths need more leading than shorter ones. More leading in long line measures helps keep the eyes on track and away from adjacent lines.

#### Space: The Vital Frontier

One way to differentiate between a good typographer and a bad one is to compare the spacing of their type. A good typographer adjusts the spacing between pairs of characters—not only of classic *kerning* pairs such as *TA* and *Yo*, but of every pair whose spacing needs tweaking in certain sizes. Every typeface has these subtle kerning candidates, but only the best typographers deal with them. The result is more-legible type because the eyes tend to recognize words by their overall shape, not by picking out individual characters. (This phenomenon also explains why you should avoid using all-uppercase text, whose overall uniform shape makes the reader work harder to recognize words.)

Generally, larger type sizes need more extensive kerning than body text does. Early phototypesetting equipment couldn't set text larger than 18-point or 24-point, so typographers handset headlines using photographic equipment whose fonts were strips or disks of film. Some display type is still set this way, but thanks to digital output devices and their ability to set virtually any size, headlines are usually typeset along with body text, and most typographers electronically adjust headline spacing.

You can, too, by using a publishing program's manual-kerning features. Start by tightening up a headline's overall spacing using a *tracking* command, and then individually kern characters

# PUNCTUATION PRIMER

as needed to obtain consistent spacing. But be forewarned: it's hard work. "To do good kerning across the board on a Mac is a time-consuming, tough job," says Shore Typographers' Kenneth Sahs. Print out tests after each tweaking session; the Mac's screen isn't accurate enough to display fine adjustments. For frequent headline work, consider a display-type program such as Letraset's LetraStudio or Brøderbund's Type-Styler, both of which electronically emulate the headline machines of yore and allow you to position individual characters by dragging them.

Regardless of your tools, follow the headline typographer's general rule: characters should be tight, but not touching. Remember to tighten up the space between words, too. And be consistent: if you tighten up a certain character pair in one headline, do it in all the headlines.

As for automatic kerning, TrueType and PostScript fonts contain kerning tables that specify common kerning pairs. Desktop publishing programs' automatic kerning features use a font's kerning table to determine how to kern those pairs. You can fine-tune the kerning tables to yield the most attractive results. If you send documents to a service bureau for imagesetting, you may need to supply a copy of the edited font too. (QuarkXPress users can supply the XPress Data file.)

Justified body text presents its own spacing challenges, especially in narrow columns. To justify text, or align it with both margins, a publishing program adjusts the space between words. The narrower the column, the greater the likelihood of distracting vertical rivers of white space. Rivers are undesirable areas of white space that appear to run vertically or diagonally through justified text. You can keep rivers at bay by telling the program to add space between letters, too, but only to a degree. Excessive letterspacing makes it more difficult to discern one word from the next, and that's at least as bad as wide word spacing. Because inconsistent spacing is an inherent part of justified text, many designers avoid justification in favor of a raggedright margin-a variable right margin.

But rags have their own requirements. You can simply let a publishing program determine line endings based on what will and won't fit, but when quality counts, you should take the helm and end some lines yourself by using the return key. For body text, you get a more attractive rag if the text tends to alternate between long lines and shorter ones. This gentle zigzagging of line endings emphasizes the uneven look of the ragged-right margin, and some say it reduces reader fatigue.

When you're looking for sensible places to break lines, look for pauses in the prose—commas, periods, dashes, and so on. The reader's Here is a quick summary of things you can do to make documents look more professionally typeset.

- Don't put two spaces after a period that ends a sentence; one will do.
- Don't use the straight-up-and-down typewriter quotes—those whose key is to the left of the return key. Use curly (or smart) quotes by pressing the open bracket ([) and close bracket (]) keys along with the shift and option keys in various finger-tangling combinations. If your word processor has a smart-quotes option, use it.

# INCORRECT

# "He said, 'You're kidding. A 36" goldfish?'"

# CORRECT

Opening double quote: option-[

Opening single quote: option-]

Closing single quote and apostrophe: option-shift-]

He said, You're kidding. A 36 goldfish?

Italicized typewriter marks to simulate prime marks

Closing double quote: option-shift-[

- Position quotes properly relative to other punctuation. Commas and periods—and exclamation points and question marks when part of the quoted statement—go inside quotes; colons and semicolons belong outside.
- Don't use double hyphens to stand for a dash.
   Use an em dash (—) instead. An en dash (—) often represents the word to ("I work the 3–11 shift"), but don't use an en dash in a phrase containing from ("I worked from 3–11" is wrong). Don't substitute an en dash for the word and ("between 10–15 years old" is wrong).
- Don't use curly quotes or those heinous typewriter quotes for inch and foot symbols. The only true inch and foot symbols (technically, they're called prime marks) are in the Mac's Symbol font.
   If you don't feel like switching to Symbol for prime marks, you can simulate them by italicizing typewriter quotes.
- Hyphenate correctly. Don't rely on automatic hyphenation—it can't discern between pro-ject (the verb) and proj-ect (the noun). Avoid hyphenating more than three conseutive lines.

For a more complete guide to the commandments of typographic punctuation, see Robin Williams's *The Mac Is Not a Typewriter* (Peachpit Press, 1990). mind pauses at these junctures, making them ideal places to end lines. Similar concepts apply to headlines. If you have a three-line headline, don't rely on a publishing program's word wrap feature to determine line breaks. Divide the headline into logical phrases, and break lines after each one. This is called breaking for sense.

Watch Your Weight: Small Capitals and Fractions The Mac's ability to scale PostScript and True-Type fonts to virtually any size makes it easy to create small caps from a regular font-just choose a publishing program's small-caps option. Ditto for fractions—create small top and bottom characters, and sandwich a slash between them.

# AN ILLUSTRATED GLOSSARY OF TYPOGRAPHY



he flavor of this favorite nut bread is enhanced by soaking the dates in boiling water and using the water in the batter. Loaves keep well if stored in airtight containers. For a variation, use pecans instead of walnuts.

### INGREDIENTS

41/2 cups brown sugar I TBSP. soda 2 TBSP. shortening 41/2 TBSP. vanilla 4 eggs 4 cups flour

I pound chopped dates

3 cups boiling water

2 cups chopped walnuts

# PREPARATION

Preheat oven to 350. Mix brown sugar, shortening, vanilla, and eggs-beat well. Add flour and soda. Soak dates in boiling water. Add flour and soda mixture to sugar mixture alternately with water from dates, using only enough water to produce a thick batter. Mix well. Add dates and nuts.

Pour in greased loaf pan and bake 60-70 minutes. Allow to cool for 10 minutes before removing from pan.

Makes 3 loaves.

Kerning Adjusting the space between a pair of characters such as To or AW for better appearance and legibility.

Tracking Uniformly adjusting letter and word spacing over a range of text. Also called track kerning, which generally means adding space between characters in very small sizes and decreasing space between characters and words in large sizes.

Baseline An imaginary line on which characters rest.

Display type Text in large sizes, usually above 14-point.

Swash An ornamental flourish on a character.

Dingbat A decorative character, sometimes called an

Drop cap A decorative capital letter at the beginning of a paragraph, set in a larger size than the surrounding body text and lowered to occupy more than one line.

Leading The amount of space between baselines. Pronounced

Letterspacing Adding space between letters to create an airy effect in a headline, justify body text, or improve the appearance of the text.

Old-style numerals Numerals with ascenders and descenders, often used in body type for better legibility.

Small caps Capital letters with the same x-height as the lowercase letters of a given font.

Gutter The vertical space between columns of text or between the inside margins of two facing pages.

Ligatures Two or more connected characters, such as fi or fl. Em space A fixed unit of space equal in width to the point size of the typeface you're using, often used for paragraph indents. Hanging punctuation Punctuation that is positioned outside the even left or right margin of text for better visual alignment. Also the technique of hanging quote symbols or other symbols over a period or comma to tighten up the text.

Em dash A dash, obtained by pressing shift-option-hyphen, equal in width to the point size of the typeface you're using. Body text Text in small sizes, usually between 8-point and

Rag An uneven left or, more often, right margin.

En dash A dash, obtained by pressing option-hyphen, equal to half the width of an em dash.

Line length The width of a column of type.

QuarkXPress even includes a feature that makes the fractions for you.

But is the quality of these elements up to the highest standards? No. The problem is subtle: when you enlarge or reduce characters, you change the width, or *weight*, of their stems, causing a mismatch with adjacent text. Thus, the stem weights of the small caps that publishing programs create don't match those of the large capitals they appear next to. In program-created fractions, the tiny numerals have such light stem weights that they often don't print well.

The answer? True-cut characters—characters specially designed to be used as small caps, fractions, and the like. More and more font developers are offering fonts containing small caps and fractions whose stem weights are designed to match the rest of the typeface. Several Adobe fonts, for example, have optional Expert Collections that include true-cut small caps, a variety of ready-made fractions, and separate numerals that were born to be numerators or denominators. Monotype offers similar ciphers under the Expert Set moniker. These collections often include other mainstays of fine typography, such as old-style numerals (those with descenders and ascenders) and ligatures (connected character pairs, such as fi and fl). They aren't cheap (Adobe's Expert Collections range from \$185 to \$275), but they're an essential part of a desktop typographer's toolbox.

If you commit to buying true-cut small caps, don't relegate them to headlines or special applications. Use them in body text where appropriate: for the chronological designations A.M., P.M., B.C., and A.D., and in other instances where large capitals would overwhelm surrounding lowercase text.

One more word about fractions: if you can't justify buying a fraction font, do create derived fractions instead of using full-size figures (as in 1-1/2). A derived fraction is better than no fraction at all.

### Truth in Italics and Bolds

Another subtle point to be aware of is the difference between true *italic* text and *derived italics*, or *oblique*, text. In most typefaces, especially serif faces, italics are specially drawn to have their own scriptlike characteristics and to complement the stroke width of the upright, or roman, version (see "Type Renaissance," July 1991). The Mac, however, can electronically slant the roman version of a font to create a kind of pseudoitalic. To see an example, type some text in a font such as Geneva, Chicago, or New York, and then choose the italic style. Illustration programs such as Aldus FreeHand and Adobe Illustrator also let you create oblique text by slanting a block of roman text to an angle you specify.

### HOW TO FIND SPECIAL CHARACTERS

To help them remember the keystrokes that summon accents, fractions, and other special characters, typesetters often refer to printed charts called keyboard layouts. For desktop typographers, the Macintosh provides an electronic keyboard layout—the Key Caps desk accessory, which displays an on-screen keyboard of the font you specify with a text-entry box above it.

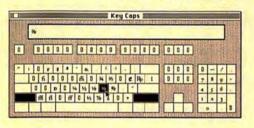
The Mac's special characters are accessed through combinations of the option and shift keys. When you press these keys, Key Caps updates its graphical keyboard to reflect the characters they summon. To locate a certain character in a given font, follow these steps.



 Choose the font's name from the Key Caps menu. This is an important step, since not all fonts provide the same characters in the same keyboard locations.

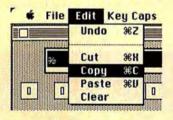
(Adobe's Caslon expert set is shown here.)

Press option with and without shift until you locate the character you want on the Key Caps



keyboard. When you find the desired character, continue holding down the option and/or the shift key(s), and then click on the character with the

mouse. It appears in the text-entry window above the keyboard. Repeat this step for any additional characters you need (such as those that would complete a fraction).



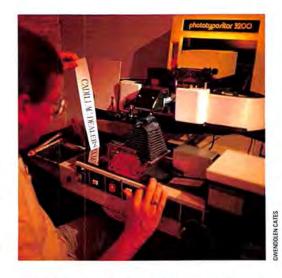
- Select the character(s) in the text-entry window and choose Copy or Cut from the Edit menu.
- 4. Return to the document, be sure to locate the blinking insertion point where you want the character to appear, and then choose Paste. If necessary, change the font to the desired typeface.

As an alternative to copying the character to the Clipboard, you can type the character directly by pressing the appropriate key combination and changing it to the desired font, as displayed by Key Caps.

Close the Key Caps window when you're done with it; leaving it open while you type in other programs slows the Mac as Key Caps keys flash merrily in the background.

Creating an accented character such as  $\acute{e}$  or  $\~n$  requires a two-step key sequence. First, press the option key along with the character that calls up the accent. Next, type the character that will appear under the accent. For example, to create an n with a tilde over it  $(\~n)$ , press option-N and then type an n.





At Shore Typographers in Chicago, Mark Hnatow uses a phototypositor machine to handspace each letter in display type.

Oblique text can be a useful design element for headlines and other special purposes, but for body text you should generally use the font designer's true italics. In most cases, that's easy—simply install the italic versions of the typeface's screen and printer fonts. But some font packages don't include true italics. Adobe's ITC Benguiat package, for example, includes only roman and bold versions, even though Benguiat has beautiful italics. In this case, the solution is to buy the font package from Bitstream, which sells a complete version of the typeface.

### The Bigger Picture

Clearly, setting top-notch type on the Macintosh requires a great deal of effort and skill, not to mention a watchful eye. Is the process as arduous on dedicated typesetting systems? Generally, the answer is no.

	PageMaker 4.0	QuarkXPress 3.0	DesignStudio 2.
COMPANY	Aldus	Quark	Letraset USA
PRICE	\$795	\$795	\$795
TYPOGRAPHIC FEATURES	The second		
Automatic kerning and tracking	•	•	•
Manual kerning/increments	●/.01 em	●/.005 em	●/.001 em
Editable kerning and tracking data	Only with third- party software	•	•
Automatic drop caps	0	•	0
Hyphenation control	Very good *	Excellent	Excellent
Type rotatice ingle	●/90-degree	•/any angle	•/any angle
Automatic fraction creation	0	•	•
Quote conversion as you type	0	0	•

yes; ○= no. \* Can't specify minimum word length for hyphenation.

Most page-layout programs, from entry-level programs such as Timeworks' Publish-It. Easy to long-document programs such as Frame Technology's FrameMaker, have some kerning and spacing-control features, but only these three programs provide the degree of control a fine typographer needs.

Dedicated systems have more extensive features for controlling spacing between words and letters. Although Mac page-layout programs allow you to manually kern with great precision, they don't provide on-screen codes that show just how much kerning you've applied between characters. With a dedicated system, if the typesetter wants to tighten a letter pair by two-thirds of a point, he or she can specify that amount, and a code reflecting it appears on the screen. This makes it easier to apply the same degree of kerning elsewhere. Hanging punctuation is also much easier on dedicated systems, thanks to their ability to zero-set characters-essentially to print one character (such as a quote) over another (such as a period or comma).

Dedicated systems are also better suited to producing lengthy, structured documents such as books and manuals. On a dedicated system, typesetters can create elaborate formatting macros that change margins, type styles, and sizes, and insert repetitive text with a single keystroke. The style-sheet features that Mac pagelayout programs offer don't go far enough in automating repetitive formatting tasks. Programs such as Interleaf Publisher and Frame Technology's FrameMaker provide better support for long documents, but their kerning and other character-finessing features don't match those of Aldus PageMaker, QuarkXPress, or Letraset's DesignStudio. The Mac makes you choose between quality and quantity.

And no typographer I know of would choose a Macintosh over a dedicated system for creating the elaborately formatted tables that appear in financial statements and annual reports. Adjusting column widths, straddling headings over columns, creating the rules that appear above totals and subtotals, and hanging parentheses into the *gutter* between columns are common chores in setting what veteran typesetters call tabular matter. The tab features in Mac publishing programs are adequate for simple tables but are taxed by complex ones.

### The International Mac

The Mac does have a significant edge when it comes to combining text and graphics, of course, and it's the preferred platform for certain types of foreign-language work, particularly for Cyrillic, Arabic, kanji, and other non-Latin writing systems. Dedicated typesetting systems are designed for Western languages and their relatively simple, left-to-right, top-to-bottom text flow, and are stumped by languages such as Hebrew and Arabic, which operate by different rules, and ones such as Japanese and Chinese, which use thousands of characters.

The Mac isn't as parochial. A portion of its system software, the Script Manager, allows the Mac to be easily adapted to other languages and script systems. Apple's KanjiTalk system is opening doors to new typographic and desktop publishing applications in Japan, and the company's forthcoming release of a Russian version of the Mac's system software was one of the hottest topics of discussion at a USSR developers' conference sponsored by *Macworld* and Apple last year.

But one of the many problems with supporting complex script systems involves accommodating the thousands of characters these languages require. The current standard for representing characters, ASCII (short for American Standard Code for Information Interchange), provides "slots" for just 256 characters—the maximum number that can be represented by one byte. ASCII is woefully inadequate for representing languages such as Japanese, Chinese, and Korean, and it complicates file exchange between systems that use various Western languages, since one language's computers may place accents and other characters at different positions than another language's computers.

The answer may be in a new character-encoding standard called Unicode, currently being developed by a consortium of major computer manufacturers and software houses. Unicode uses two bytes to represent characters, not one, allowing for up to 65,536 character positions—enough to represent every language in the world, along with a multitude of symbols and punctuation characters. Alas, the Unicode standard isn't finalized yet, nor has Apple announced when the Mac will support it. But TrueType and PostScript Level 2 can support multibyte character encoding schemes, so they're ready for Unicode when it arrives. "Font Futures" describes some additional type technology on the horizon.

In the meantime, most of us are more concerned with English-language text and the blood and guts of typography—putting words on paper and ensuring that they are spelled and hyphenated properly and spaced attractively. The techniques I've described here can help in that noble task. And even if you don't apply every one of them to your work, just knowing they exist is likely to give you a new respect for type—and for professional typographers, those meticulous directors of the most powerful cast of characters ever assembled.

See Where to Buy for contact information.

Contributing editor **Jim Heid** is a former typographer and former member of the International Typographers Union. He is the author of Macworld Complete Mac Handbook, an updated and expanded collection of his Getting Started columns.

1991 has been an important year for Macintosh typography. TrueType,
announced by Apple, and Multiple Master from
Adobe, promise to change the possibilities of
digital typography. The most remarkable features

digital typography. The most remarkable features have yet to be realized, and the most talked about of these is nonlinear scaling.

When metal typefaces were cut by hand, each point size was designed independently, with subtle changes in the proportions and shapes of the letters.

The new digital type technologies promise a way to reproduce this attention to design detail through nonlinear scaling. With nonlinear scaling, the proportions of a character's outline change under various conditions. For example, in large point sizes, serifs may be more pronounced, or if the type reverses out of a dark background the letter may be scaled at a heavier weight. TrueType, and now PostScript—through its Multiple Master technology—promise such intelligent scaling in the near future.

But nonlinear scaling creates difficulties for typesetting applications, which have always relied on fixed and reliable character widths. These programs fit type into a line by counting the cumulative widths of the characters on that line—widths that are obtained by tables of character metrics located within the font itself. If type is to be scaled nonlinearly, though, character widths have to be calculated on a case-by-case basis, not just copied out of a standard width table.

The only way to make character-width calculations consistent across applications is to do it at the system level. This will be one of the jobs of Apple's Line Layout Manager, a system utility planned for a future release of system software (it isn't in System 7.0).

Another difficulty with nonlinear scaling is that it must be based on subjective visual criteria, not just precise mathematical formulas. How type in small sizes, small capitals, and condensed type should be correctly proportioned cannot be predicted algorithmically. For the best visual results, each typeface must be handled as a distinct case, and no one is yet willing to suggest just how that will be done.

Another capability dependent on the arrival of Line Layout Manager is character ductility—the ability to distort letter shapes to accommodate certain linguistic or typographic situations. This isn't a big issue in Western typography—except in some script and italic faces—but in Arabic, for instance, certain letters change shape according to the letters that appear around them. If those characters could change their shape contextually, keyboarding Arabic manuscripts would be greatly simplified. Similar situations exist in ideogrambased languages, such as Chinese. Again, Line Layout Manager is the key to making this prospective change practical.—James Felici







Reproducing the top W (Garamond) against a dark background results in a letter that looks thin with pronounced serifs, shown in the middle. The bottom W (Garamond Book) is easier to read against the dark background because it has wider diagonal strokes.

# sive to incorporate.

New options mean better, moreaffordable four-color publishing

A diagram of the process most desktop publishers follow to produce color pages used to look like a complex board game complete with meandering detours to various vendors and dangerous squares with legends reading "Design change, go back to separator, pay \$1000" or "Stripping mistake, lose one day, miss deadline."

But the publishing game doesn't have to be played that way anymore. New techniques are enabling a growing number of publishers in businesses ranging from small design studios to Fortune magazine to straighten the crooked path that leads from design to four-color film. After years of inching toward the goal, these publishers are finally saving time, cutting costs, and even improving their products by building complete color mechanicals on the desktop.

Because these electronic documents incorporate all text and graphic elements on a page including high-quality color photographs—they go directly from design to separation without pasteup or stripping. The process typically requires only one vendor. Highly accurate color mockups are a simple printout away at any point. And late changes are comparatively easy and inexpen-

### Ask Me How

Two paths to complete color design are open to today's publishing pioneers. The high road involves translating Mac pages into a format that can be read by high-end prepress workstations (known in the trade as CEPS, or color electronic prepress systems). Once the files are on the CEPS stations, they can be merged with high-quality scans and output on high-end film plotters. This method marries the benefits of desktop design with a proven standard for color quality, but it isn't cheap.

The low road is more familiar to Mac publishers, relying as it does on PostScript imagesetters for output. What may be unfamiliar to many, however, is the quantum leap in quality that service bureaus using PostScript imagesetters have been able to achieve during the past year.

How good can imageset color get? All the photos and color elements in this article were placed in PageMaker and output on an Agfa SelectSet 5000 PostScript imagesetter.

Which of the paths to fully integrated color \$ publishing is right for you depends on factors such \{ \bar{\gamma}



as the type of publications you produce and how much extra work you're willing to take on. Before you start down one or the other road, you need to know a few things about how the two processes work, where you will and won't save money, and how the switch to full-page publishing will affect your production cycle. You will also want some information on how to get the best quality you can, whichever path you follow.

### You Take the High Road

While software and hardware combinations that link Mac page-layout files to proprietary CEPS workstations have existed for several years, until this year they have mostly been adopted by larger and more sophisticated Mac publishers, such as catalog houses and magazines. One reason is that the CEPS companies that created the linking systems have no experience marketing to end users, so few desktop publishers are aware of these prepress solutions.

These schemes for bringing Mac files into the proprietary formats imposed high costs and many restrictions. For example, Scitex America and Crosfield have both offered proprietary turnkey systems costing \$30,000 to \$50,000 depending on the hardware selected—a steep investment for a proprietary solution to a new, unsettled application area. And Crosfield's initial effort at an off-theshelf link resulted in one that could accept files from just one of the three

then-popular page-layout programs. Predictably, the majority of desktop publishers were turned off by these approaches.

In response, CEPS vendors began shifting their focus to systems that could accept files from any standard Mac graphics or publishing program. The Du Pont Imaging StudioLink system was the first, late in 1988, followed closely by Scitex's VIP image processor. Hell's ScriptMaster system and Screen USA's OMEGA RIP processor both came out last year.

Initially, these products were a problem to use, for reasons that had as much to do with the culture of color-prepress service bureaus as with the technology. After years of either ignoring or maligning desktop publishing, CEPS operators suddenly found themselves working with desktop publishing documents filled with fonts and file formats about which they knew practically nothing. The links themselves tended to be slow, unable to process certain kinds of files, and rife with limitations that made them unacceptable to many publishers-an inability to accept Adobe's popular Type 1 fonts, for instance. Today, although prepresslinks systems are still nowhere near perfect, most of the shortcomings affect prepress operators more than they do publishers.

### PREPRESS PRIMER

Prepress involves the same basic tasks whether done traditionally or electronically.

- For type and black-and-white line art, creating a negative.
- For noncolor photographs, creating halftone negatives (made up of dot patterns to simulate grays).
- For color elements, making four color separations (one film negative for each of the four standard printer's inks, called process colors).
- Making color proofs (also called match prints) so you can see how faithful the separated image is to the original
- Doing color correction on these separations to account for peculiarities in the printing press used or in the colors of the original image, as well as retouching to fine-tune the image.
- Trapping color elements that abut, such as a blue border around a red circle, so that the colors will print without gaps between them in case the printing press is slightly out of register. The interior element's outside border is printed slightly larger than actual size (spreading), and the exterior element's inside border is printed slightly larger than actual size (choking) so there is

enough overlap to prevent gaps.

- Creating silhouettes (also called masks), commonly used to isolate a subject from its background.
- Assembling all the pieces of film by stripping individual negatives onto the master negative, called a flat, which contains multiple pages and is sent to the printer when completed.

In the electronic approach, you no longer worry about multiple pieces of film, since the negatives are not created until you have merged all your elements in the layout and finalized it. This reduces errors and makes it easier to make changes and corrections.

Because electronic color prepress is relatively new, you may not find one vendor with the expertise or equipment to handle all the tasks. Just as traditional publishers often rely on one vendor for color separations and another for stripping, many midrange desktop publishers use one vendor for scanning and retouching and another for output. With the growth in service bureaus experienced in both electronic color prepress and film output, however, the one-stop shop is increasingly easier to find.

### **CEPS Steps**

The exact steps a publisher and CEPS operator take to produce a given page vary considerably, depending on the prepress-links system being used and the elements on the page. In fact, different shops with the same linking system may well follow very different routines. On a generic, idealized level, however, all the prepress-links systems subscribe to the same basic work-flow model.

All the linking systems start with the premise that most Macs lack the processing power to work with fullresolution versions of scanned photographs, which can easily run to tens of megabytes. So CEPS service bureaus make two set of scans: lowresolution scans for the designer to position during layout; and highresolution scans, which the service bureau substitutes into a layout before outputting the final film. The service bureau retains responsibility for color correction and any required retouching.

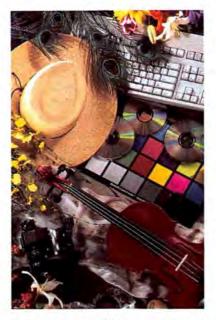
The designer positions the low-resolution scan on a page, crops it, and even—within limits—rotates and/ or resizes it. (The limit for enlarging a scan is usually about 20 to 50 percent.) When it's time to output pages, the CEPS system's file-serving software recognizes the position scans by their file names, automatically swaps in their high-resolution cousins, and outputs the pages with the photographs in position and with scaling, sizing, and cropping instructions applied.

To understand prepress-link technology, it's important to know that film plotters can't interpret Post-Script. To print Mac pages on a film plotter, it's necessary first to run the file through a RIP (raster image processor), which translates PostScript's page descriptions to the proprietary language of the CEPS system.

This translation process can be a source of problems, but bringing Mac files into the domain of the proprietary CEPS workstations for retouching and stripping does have some clear advantages. Because proprietary formats describe a page in a less complex way than PostScript, even complicated pages print more quickly. Also, when you send files to the CEPS shop, it handles the job of trapping tint areas, color type, and PostScript illustrations—a difficult job given the limited capabilities of the Mac's trapping tools.

### I'll Take the Low

From the end user's point of view, the low-road, PostScript-output path to Mac color pages isn't that different from the high-road method. The Post-Script service bureau makes two sets of scans, keeps the high-resolution versions, returns the low-resolution position scans, and then merges the full-scale scans into the final layout during output. The main difference between the two processes is that the PostScript service bureau uses a Post-Script imagesetter to output the pages; no translation is required from the layout program's PostScript files to another format.





To compare the results of the two color-prepress approaches, we sent high-resolution scans of the same photo to two service bureaus: a PostScript shop and a CEPS shop. The image at left was color-separated in Adobe Photoshop and output via an Agfa SelectSet 5000 PostScript imagesetter. The image at right was separated and output using a Scitex prepress system. In both cases, the service bureaus did standard color correction to match the original photograph's color balance. Neither did any retouching.

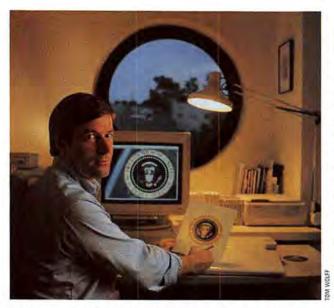
Until very recently the all-Post-Script path to color publishing was unacceptable for publications requiring high-quality output. Colors in photographs tended to be murky and inconsistent. Moiré patterns and the milder form of patterning called "prominent rosettes" cropped up regularly in both tints and photographic work. Imagesetters often got bogged down when outputting large or complex color files.

During the past year, three developments converged to dramatically improve PostScript color. One, the better PostScript service bureaus now use color scanners that are as good as high-end devices (in some cases they are high-end devices). Two, instead of printing color separations on what are essentially typesetting machines, PostScript services now have access to a new generation of faster, more precise imagesetters, as well as improved halftone-screening technologies (see "Hell's Angles"). Three, it's finally possible to find people running PostScript equipment who actually know something about color.

 Superior Scanning Without good input, good color is impossible. A \$10,000 Nikon slide scanner—previously the favorite of PostScript service bureaus—cannot compete with the \$70,000-plus machines serious shops are now buying. The premier scanners in PostScript shops today are the Optronics ColorGetter, the Scitex Smart Scanner PS or SmarTwo PS, and Screen USA's SG-2010. These machines are similar to the input devices used in CEPS systems, but they have an interface that enables a Mac to drive them directly. Some PostScript service bureaus—mostly those that are outgrowths of traditional prepress shops—make scans on conventional CEPS scanners and transfer them to the Mac via add-on interfaces.

Because the scans come from high-end scanners, their quality is excellent. Midrange scanners like the Barneyscan CIS 4520, the Array SpeedScanner, and the Eikonix 1412 can also produce good results, but typically don't provide the same highlight and shadow detail as the more expensive devices, especially at larger sizes.

• Better Imagesetters The imagesetters setting the standard these days are the highly accurate drum-recorder models—the Agfa SelectSet 5000, the Optronics ColorSetter 2000, the Linotype-Hell Linotronic 630, the Scitex Dolev PS, and the Purup Prepress America ImageMaker 80/10, Also popular at serious color shops is the Linotronic 330, an upgrade to the standard L300. In the right hands, other imagesetters, like the Varityper 5330 and the Agfa 9800, can produce



Paul Grabhorn, who runs the Grabhorn Studio in Washington, D.C., combines strategic-planning consulting with document creation. He works extensively with federal agencies to help focus their ideas and then produces the publications that describe them. Grabhorn outputs final film directly to a PostScript imagesetter rather than working through a proprietary prepress system. "I've made some real waves in the government world. This is completely new to them."

good work, but they can't match the features and specs of the drum models, and are not the imagesetters of choice for color.

 The Expertise Gap Technology, as the CEPS advocates are quick to point out, is useless without the skill to make it work, and it's quite true that the expertise gap has replaced inferior technology as the most limiting factor in PostScript prepress. But many of the better PostScript-based service bureaus have been doing color for years

now. They have invested heavily in equipment and training, and some have even hired expertise away from traditional color services and printers. Service bureaus that specialize in color may be exceptions, but they do exist.

In a parallel trend, a growing number of conventional prepress shops, adopting an if-you-can't-beat-'emjoin-'em attitude, are bringing imagesetters under their roofs—a sign that the Post-Script market has matured.

### **Money Matters**

The first thing that people who are considering a change in their production process want to know is whether the switch will save money. The answer in the case of Mac prepress is yes, but the savings may not be in the form of hard production dollars. Time, as they say, is also money.

If you are looking to cut your prepress bill, the proprietary-links CEPS path to Mac prepress probably isn't for you. Prepress shops using these systems have invested millions of dollars and emphasize personal service. Their costs are high.

Many people initially believed that the prepress-links systems would lower costs at CEPS service bureaus by

reducing the system and staff time required to produce pages. But it soon turned out that hitches in the Post-Script-to-proprietary translation made the process anything but automatic. As I write this, for example, none of the CEPS RIPs can automatically bring over a color TIFF file placed in a layout; only Crosfield and Scitex can correctly interpret a call for white type to knock out of a photograph; only Hell can automatically separate spot color in a four-color page and print a fifth sheet

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Programs such as Adobe Photoshop give you control over how colors will print, making it possible to do prepress on the Mac. But having the capability to do the color work on the Mac is not enough: operators still need to understand color printing to effectively use these tools.

of film for special inks. None of the systems can interpret information from programs like QuarkXPress, Adobe Illustrator, or Aldus FreeHand about how elements should overprint—which means that any trapping you might try to do on the Mac will be a waste of time. Workarounds exist for all of these problems, but they typically require staff time on the CEPS system or have other disadvantages.

Prepress-links production, on the other hand, generally isn't any *more* expensive than traditional stripping and separation, and you still enjoy the benefits of desktop design. In addition, industrious publishers willing to coordinate closely with the CEPS service bureau and do as much of the production work as possible themselves may actually save money on some jobs.

The ideal job for prepress-links production is one in which multiple pictures on a page fall into rectangular boxes; catalogs are the most often cited example. Because digital scans are easily archived, anyone who frequently reuses pictures—as long as they reuse them at similar sizes—will also save money.

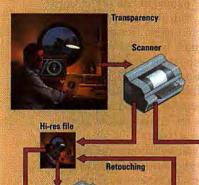
In contrast to CEPS shops, Post-Script service bureaus, with their lower equipment and staff costs, have been extremely aggressive in their pricing. How aggressive? Results of an informal survey I sent out to ten Post-Script and CEPS service bureaus around the country indicate that bringing fully composed color pages

to a PostScript service bureau costs, on the average, half what it costs to send files through a prepress link or to do it traditionally.

The survey asked for cost estimates of a half-dozen jobs of varying complexity. To make the level of service comparable between CEPS and PostScript shops, I asked the PostScript shops to include a color-correction cycle in their estimates. So the 50 percent savings figure for the PostScript route includes the cost of a preliminary proof of the scans—typically handed over along with the low-res position file—and a guarantee

### Navigating the Low Road

### SERVICE BUREAU



Here is the basic process for PostScript-based color prepress, using these two pages as an example. The precise division of labor varies among publications.

- 1. Scan photos. Send photographs as transparencies to a service bureau for hi-res scanning. (Macworld uses the services of Digital Pre-Press International.) Designer receives low-res versions of scans for placement in layout program.
- 2. Create files. Create text and computer-generated images, including object-oriented graphics (for example, in Adobe Illustrator or Aldus Free-Hand) and bitmapped graphics (for example, in Adobe Photoshop, in SuperMac's PixelPaint, or via a screen-capture program).
- 3. Fine-tune images. Do color correction and retouching of color scans using a Mac or a dedicated retouching system. (Macworld's service bureau retouches scans in Photoshop.) Output a color proof to verify color. (Macworld's service bureau outputs proofs on a Fuji Color Art system.) Do further retouching or correction if necessary.
- 4. Do the layout. Place all elements in a page-layout program such as Aldus PageMaker or Quark-XPress. (This layout includes a scanned photograph, an object-oriented EPS file with linked TIFF images, a computer-generated screen shot, type, and various color elements generated in PageMaker.)



- 5. Send final layout to the service bureau. For PageMaker, export the layout as a .SEP file. Substitute the high-res scanned photos for low-res versions in the layout. Run Aldus PrePrint to make color separations. For Quark-XPress, substitute the high-res scans and make the color separations from within QuarkXPress. (Macworld uses the PageMaker/PrePrint option.)
- 6. Output film negatives. Send the separation files to an imagesetter for output. (Macworld's service bureau uses an Agfa Compugraphic SelectSet 5000 imagesetter.) Create a color proof for final review and for the printer to use as a press check. (Macworld's service bureau again uses a Fuji Color Art system.)

### MAGAZINE







that final color will match the original transparency.

Many Mac publishers currently pursue a partial desktop solution to color, stripping individual CEPS photo separations into pages that have been imageset with color type and tints in position. To see if going all-desktop is worth the effort, I also asked for a bid using this half-and-half approach. Again, the fully composed Mac pages were significantly less expensive—a third less than the mixed method.

Naturally, not everyone who goes to a PostScript service bureau for production will save 50 or even 25 percent. Shops vary, as do users. To best exploit the potential for cost savings, you have to shop around and work intelligently. Avoid, for example, providing unnecessarily complex Post-Script files that take forever to print, and learn to do your own trapping in programs like FreeHand and Quark-XPress. (For an introduction to trapping, see "Setting Traps," *Macworld*, May 1991. For advice on working with color files, see "Prepress Progress Report," *Macworld*, October 1990.)

### Money Isn't Everything

Both high- and low-road publishers agree that desktop production of color pages saves time and effort and can actually result in better products. One obvious advantage is that once you have a color page, the cost of adding color elements is small, since the main cost—color separation—does not depend on the amount of color used. "If it were done conventionally, we just couldn't afford the stripping and redos that would be involved in the amount of color we use," notes

Michael Grossman, design director of the very colorful *Entertainment Weekly* (produced via Scitex's VIP).

Another aspect of quality is control, a word frequently heard on the lips of Mac color publishers. These individuals like knowing that when they crop a picture, trap an illustration, cut a silhouette, or correct color to bring out the nuances in a photograph, what comes back from the prepress service bureau won't be an interpretation or approximation. Some call it design integrity; others focus on the time saved from not having to send unsatisfactory work back.

The time savings that comes from doing full-color Mac design probably won't come in the form of shorter turnaround for film production. In fact, you might want to leave an extra day at the end of your production cycle in case anything goes wrong. Remember that although a traditional prepress service bureau can always put more color strippers on a rush job, there's no way to break up a complex digital page so that two machines can process it. Also, strippers and pasteup artists rarely just give up on a job, as computers sometimes do—for reasons that often take hours to track down.

The most significant time savings are the result of collapsing the design and production processes into one. Janet Waegel was the design director on the launch of the Scitex VIP-produced *TV Time*, a weekly viewer's guide. "We do this with fewer people and in half the time it would take us doing it traditionally," she says. "Once a layout is done, it's there, it's finished. There's no late-night quilting bee gluing it down, and no time spent cutting film. It's a one-stop process."

Of course, preparing your own pages for output can mean spending extra time on jobs you never had to do before, like trapping. Generally, however, the designers I spoke with felt strongly that the trade-offs were balanced in their favor. Tim Boyse of Ikon Creative Services in Los Angeles recently created some packaging for RCA-Columbia Pictures Home Video.

for approval, and then go back and remove backgrounds from type so a color house can have line art to shoot."

Three aspects of fully integrated desktop publishing work together to make the process a flexible one when it comes to making changes to design or copy. The most important is that you do not send out for film until the absolute end of the production cycle. Another is that you can resize scans up to that final step. And the third is that it is easy and inexpensive to generate very accurate color mock-ups.

Tighter mock-ups sound like a simple matter, but the ability to see what a job will actually look like combined with the ability to make even substantial revisions easily and inexpensively can have a profound effect on people's work routine and relationship with clients. "The main advantage is not making last-minute changes to film," notes Don MacLeish, print manager at Lawrence Advertising in Anaheim, California, which produces retail ads for Standard Brands Paints (a fussy client where color is concerned). MacLeish takes his client through two revision cycles using QMS color printouts, and then moves on to a previously unimaginable step: "The buyer comes in [to the imagesetter change. The Linotype-Hell merger is a symbol of the current state of affairs—the joining of one of the CEPS pioneers with the firm whose Linotronic brand name is a synonym for imagesetters. It is clear that as time goes by, the differences between the two roads to Mac color will diminish, but meanwhile, those picking a Macbased prepress method will do well to take a few considerations besides price into account.

One consideration is quality, Perhaps more because of knowledge than technology, CEPS service bureaus still produce the highest-quality separations. Their work is also more consistent, requiring fewer rounds of corrections, and they trap pages correctly. In Macintosh page-layout programs, only the most ingenious workaround artists can find ways to trap all the elements they want to use (though proper trapping is quite possible for people who work in FreeHand or Illustrator). As a general rule, publications that live or die by the quality of their color-fashion magazines, coffee-table books, luxury catalogsshould stay with the high end.

At the moment, PostScript imagesetters are also incapable of producing poster-size work. (This may change, however. By the time you read this a company called Optrotech Graphic Arts should have released the Sprint 110, a drum-based imagesetter with a print area of 39.3 inches by 32 inches.)

Service and support vary from business to business, but overall the PostScript service bureau is a more do-it-yourself kind of place and offers fewer services. If you go the PostScript route, you'll likely be encouraged to learn to trap the artwork yourself and perhaps to make your own color separations (though many shops will gladly provide these and other services, such as retouching, usually at reasonable rates). PostScript service bureaus almost certainly won't employ any traditional strippers, nor will they correct color film by manually etching dots on it; some PostScript shops may even send out for color proofs or scans. CEPS shops serious about Macintosh color prepress, on the other hand, often have their own PostScript imagesetters, which they use for mak-

# Publications that live or die by the quality of their color should stay with the high end. But the differences between the two roads to Mac color are diminishing. For most publishers, both approaches now offer good quality.

"Three years ago, doing pasteup by hand, it took three people about 24 hours to produce a mechanical of a videotape box," Boyse says. "Now—even though we're setting the type and making the separations ourselves—I can do a box in three or four hours." Asked whether the main difference was just using the Mac in the first place—for type and tints—or doing fully paginated designs, Boyse responds that "going halfway is a big waste of time. It doesn't make sense to produce a tight black-and-white just

service bureau] and we bring the ad up on the calibrated screen, which has truer colors than the QMS. We stand over the operator's shoulder while he corrects color, makes changes, or retouches—and then it's straight to film." While presenting the so-called soft proof at the color service is a bit unusual, on-screen proofing sessions are becoming remarkably common.

### Which Way?

The printing and prepress business is going through a period of dramatic

### **HELL'S ANGLES**

sually, the last thing most publishers want to concern themselves with is the process by which highresolution printing devices calculate the angles of halftone screens used in four-color film. But new developments are making one aspect of this abstruse process-the difference between rational and irrational screening-something Post-Script publishers who want to get the highest quality need to understand. If you imagine a page as a piece of graph paper divided into very small squares, a rational screening system demands that all halftone dots fall within the squares; they can't fall on a line. This is fine if the rows of halftone dots are at 90 or 45 degrees, but four-color printing requires four nonoverlapping angles-usually at 45, 90, 75, and 15 degrees. As anyone who's played with graph paper knows, there's no way to fit rows of dots at 15 and 75 degrees neatly on the grid squares. You have to approximate. This approximation is a major source of moirés in Post-Script halftoning, which has always used a rational screen method. By trial and error, Adobe and other developers have found the best approximations of the traditional angles, and PostScript printing is not the problem it once was.

As this article was being written, however, alternative technologies promising to improve the situation even further were beginning to emerge. The biggest news is that imagesetter users now have access to irrational techniques similar to those used on high-end CEPS

systems. Irrational screening is a very complex matter mathematically, but it essentially amounts to the ability to place dots on the lines of the graph paper, thus eliminating the need to round off angles. Hell holds the patents on irrational technology and has previously shared them only with the other Big Four CEPS makers (Scitex, Crosfield, and Dainippon Screen). Following the Linotype-Hell merger last year, however, the company released an irrational screening system as an option for its RIP 30 processor and as part of its new RIP 40. Early reports say that the results from this system, which the company calls HQS, are excellent.

Although blocked by Linotype-Hell from using the tried-and-true irrational techniques, Adobe has meanwhile invented a completely new halftoning method, dubbed Accurate Screens. By the time you read this, the technology, which Adobe claims will be every bit as good as the Linotype-Hell standard, may be available on imagesetters using variations of Adobe's Emerald RIP technology.

The Optronics ColorSetter 2000 has always used proprietary hardware and software that reduce screening inaccuracies. The company says that by the end of this year it will release a completely new screening system based on its own and Linotype-Hell's irrational technologies (the two firms entered into cross-licensing agreements earlier this year). Optronics says the new screening method will add clarity and better tonal modulation to separations.

ing text changes or for outputting complex PostScript graphics. That's the nice thing about the high end: one way or another, they can always deliver the job.

Whether you go the PostScript or CEPS route, remember that the shop you end up working with will be your partner in production. Interview prospective partners carefully before picking one. Look at samples of the work they've done. If you go with a PostScript shop, try to find one with experienced color-printing professionals on staff. If you go the CEPS route, be sure to probe the staff on their level of experience with desktop publishing. In either case, get a sense of how long they've been doing desktop color, how much effort they've put into it, and how much work they've produced.

The service bureaus that are making this process work recognize that many users need help to succeed at color production. Larger service bureaus may offer seminars or have publications they have prepared that explain the color-publishing process. And the good PostScript service bureaus offer to teach you how to trap files or how to calibrate color-separation software.

Once you have picked a prepress service bureau, be sure to coordinate with the staff carefully before you produce your first job. Describe the job carefully, being sure to mention all the programs you're using and all the elements the pages are likely to contain, as well as how the job will be printed. If you go to a CEPS service bureau, be sure to ask about the problem elements, such as PostScript graphics with lots of blends, or files with a fifth color. Such elements may require special handling, and waiting to handle them until after you turn the job in for output is a good way to blow both your deadline and your budget.

Whether you follow the high or low road, two final pieces of advice will stand you in good stead. First, do not try to change over your entire operation in one swoop—especially if you're on deadline. If you publish a magazine, for example, start with one or two articles, then evaluate the process to see where the snags are.

Second, learn as much as you can about color printing. Talk to your prepress service bureau, go to a press check and ask questions, read books, experiment. The more you learn, the more control over the process you'll gain, and the more new things you'll be able to achieve. Before long you may be surprised at how something you began for efficiency's sake has become a source of great creative satisfaction.

See Where to Buy for contact information.

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THIS YEAR'S ROUNDUP OF GRAY-SCALE SCANNERS MAY STARTLE YOU FOR AN UNLIKELY REASON. Bucking the trend seen in

Macworld

Lab ranks 13

gray-scale

scanners for

image quality,

speed, and

software

nearly every other peripheral group, these scanners haven't changed much since last year. There are a few minor surprises, software improvements, and some new contenders, but the top choice remains the same as last year's—the Xerox Imaging Systems GS plus—and several other products held steady as well (see "Grade-A Gray Scale," *Macworld*, October 1990).

We love innovation, but those rare occasions when technology lets us catch our breath offer important opportunities. We know these scanners so well that we could refine our tests to reflect more clearly the nuances that often distinguish the best machines from the pretenders.

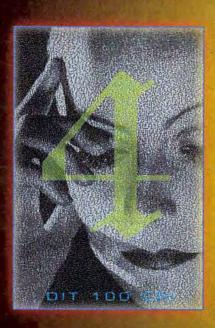
The most important test measured shadow sensitivity—how well scanners differentiate among subtleties in shadow areas. Next in importance, we recorded how much image-altering electronic noise, or static, scanners generate. We also judged how well the scanners capture detailed line art, and we timed their scanning speeds.

by Steve Roth





















### **Quality Control**

Before you leap to the test results, however, consider the factors that contribute to each scanner's scores. No scanner grabs a perfect image. Most scanning software includes brightness and contrast sliders that let you adjust the gray levels in an image. The trouble with those two controls is that they throw away information. When you brighten an image to bring out dark details, for instance, light areas wash out to white. The better scanners also provide gamma control, a correction technique that improves image quality without throwing away information indiscriminately. You can bring out details in

Analog-to-digital

converter

**Analog signal** 

shadows, for instance, without losing the details in the light areas.

And almost every scan destined for printed output needs *sharpening*—a method to reduce blurriness, especially in details (see "Looking Sharp"). With some effort, you can sharpen scans after they're captured in Letraset's ImageStudio, Aldus Digital Darkroom, or Adobe Photoshop (which provides the best sharpening filters). Only one scanner in this roundup provides sharpening while you're scanning—the Agfa Focus II GSE Scanner.

It may not seem like it, but scanners are sort of like radios. In their attempts to capture information, scanners generally come up with some static. With scanners, this noise appears as stray pixels that don't match the gray in a particular area. It causes a speckled look that is especially visible in lower-resolution scans and is accentuated by sharpening.

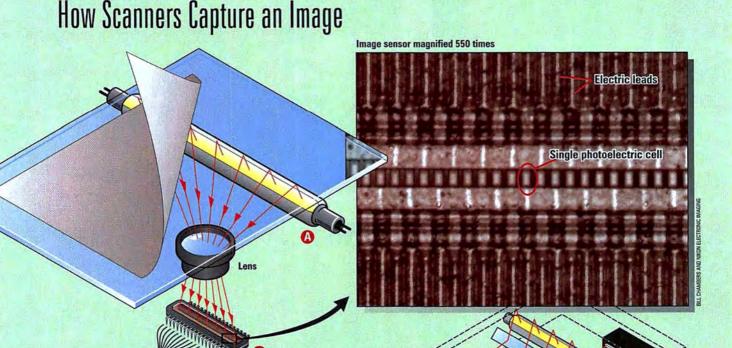
Though it can look similar to noise, a diffusion dither—a way to reconfigure the dot pattern of a scan to boost image clarity—actually improves a laser-output scan. If you plan to produce much of your work on lasers (as opposed to imagesetters), look for a scanner with a good diffusion dither, or software (such as Photoshop) that lets you create a diffusion dither from a gray-scale scan.

Image sensor

Light source

Lens

Mirrors



Gray-scale scanners capture an image by converting varying intensities of light to digital signals that can be interpreted by the Macintosh. Through a variety of mechanical schemes, such as the mechanism used by the Hewlett-Packard HP ScanJet Plus shown in the inset at bottom right, a light source (A) passes across the paper image to be scanned. The image is reflected, often through a lens, onto an image sensor (B). This sensor, composed of microscopic photoelectric cells (see image at top right), produces electrical impulses of varying voltages—higher voltages are generated by lighter, more reflective areas on the image, lower voltages by darker areas. The analog voltage signal is fed into an analog-to-digital converter chip, which then forwards the digital signal to the computer.

Host computer

Digital signal

### **Speed Factors**

In Macworld Lab tests the scanning times varied by only a factor of two from the fastest (the Pentax IQ Scan, with an average scan time of 31 seconds) to the slowest (the Abaton Scan 300/GS, with an average of 67 seconds), not counting the plodding ThunderWorks-driven Apple Scanner and ThunderScan Plus (see "ThunderScanning"). These reasonably close times eliminate scanning speed as a major buying consideration except for high-volume users.

You should be more concerned about speed if you work with a scan in Photoshop or another image processor. The results can be excellent, but the time penalties steep.

### **Driving the Scanners**

Several scanners have moved away from DAs and stand-alone scanning programs, instead offering plug-in modules that let you scan from within ImageStudio, Photoshop, and Digital Darkroom. (Photoshop can use Digital Darkroom's plug-ins, and all the plug-ins we tested worked with both.) Several scanners also come with one of those programs. The scanners that include Photoshop have opted for

### THUNDERSCANNING

The ThunderScan Plus, from Thunderware, is an innovative little \$249 device that turns an ImageWriter into a scanner. The ThunderScan replaces the printer's ribbon cartridge, so instead of the ImageWriter putting an image on the paper, the ThunderScan captures the image that's already on the paper fed into the printer.

Unfortunately, this clever device works poorly. It placed near the bottom of both our shadow-sensitivity and noise tests, and fared abysmally on the line-art test. With a great deal of time (an hour or more) and laborious adjustments, you can get an OK scan, but it will never be adequate for a newsletter with even mediocre production values. If you're serious about capturing quality images, don't waste your time considering the ThunderScan.





Shadow Detail Some scanners do a far better job distinguishing subtle differences in dark areas. On the left is a scan from the Xerox GS plus. Note the crisp detail in the man's coat. On the right is the same image scanned with the Dest PC Scan 3000. Notice the streaking.

Photoshop LE, or Limited Edition, which doesn't make separations.

One thing that improved this year is the way scanning software handles the scaling/resolution question. Some of the scanners (from Apple, AVR, Canon, Dest, Pentax, and Prime Option) still make you do the arithmetic if you want a scan of a certain size at a certain resolution, but the others do the math for you.

Some scanners have increased resolution—but be skeptical. The lineart test shows that higher resolution does not necessarily mean better line art. The 400-dpi Agfa Focus II GSE Scanner and 600-dpi Prime Option

Phovos 600GS did not produce better line art than that of some of their 300-dpi counterparts.

In another minor change this year, more scanners *interpolate* dots—add extra dots between scanned dots to simulate higher resolution. This method does not pick up additional detail, but it does result in smoother output with fewer jaggies.

The following ranking reflects how well the scanners handle these considerations. Now, in true David Letterman style, here are the scanners from the bottom up—worst to best.

### Pentax IQ Scan

When you think Pentax you think great optics, right? Think again. Despite a curvaceous, space-age design, the Pentax IQ Scan is a terrible machine. First and foremost, it offers only 4-bit (16-gray-level) scans. Given that deficiency, its shadow-sensitivity results were impressive—until

we saw the noise test. The Pentax scored far below any other gray-scale flatbed. This scanner captures subtle differences, but drowns them out with noise. Its line-art results are similarly disappointing.

The IQ Scan's two pieces of software both scan only to memory, not to the hard drive. The DA doesn't even have a preview, so you're selecting blind. It does have five-level gamma control and a selection of five dither patterns (though no diffusion dither). The Photoshop plug-in has a preview, along with the basic controls for scan area, mode, and resolution. And unlike the DA, the Photoshop module shows available and required memory for the scan. But that's about all. Despite its futuristic looks, the only way to describe the IQ Scan is primitive.

### **Apple Scanner**

When it came out a few years ago, the Apple Scanner was a standout, with some of the best software around. But this 4-bit unit has not aged gracefully. It failed the shadow-sensitivity test miserably and placed near the bottom in the noise and line-art tests. Its once-innovative software now looks unnecessarily complicated. The original Apple Scanner included the AppleScan application and HyperScan, a clever stack Andy Hertzfeld created for scanning into HyperCard, but now it comes with only AppleScan.

If you already have an Apple Scanner, however, Thunderware's ThunderWorks for the Apple Scanner software (\$149) is worth buying for the tbrow-scrolling feature alone. Move the image with a grabber hand, and when you release the mouse, the image keeps moving in order to review

		Advanced Vision	Agfa					
	Abaton	Research (AVR)	Compugraphic	Apple Compute	Canon USA	Dest Corporation	Hewlett-Packard	Pentax
Scanners	Scan 300/GS *	AVR 3000/GS Plus	Agfa Focus II GSE	Apple Scanner	Canon IX-30F	PC Scan 3000	HP ScanJet Plus	Pentax IQ Scan
Price :	\$1595	\$1990	\$5495	\$1799	\$1545	\$2040	\$1590	\$995
Shows disk space or memory (required/evallable)	•/•	0/0	0/0	0/0	0/0	0/0	•/0	9/6 ‡
Memory or disk limited	disk	disk	disk	disk	disk	disk	disk	memory
Internal SCSI interface	•	• 11	•	•	•	•	0	
Resolution settings/ increments (in dpi)	75, 100, 150, 200, 240, 300 °, 72–300/1 **	72-300/1	13 settings, 100–800	76, 150, 200, 300	75, 150, 200, 300	38-600/1	12-600"/1	39-800/3
Maximum optical resolution	300	300	400	300	300	300	300	300
Gray-level options	2, 16, 256	2, 256	2, 64, 256	2, 16	2, 256	2, 256	2, 16, 256	2,16
Bundled software !!!	IS or DD, APC, AS	PLE	MCV	AP	SD	PP	DS	IQ .
Scanning modules	IS, DD/PS	DD/PS	·	_	_	-	_	DD/PS
Gray preview	0	0	0	0	0	0	•	<b>0</b>
Diffusion dither	0	0	0	0	•	0	•	0
Gamma control (during scan/ after scanning)	• 10	0/•	•/0	0/0	0/0	0/0	0/0	•(0
Sharpening (during scan/ after scanning)	0/0	0/•	•/0	0/0	0/0	0/0	0/0	0/0 - 10 10 11
Maximum image size (in inches)	8.5 x 14	8.5 x 14	8.3 x 12.7	8.5 x 14	8.5 x 11 ***	8.5 x 14	8.5 x 11 ***	8.5 x 14

<sup>• =</sup> yes; O = no. \* The Scan 300/S model, for \$1195, comes with 16 gray levels. \* Optional Picture Pac holder for books and magazines, \$525. \* No/no when using DA. \* Not with ImageCopy DA. \*\* With Photoshop. \*\* With ImageStudio and Abaton Scan DA. \*\* Resolution option up to 1500 dpi, but only at smaller scaling percentages. \*\* Limited by zoom level and image size. An area of any previous scan serves as gray preview. \*\* With MacImage. \*\*\* Unit ImageCopy DA. \*\* Can increase to 64 with ThunderWorks software (\$149). \*\*\* 2 and 256 only with Photoshop plug-in. \*\*\* AppleScan, APC = Abaton Printer Calibration, AS = Abaton Scan DA, DD = Digital Darkroom, DS = DeskScan DA,

a large image in a small window—every program should have it.

ThunderWorks uses multiple passes to capture 64 levels of gray, but this process takes more than twice as long as the next slowest scanner does, and the results aren't much to crow about. For \$1799, forget the Apple Scanner.

### Dest PC Scan 3000

The Dest PC Scan 3000 came out near the bottom in the shadow-sensitivity and noise tests. It's surprising that the noise test came out even that well because the scanner displays obvious streaking (see "Shadow Detail").

The PC Scan 3000's Publish Pac scanning software is adequate, though you need to go through three dialog boxes to set up scanning parameters. There are five zoom levels once you've captured the scan (convenient for checking details), and a decent help system.

But the previewing feature is abysmal. As soon as you drag a scanning selection over the small black-and-white preview, everything outside the selection disappears. When you zoom in on the preview, the PC Scan 3000 just magnifies the already jaggy image into an unrecognizable mass. Publish Pac has automatic contrast

and brightness adjustments, but these don't work well either. This scanner is nothing special, and neither is the \$2040 price.

### AVR 3000/GS Plus

The AVR 3000/GS Plus registered average results in all tests, and its software has fewer features than any of the other scanners. This unit offers control over mode (256 gray-scale, halftone, or line art), contrast, brightness, and resolution. That's it. There's a black-and-white preview, and a pointer tool to select the scanning area. (A quirk in the pointer reveals the scanner's non-Macintosh origins—it points the wrong way—up and to the right.) At \$1990, pass on this one.

### Canon IX-30F

The Canon IX-30F is about as middleof-the-road as you can get—in all our tests, in price (\$1545), and in software quality. This machine lacks controls for brightness in gray-scale and halftone modes and has no contrast control—period—much less gamma. The IX-30F offers a basic set of paint tools (pencil, eraser, marquee, gray palette, and convenient seven-level zooming) for cleaning up scans, and a decent-size scan preview (though it's black and white). We found nothing terribly wrong with this scanner, but nothing to recommend it either.

### Truvel TZ-3

The Truvel TZ-3 is the only overhead scanner in this roundup. Its lens, mounted on a moving arm, passes above a flat bed. Place a special target sheet on the scanner bed, then turn the aperture, focusing, and zooming rings on the lens until the image is set up right. This can be tricky and time-consuming, and you have to go through it just about every time you change the size of the scanning area. And the size of the scanning area is limited by memory-a terrible flaw in a scanner capable of 900-dpi, 256-graylevel scanning. (Figure 6MB per square inch at those settings.) All this trouble results in slow, clean scans, with little noise, that unfortunately don't pick up shadow detail terribly well-hardly a ringing endorsement for a \$7690 machine.

The TZ-3 stands out, however, in capturing line art at high resolution. In our tests, scanning at 841 dpi, the TZ-3 scored far and away better than any other scanner. If you can't live without top-quality line-art scanning, buy this machine. If your needs are any more general, forget about it.

Prime Option	Thunderware	Truvel	Umax Technologies	Xerox Imaging Systems
Phovos 600GS	ThunderScan Plus	TZ-3	UG80 Grayscale	GS plus
\$1995	\$249	\$7690 *	\$1495	\$1995
0/0	0/0	0/0	0/0	0/0 1
disk	memory	memory	disk	disk
•	NA	0	•	•
61-2540/1	18-576/1	1-900/1 **	1–300/1	75–300/1 <sup>11</sup> , 75–120/5, 120–300/10
600	288	900	300	300
2, 256	2, 64	2, 4, 16, 256 ***	2, 16, 256	2, 16, 256
PLE	TW	TS	IS	MI, IC
DD/PS		DD/PS	IS, DD/PS	_
0	NA	0		• "
•	0	0	0	• 11
•/•	•/•	0/0	0/0 116	• "/0
0/•	0/•	0/0	0/• "	0/0
8.5 x 14	11 x 14	12 x 17	8.5 x 14	8.5 x 14

IC = ImageCopy DA, IQ = IQ Scan PSDA, IS = ImageStudio, MCV = McView, MI = MacImage, PP = Publish Pac, PS = Photoshop, PLE = Photoshop LE, SD = ScanDo, TS = TruScan, TW = ThunderWorks. \*\*\* Three levels. \*\*\* Thr

### **Umax UG80 Grayscale Scanner**

One of last year's newcomers, the \$1495 Umax UG80, fared well in our shadow-sensitivity and speed tests. And its software (plug-ins for Photoshop/Digital Darkroom and Image-Ştudio) has improved since last year, allowing you to change scale or resolution independently, with the software doing the arithmetic.

The documentation hasn't improved, however; there is none aside from what comes with the bundled copy of ImageStudio, and a couple of cryptic Read Me files. And the UG80 really fell down in our line-art trials, dropping it out of serious competition with the scanners that follow.

### Abaton Scan 300/S

The 4-bit Abaton Scan 300/S is basically identical in software and function to its sibling, the 8-bit Scan 300/GS, which is one of our top choices in this roundup. You can't expect high-quality imagesetter halftones out of this scanner, but at \$1195, the price is right (as is the software) for line-art work and if you're scanning images for position only.

### Agfa Focus II GSE Scanner

The Agfa Focus II offers several attractive qualities. Its McView software

features reasonably impressive gamma control and includes options for adjusting the lightness of highlights and shadows, an automatic density control option, a user-definable correction curve, and a set of canned corrections such as Dark Original and Brighten Highlights. The asyou-scan sharpening also works

well, though not as well as Photoshop's filters. (All of the Agfa Focus II's controls would be much more useful if the manual's explanation went beyond a few terse, uninformative sentences.)

Other features include a descreening option for removing the dots from previously halftoned material (basically a blurring filter; Photoshop's works better), and a feature that corrects for out-of-alignment lineart scans. You draw a line parallel to a horizontal line in the scan, and

McView rotates, in 1-degree increments, the whole picture to align with the horizontal. It's a good idea, but many jobs require movements finer than 1 degree.

McView also provides *vectorization*—conversion of bitmaps to objects that you can save in various popular formats. It also allows calibration for fine-tuning output; adjustments of halftone *screen frequency* (the number of lines per inch) and angle for proof prints and EPS saves; a densitometer for checking gray values in scans; and basic paint tools for cleaning them up.

The Focus II was one of the top choices last year, based on excellent shadow sensitivity, but its shadow results this year disappointed us. It placed fourth in noise, and its line-art output was average. This scanner still shows promise as a production workhorse, but at \$5495, smart shoppers will steer clear.



The top three: Clockwise from top, the Abaton Scan 300/GS, the Xerox Imaging Systems GS plus, and the Hewlett-Packard ScanJet Plus.

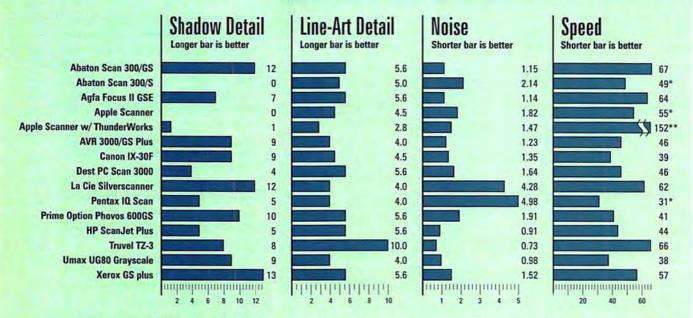
### Prime Option Phovos 600GS

Prime Option entered the gray-scale field this year with its \$1995 Phovos 600GS, a true 600-dpi flatbed scanner that can interpolate up to 2400 dpi. The 600GS posted respectable shadow sensitivity results, aided by as-you-scan gamma-correction settings (vaguely named Sharpen, Smoothing, and Linear, though you won't find them explained anywhere).

We expected the 600-dpi resolution to make a big difference in the line-art test, but it didn't. The 600GS

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Shadow Detail Distinguishing between subtle gray differences in dark areas is a gray-scale scanner's most difficult task. We measured the values that each scanner captured when scanning a calibrated 32-gray-level test strip; the differences in the darkest 5 to 8 bars on the strip are so subtle that they're hard to detect with the naked eye. The graphs you see above are simple counts of how many subtle differences among the darkest 16 bars could be distinguished by each scanner. The higher the score, the better the scanner differentiates between gray values in dark areas. To determine these numbers, we calculated the mean gray value of all the pixels that each scanner captured for each gray bar. The pixels in a medium-gray bar might have an average value of 133 (an ideal black would be 256), for instance; a light bar might have an average value of 29. Then we looked at the difference in average value between adjacent bars on each scan to determine that scanner's ability to distinguish those two gray levels.

Line-Art Detail To find out how well these scanners capture line art the tiny details, such as the patterns in an old-fashioned etching—we scanned a series of progressively more tightly stacked lines from a test sheet. If we could count how many lines there were in the scan, the scanner did its job. The value you see here is the maximum number of lines per millimeter that each scanner could recognize when scanning at its highest resolution.

**Noise** Electronic noise generated by a scanner affects consistency. Every pixel should be identical in a given gray bar; to evaluate the scanners' consistency we measured the standard deviation, or spread, of values within each of 37 different gray bars as scanned by each scanner. The results shown are the averages of those values for each scanner.

**Speed** We timed two 8-by-11-inch scans—one at 300 dpi in line-art mode, the other at 200 dpi in gray-scale mode (at 256 gray-levels, except as noted). The numbers shown here represent averages of the gray-scale and line-art results, in seconds. If a scanner could be driven by more than one program, we measured the times in each program (they varied widely) and averaged the results.

\*Scanned at 16 gray levels. \*\*Scanned at 64 gray levels.

really faltered, though, in the amount of noise it generated—producing obviously stippled images at lower resolutions.

The Phovos 600GS comes with a Photoshop plug-in and an *rdev*—a Chooser item—to select the scanner in the Chooser. This can be exasperating; you have to go to the Chooser to switch between scanning and printing. Even worse, the flatbed's cover will not stay up by itself. Other nits to pick: the Phovos 600GS cannot scale while scanning and offers only a small, black-and-white preview. Several ostensibly sophisticated options, such as MTF Correction, and Bold Lining, are not explained in the paltry documentation.

### **Hewlett-Packard ScanJet Plus**

A few years ago Hewlett-Packard brought reality to gray-scale scanner prices with the ScanJet Plus, priced at a then-incredible \$2090. That price just dropped a whole lot more—to \$1590—again undercutting just about every other comparable scanner.

For that money you get a scanner that scored near the top in noise and average in line-art trials, but that fared poorly in shadow sensitivity, making its excellent noise control nearly irrelevant. And there are no gamma controls to help you clarify details. The ScanJet Plus is just average in its scanning speed.

The ScanJet Plus's easy-to-use DeskScan software partially compensates for these failings. DeskScan's unique gray-scale Live Preview updates the preview image every time you change a setting. Though it's a small preview, you can zoom in on a selection, and DeskScan rescans that area so you can examine it in detail. The option for automatic contrast and brightness adjustment is convenient, though you still have to fine-tune those settings manually.

Another winning feature is the ability to scan directly to the printer (for trying scans out quickly or using the ScanJet and your printer as a slow copying machine).

Even with these assets, there is only one compelling reason to buy the ScanJet Plus: some programs, such as Microsoft Word, require scans to be pasted in from the Clipboard. The ScanJet Plus can scan directly to the Clipboard, accommodating this idiosyncrasy for about \$400 less than the similar (though higher-quality) Xerox GS plus.

### Abaton Scan 300/GS

The Abaton Scan 300/GS was the surprise of this roundup. It was second only to the Xerox GS plus in detecting shadow details and came in a respectable fifth in our noise tests. The three gamma settings further improve that gray response. Line-art results were average.

The Scan 300/GS's software includes either ImageStudio or Digital Darkroom (your choice), a scanning DA, and plug-ins for Photoshop/Digital Darkroom and ImageStudio. (Among these software choices, avoid the Photoshop plug-in, which has disappointing resolution choices and cannot scale an image while scanning.) There's a stand-alone calibra-





Looking Sharp Nothing does more to improve the look of scanned images than sharpening. The image on the left was printed as scanned. The image on the right was sharpened with Photoshop 2.0's Unsharp Masking filter.

tion program that lets you modify scans so they print looking more like what you see on screen, and an informative how-to HyperCard stack (though it explains more about the scanner than about the Mac software).

The Abaton Scan DA suffers from a major bug—it treats line-art scans like gray scale for the sake of required memory, meaning you need eight times as much memory as is really required for line art. The only other disappointments in this \$1595 scanner are the speed (it's more than 45 percent slower than the Xerox GS plus

for gray-scale scans) and the lack of a diffusion dither.

### Xerox Imaging Systems GS plus

When Xerox bought Datacopy a couple of years ago and the old hands from Datacopy left, bets were that the great scanners and software that Datacopy produced would dry up in a couple of years. But the GS plus hangs on as my favorite gray-scale scanner.

The GS plus led the pack in shadow sensitivity, and although it placed low in the noise test, it wasn't noisy enough to interfere much with image quality. It was medium-slow on the speed tests and it was right in the thick of the pack on the line-art test.

What makes the GS plus so attractive,

aside from excellent gray response, is its MacImage software—the best scanning application available—and ImageCopy DA, a quick-and-easy scanning program.

MacImage includes superior gamma correction (including a spate of preset curves and the ability to customize curves), amazing halftoning control, some special gray-scale effects, and 11 zoom levels. The GS plus bundles a calibration program that creates a gamma curve that can then be used in MacImage. MacImage provides the best and easiest way to get good scans, but only after you experiment some and closely study the manuals (Xerox should print new manuals for this version, 2.3, of Mac-Image, rather than rely on a skimpy addendum).

MacImage doesn't have a preview per se, but you can select an area of any previous scan for your next scan.

While MacImage can be daunting for a first-time user, the ImageCopy DA is a breeze (it even allows the GS plus to scan to the Clipboard). Image-Copy's preview, though black and white, is dithered for clarity.

About all I'd add to this \$1995 scanner are a good diffusion dither and some image-modification software, preferably Photoshop. The GS Plus is well worth \$400 (plus the price of Photoshop) more than the Abaton or HP offerings. If you can afford it, this is the scanner to buy.

See Where to Buy for contact information.

### THE SILVERSCANNER COLOR OPTION

Can an inexpensive color scanner beat the gray-scale crowd on their own turf? To check it out, we ran the \$1999 La Cie Silverscanner, the favorite inexpensive scanner in our color flatbed scanner roundup (see "Affordable Color Scanning," Macworld, June 1991), through our battery of gray-scale tests.

While the Silverscanner picks up shadow details with the best of the lot, the trade-off is noise far worse than that of any scanner in the gray-scale roundup except the Pentax IQ Scan. So if you're scanning at lower resolutions and using sharpening filters, be prepared for some noticeable speckling and splotchiness. The Silverscanner didn't fare terribly well in the lineart test, and it was average on speed.

If you don't require the very best in gray-scale scanning, however, and feel you might need color scans now or in the future, choose the Silverscanner.

Along these lines, a new 600-dpi color scanner from a longtime leader in the scanner arena merits a close look. Microtek's \$2195 ScanMaker 600ZS, based on the popular but recently discontinued 300ZS model, began shipping at press time. Microtek is also shipping the \$1695 ScanMaker 600GS gray-scale unit based on the old 300GS model. And at press time Hewlett-Packard indicated that it expects to ship a new product, the ScanJet IIc, shortly after this article appears. The \$1995 scanner will feature 24-bit, single-pass color scanning; and 8-bit gray-scale scanning at 400 dpi.

Contributing editor Steve Roth is coauthor of Real World PageMaker 4: Industrial Strength Techniques (Bantam Computer Books, 1990). Living in Seattle, be is intimately familiar with shades of gray.



## REVIEWS

### Computer-Controlled Stereo VCR

### PC-VCR

Pros: Accurate to within one frame; feature-packed; excellent VHS, S-VHS, stereo hi-fi VCR in its own right; titling feature; staggering unrealized potential. Cons: Inscrutable manual; programming required to permit Mac control; insufficient, poorly documented software.

Company: NEC Technologies.

Requires: Mac Plus. List price: \$2100.



Thus the PC-VCR was born: a magnificent machine, a superlative VCR, designed and executed with great imagination, but shipped with almost no useful software.

### It's a VCR

The PC-VCR hardware is slim and attractive. Its color matches the Macintosh, and its tape door and control panel are neatly hidden by a flip-open front panel, as is common in recent high-end VCRs. As a VCR, the unit's features include automatic tracking, S-VHS recording and playback, an eight-event programmable timer, a remote control with an on-screen menu system (which is exactly as hard to understand as on other VCRs), and



indexing to quickly locate newly recorded programs.

The cleverest innovation is the unit's time-code striping scheme. Before you can access any of the PC-VCR's great features, you have to play a cassette from beginning to end, so that the PC-VCR can record framecounting signals onto an unused part of the tape's control track. Incredibly, and unlike SMPTE or other common time-code schemes, the PC-VCR's time-code striping doesn't touch the existing audio or video bands. In other words, you can time-stripe your most valuable tapes, and nobody but the PC-VCR will ever know that it has been modified. (Note to video editors: When you're getting ready preparing to edit footage, this nondestructive time code saves you one generation of tape copying, since you don't have to duplicate the original just to add SMPTE code to the audio track.)

Once you've striped the tape, the VCR can fast-forward or rewind to a specific frame automatically. Actually, that's not quite true-one of the few drawbacks to the system is that the VCR doesn't actually read the time code when rewinding or fast-forwarding. When it's hunting for a particular time-code address, it zips to a point just before the spot you've specified, slips into play mode for a moment to get its bearings (by reading the time code), then zips some more, and so on. In other words, it finds a spot by using the same trialand-error method you use on a VCRexcept that the PC-VCR does it with mathematical (albeit sometimes still poky) efficiency.

### It's a Computer Peripheral

Once you've connected the PC-VCR to the Mac's modem port, the PC-VCR offers much, much more. Seated at the computer, you can control all transport functions (rewind, play, record, stop, pause, and so on); mute the audio; change the record speed; turn the thing on or off; eject the tape; use the character generator to super-

impose titles on something you're recording; and so on. (The character generator is fabulously useful, except that only three sizes of type are offered, in one style [all capitals and no apostrophe], and the larger two sizes look jagged.) In fact, computer control of the VCR permits access to hundreds more possibilities than either the remote control or the front panel offers.

Unfortunately, you have to issue all these commands by programming them. The PC-VCR's own language isn't nearly as difficult to learn as, say, Pascal; everything is a coded two-letter command followed by a number. To change to channel 5, you type in CN5. All of this is documented in the manual, but it's by no means for the layperson; the writing is technical, few examples are provided, and you're never told what you'd use each command for.

Worse, to issue these commands, you have to use a telecommunications program like MicroPhone. Typing text codes is about as unfriendly an interface as there is.

### The HyperTalk Connection

Fortunately, there's the promise of a better way: HyperTalk. If you're adept at programming in HyperCard, you can use XCMDs to control the VCR too, making it possible to build your own software. (The unit does come with a sample HyperCard application, but it's feature-poor and not frameaccurate.) Alas, these XCMDs aren't documented anywhere; when asked how to learn to use them, NEC spokespeople suggest opening the provided sample stack and "studying" them. (That is, that's what NEC says if you're lucky enough to find somebody in that vast corporation who's ever heard of this product.) After dropping two grand on a piece of equipment, you'd think you'd get a little more help than that.

At the moment, then, the truly incredible powers of the PC-VCR rest in the hands of programmers. But the situation is about to change dramatically. NEC reports that at least 30 companies are developing software for the PC-VCR. Furthermore, NEC plans to replace the currently included software with something much more

powerful. If you want to find out what's available—and whether or not the shipping software has been improved by now—call 800/562-5200; at the prompt, press 632.

When all this software development comes to fruition, it's going to be an amazing time for both home and semipro video jocks. Just thinking about the programs on the way can increase your heart rate. Imagine, a video database: type a keyword, watch the clip play on your screen. Or how about editing software that permits you to hook up two PC-VCRs to edit and dub quickly and easily, with single-frame accuracy.

Developers are also working on a quick, simple way to set the VCR for recording programs: click on the icon representing a television show, and drag it onto the appropriate square of an on-screen calendar. Another program will let you download broadcast-TV listings from Compu-Serve and transmit them to the PC-VCR's internal buffer; now the machine knows what shows will be on when. And finally, imagine presentation software that lets you show clips instead of slides. (A somewhat buggy plug-in already is included with the unit for use with Aldus Persuasion.)

### Ahead of Its Time

Technologically speaking, the PC-VCR is about as well done as such a device could be. It doesn't feel like a VCR with something grafted onto it; instead, it feels as though it was designed from the ground up with flexibility and creativity in mind. Of course, having a VCR that can jump to a precise frame of videotape doesn't have as many repercussions in the multimedia world as you might think. For example, you can't click on a HyperCard button that says Go to Closing Credits and immediately watch the gaffers' names scroll by; the PC-VCR is still a VCR, and it still takes time to fast-forward the tape. That's why videodiscs-which provide instant random access-won't become obsolete just yet.

But presenters can minimize tapetransport delays by arranging their video "slides" in the correct order on the tape to begin with. Video editors won't find instant access critical. And high-end video nuts everywhere will welcome the machine's programmable smarts. At the moment, the PC-VCR is a highly communicative machine with nobody to talk to. But when software appears that takes advantage of its flexibility, it will play an interlaced field of dreams.

### -David Poque

See Where to Buy for contact information.



Hardware/Software Security Kit

### **PASSPROOF**

Pros: Simple, elegant, nonintrusive; reasonably effective. Cons: Works only on SE or Mac II series; can't protect external floppy drive; port covers can be removed with scissors.

Company: Kensington Microware.

Requires: Mac SE or II series; hard drive;

System 6.0. List price: \$99.95.



A good security product has to strike a delicate balance: it must protect the computer

without making access a hassle for legitimate users. After all, if you seal your Mac in a block of cement, your security problems are over.

Kensington's PassProof is a remarkably elegant combination of hardware and software for securing every route of access to the Mac. It won't stop a truly determined thief, but neither does it get in the way of everyday use.

### Lock It Up

The best component of the PassProof kit is a well-engineered, Macintoshcolor key lock for the main floppy drive. Not only does the lock slip in quick as a wink, but the thing simply will not come out without the unique cylinder key. Bobby pins, paper clips, and prying utensils all fail to dislodge it without destroying the Mac's case. The lock has a satisfying, solid feel when you turn the key. The downside is this: you have to buy two PassProof kits if you have two internal floppy drives. And there's no PassProof component for an external floppy drive; if you own one, you'll have to disconnect it, or you'll defeat the whole point of using PassProof. (continues)



PassProof from Kensington Microware

The kit also includes flat steel plates that cover the floppy port and the SCSI port in the back of the Mac. Each is secured by a pair of screws that have abnormal heads, for which a special screwdriver (more like a deformed allen wrench) is included. These plates prevent people from getting bright ideas about attaching an external drive, thereby circumventing PassProof's other elements. There's an additional special screw for the Mac II cover, to prevent people from making off with your prized NuBus boards.

### Software Padlock

PassProof's software is more complicated, but only slightly so. Once you've installed the Control Panel device in the System Folder, you enter a master password; you are now the Master User, with exclusive rights to change the program's options. Up to 255 other users can have access to the Mac itself, however, once you've given each a user name and a password. From now on, the software will demand a valid user name and password every time the Mac is turned on; both successful and unsuccessful attempts to sign in are neatly recorded in a log file.

The password policy is pretty strict: Uppercase and lowercase characters count; as you enter the password, you don't even see corresponding asterisks (because that would give away how long the password is); and you can require a series of sequential passwords, which must be entered in the correct sequenceand PassProof countenances no mistakes. The nice thing is that you, the Master User, never have to lie awake at night worrying what you'll do if you forget your password-because you hold the physical key to the floppy drive as well. If you forget your password, just start the Macintosh from an unprotected floppy and reinstall PassProof.

The PassProof software includes a tight, nicely done screen dimmer. If the Mac sits idle for x minutes (you decide), the screen goes dark, a moving icon bounces around the screen, and you must reenter your password to regain access. All this is optional; you can still choose between the security of the screen dimmer and the lush absurdity of After Dark's Flying Toasters.

Incidentally, it's not PassProof. It's PassProof™. Kensington puts that trademark on all four of the files PassProof puts in the System Folderand the software won't even run if you take ™ off an icon name. PassProof is not System 7-compatible (according to the company, by the time you read this, it will have a new version that will be compatible).

### Leaving the Back Door Open

Alas, a complete security system is only as strong as its weakest link, and PassProof has one. It's those special screws for the SCSI and floppy ports. You can't turn them with a Phillips or normal screwdriver. You can, however, turn them with the blade of a pair of scissors. If somebody is really bound and determined to get into your Mac, and is armed with an external drive, PassProof isn't going to represent more than a ten-minute delay. But if you are concerned, Kensington will send you a set of redesigned screws that solve the problem, at no charge.

In the meantime PassProof's real value is the psychological hurdle it presents. Any casual or nonbloodthirsty thief is likely to be deterred just by glancing at the solid-looking floppy-drive lock. PassProof won't transform your Macintosh into a fortress-but it does create a sturdy checkpoint at the drawbridge.

### -David Poque

See Where to Buy for contact information.



Online Dictionary and Thesaurus

### THE AMERICAN HERITAGE ELECTRONIC DICTIONARY 1.0

Pros: Complete word definitions; excellent dictionary search capabilities; recognizes misspelled words as well as any spelling checker does; clear, concise manual. Cons: No keyboard shortcuts; poor online help; weak thesaurus; numerous inconveniences and small design flaws. Company: The Writing Tool Group, a subsidiary of WordStar International. Requires: Mac Plus; System 6.0.2; hard drive with 3MB of free space. List price: \$99.



There are few writer's tools as important as a dictionary and a thesaurus. For writers

who use the Macintosh, on-line dictionaries, such as Spelling Coach Professional (Deneba) and Webster's Ninth New Collegiate Dictionary (Highlighted Data) on CD ROM, have been around for a while now, but sadly, all fall well short of the ideal. Electronic thesauruses, such as Word-Finder (Microlytics), Thunder 7 (Baseline Publishing), and Coach Professional, have also been available for some time, but they too fail to match the best printed thesauruses. I was thus cautiously hopeful when I received for review a new online dictionary and thesaurus, the American Heritage Electronic Dictionary, originally from Houghton Mifflin Software.

According to The Writing Tool Group, the dictionary portion of the American Heritage Electronic Dictionary contains the more than 116,000 definitions and 28,000 main entries of the American Heritage Dictionary, Office Edition; the thesaurus portion, Roget's II, contains synonyms for over 42,000 words. The entire program comprises a desk accessory (DA) and nine data files that occupy a hefty 3.1MB of disk space. Unfortunately, all nine files must be stored in the System Folder; you cannot place them in a folder of their own, either within the System Folder or anywhere else. (continues)

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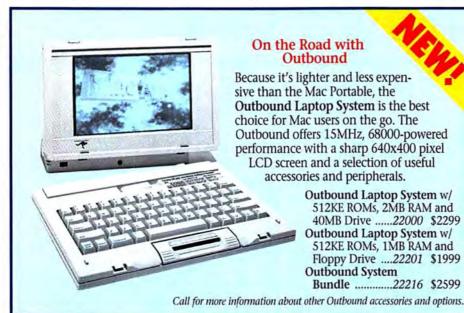
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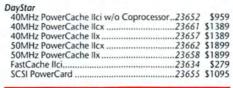
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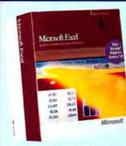


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Ideally, the American Heritage Electronic Dictionary would open automatically, the way Thunder 7 does, in selected applications (such as your word processor)-but it doesn't. Instead, you must manually select the DA each time you want to launch the program. Ideally, the DA would add its menu (entitled AHED) to the currently active application the way Coach Professional does, but this occurs only if the Finder is turned on. If MultiFinder is turned on, the AHED menu is added to the separate, and much less convenient, DA layer. (If you use a trick not mentioned in the manual-pressing the option key when selecting the DA-the AHED menu will be added to the current application's menu bar.) Even less conveniently, the application whose menu bar contains the AHED menu must be stored on the start-up volume; if it's stored anywhere else (in a different hard drive partition, for example, or on another drive), the dictionary refuses to run.

Another disadvantage is that it cannot, at the press of a key, search for a word you've selected in a document the way Coach Professional does. To look up a word or search for a synonym, you must open the appropriate window with a command from the AHED menu and either type in the word manually or paste it in from the document. No keyboard shortcuts are provided, and there's no way to add them.

In most instances, the dictionary locates and displays one or more definitions in the dictionary window's scroll box after a short pause. (When I tested this software, the entire program slowed to a crawl on rare occasions; quitting and relaunching always solved the problem, however.) The lookup function has no trouble recognizing plural nouns and verb forms other than the infinitive, and if you misspell the word you're looking for, it displays a list of properly spelled alternatives. Unlike Webster's Ninth New Collegiate Dictionary, American Heritage is as intelligent as the best spelling checkers when faced with such mistakes as missing first letters (such as onnection instead of connection), phonetic substitutions (flegmatic instead of phlegmatic), and reversed letters (aptriotic instead of patriotic).

By and large, the definitions are more complete than those in Coach Professional, and they include pronunciation, hyphenation, parts of speech, inflections (different forms for number, tense, and so on), etymology, and occasional usage notes. Unlike Webster's Ninth New Collegiate Dictionary on CD ROM, the American Heritage Electronic Dictionary has no illustrations or spoken pronunciations. Conveniently, you can look up the definition of any word within a definition simply by double-clicking on it. Not so conveniently, you can copy only one word at a time from a definition to a document. (In Coach Professional, you can copy any part of a definition. In Webster's Ninth New Collegiate Dictionary, you must copy the entire definition; a copyright notice is added automatically.)

When it looks up a word, the dictionary searches only the head words, those found at the start of each main entry. A special SearchText command unique to this program, however, searches the entire dictionary to locate entries containing a specified word or, using the command's Boolean functions, combination of words. For example, SearchText can find all words based on a specific Latin root. And it can generate a list of Greek gods (plus a few other stray words) by searching for Greek and god. SearchText also works well as a kind of reverse dictionary; if you can't remember the word for the study of insects, for example, SearchText can



Too Many Menus In addition to the list of windows at the bottom of the American Heritage Electronic Dictionary menu, two pop-up menus in the dictionary window list open dictionary and thesaurus windows separately, while a third provides access to up to 16 previously looked-up words (as in the open menu here). A less confusing, more economical design would easily combine everything in a single menu.

ferret out entries containing both study and insects, and thus find entomology. A variety of special search symbols enable you to narrow a search to a certain part of speech, a geographic region, a type of usage (such as slang or archaic forms), and so on.

The thesaurus window-reached by means of a menu command or a button in the dictionary window-is almost identical to and just as cluttered as the dictionary window (see "Too Many Menus"). Thesaurus entries are sorted by meaning and, unlike those in Coach Professional, always display the appropriately inflected forms (if the noun you enter is plural, for example, all the synonyms are plural). The thesaurus does not recognize misspelled words (you'll need to switch to the dictionary for that) and, as with the print edition of Roget's II, it lists only close synonyms (no distant synonyms, related words, or antonyms). Also in contrast to the more comprehensive Roget's International Thesaurus (my favorite thesaurus, currently available only in book form) and Coach Professional, the electronic Roget's II has a rather restricted word list, and it lacks synonyms for such commonplace words as theater and patriot, for example.

The American Heritage Electronic Dictionary contains several unusual features in addition to the dictionary and thesaurus. Its Wildcard command locates all words that contain a specified string of known letters and either a fixed or indeterminate number of unknown letters. For example, crossword-puzzle players can find a fiveletter word that begins with b and ends with tz, and songwriters can find words of any length that rhyme with bappily. The Anagram command generates a list of words that contain the same letters as the word you specify; if you enter sport, for example, Anagram returns with ports and strop. If the Wildcard or Anagram window lists a word you don't know, a double-click will reveal its definition.

Clearly, the American Heritage Electronic Dictionary has many minor irritants and small flaws and the thesaurus and online help are also of (continues) relatively poor quality. On the other hand, this program contains the best online dictionary currently available for the Macintosh. Its searching ability is unequalled, its ability to recognize misspelled words is excellent, and its Wildcard and Anagram functions are nice bonuses. The priceless than half that of Webster's or Coach Professional-is also right. All told, I judge the American Heritage Electronic Dictionary a winner, but only by a technical knockout. The Writing Tool Group will have to revise the program and eliminate its many shortcomings if it wants to really KO the competition.-Robert C. Eckhardt See Where to Buy for contact information.

Font-Customization and Format-Conversion Utility

### FONTMONGER 1.0.3

Pros: Excellent interface and help system; nifty features like built-in alterations and extensive customization options; very good technical support. Cons: Post-Script-to-TrueType conversion can be uneven due to inherent problems with TrueType-PostScript compatibility, especially with word processors.

Company: Ares Software Corporation.

Requires: Mac Plus; second disk drive; System 6.0.2. Recommended: Hard drive. List price: Version 1.0.4 \$99.95.

FontMonger was the first product released in response to the introduction of True-Type as Apple's alternative to the PostScript font format. The ease with which FontMonger batch-converts between PostScript Types 1 and 3 and TrueType is in itself a masterly stroke.

FontMonger's font-format conversion, while adequate in performance and impressive in terms of letter-curve-fitting, is a victim of the bugs and problems endemic to any new industry standard. The integration of competing font formats in Macintosh desktop publishing is far from seamless. You cannot convert fonts from PostScript to TrueType without encountering problems ranging from slight variations in leading and character widths to actual font substitution. The former is due to

problems with TrueType technology itself, while the latter is a function of the way certain applications use font ID numbers rather than names. (At press time, Ares Software was betatesting a new version of FontMonger that the company claims will actively and accurately address these problems of incompatibility.)

Despite these problems, Font-Monger would be a bargain at twice the price. Its extensive font-customization tools, combined with an elegant and easy-to-learn interface, bring powerful typographer's tools to the desktop.

FontMonger's Alterations menu offers built-in changes, such as Small Caps, Slant, Superior, and Inferior. With these you can easily choose all or a range of characters within a font to create a small-caps typeface, an italic typeface for a font that does not have one, or subscript and superscript numbers. These alterations can also be combined to create new typefaces, such as a Slanted (or italicized) Small Caps typeface.

### I've Grown Customized to Your Typeface

Double-clicking on any character in FontMonger's Key Caps-like display brings up a FontMonger character dialog box, which includes a Composites panel designed to help you automatically create composite characters such as horizontal and vertical fractions (that is, ½ and ½).

The Composite button to the left of the fraction buttons allows optimum customization; you can create a composite of any number of characters, in any number of fonts, and with



Macworld's Logo It was incredibly simple to import the Macworld logo as an EPS file into the Stone Serif typeface. Now placing the logo is as easy as pressing the grave-accent key on the keyboard in that typeface.

any number of symbols, limited only by what you consider good taste. Characters or composites of characters can also be mapped to custom key combinations.

The Readouts panel provides control of width and height (what percent the character is scaled from its original size), horizontal and vertical distances (how far a character is moved up or down by 1/1000 point), slant (the number of degrees a character is obliqued, or italicized), and letterspacing.

The last box on the Readouts panel is even more helpful: the Context box allows you to type in letters that are placed before and after the character you select, so you can evaluate how you've changed or created a character in relationship to adjacent characters.

FontMonger does not limit you to characters within a single typeface or even to typefaces themselves. Open up any number of fonts and cut and paste characters between the keyboards—kind of like cross-font pollination.

You can also create your own symbols and save them as EPS or PICT files and import them into your commonly used font. It was easy and straightforward to incorporate some common *Macworld* symbols, like the end box (a), directly into the font used for *Macworld*'s body text.

### It's the Little Things that Count

Little touches make FontMonger's interface impressive. If a font is installed or in use, FontMonger makes a copy of the font you need to work on. And the System 6.0.X context-sensitive help messages rival or surpass System 7's balloon help.

It will be some time before users can extensively test and retest format conversion using the numerous configurations and seemingly limitless number of fonts in the Mac world—as I noted, a number of problems have resulted from the immaturity of TrueType technology. But Font-Monger is much more than a conversion utility. Its font-manipulation capabilities and easy-to-use interface make its \$99.95 price a real steal for desktop publishers at every level.

### -Luis Camus

See Where to Buy for contact information.

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Circle 47 on reader service card



### 24-bit Video-Image Capture Boards

### COLORSNAP 32+

Pros: Quick to digitize; feature-packed software; high-quality images.

Cons: Abysmal manual; poorly designed interface; displays only one image at a time. Company: Computer Friends.

Requires: Mac II; 4MB of RAM; hard drive; 8- or 24-bit color video board, external video device. Recommended: 8MB of RAM. List price: \$995.

### **QUICKIMAGE 24**

Pros: Easy to use; high-quality images; excellent manual; low price.

Cons: Strange, nonstandard interface; no color-correction features; slow to digitize. Company: Mass Microsystems.

Requires: Mac II; 4MB of RAM; hard drive; System 6.0.5; external video input device; cables. Recommended: 8MB of RAM. List price: \$695.



Wow, is desktop video taking its sweet time to arrive. Even a task as simple as capturing a single frame of moving video onto your screen requires a NuBus

board costing nearly \$1000. The shortcomings of recent entries, the ColorSnap 32+ and the QuickImage 24, illustrate how difficult creating such a product must be.

### Hooking Up

The first thing you do is slip one of these NuBus boards into the Mac. With its two large, sandwiched circuit boards, the ColorSnap can be a tight squeeze; you may have to make sure it's positioned at the end of your row of NuBus slots.

Next you plug a videocassette recorder, camcorder, or still-video camera (like the Canon XapShot) into the jacks on the exposed end of the board. You can hook up regular TV signals (NTSC composite) or S-VHS signals to either board; the Color-Snap also has a jack for RGB (computer monitor) signals, and comes with cables. You have to provide your own cables in order to use the Quick-Image, but you can connect two devices at once and switch between the input signals from within the Quick-Image program.

Now you copy the controller program to the hard drive (the Quick-Image also requires an INIT), run it, and turn on the VCR or camera. You see the incoming video picture, in gray or color, in a 2-inch-square preview window. The ColorSnap updates this display slowly—perhaps twice per second; the QuickImage, on the other hand, shows the video in full real-time motion, so it's much easier to choose your moment of capture.

At the instant you see the frame you want to capture, you click on the Capture button. You lose control of the Mac for about three seconds (ColorSnap) or ten seconds (Quick-Image) while the computer processes that fraction-of-a-second image. Then, suddenly, a gloriously clear window appears, containing an impressive fullcolor digitization of the video frame you wanted, filling the screen of the Apple 13-inch color monitor. You can save the image in a PICT or TIFF file of any color depth (ranging from black and white to 16 million colors). The QuickImage also has some special-effects filters, but they generally succeed only in mucking up the image.

Both packages, incidentally, come with a plug-in module so that you can capture video directly into Adobe Photoshop. The ColorSnap includes similar modules for QuarkXPress and ColorStudio.

### Interface in Your Face

Beyond this basic similarity in function, the experience of using these two packages is utterly different. For some reason, both manufacturers decided to jettison the standard Macintosh interface. The QuickImage interface has some weird, Next-like square buttons that don't convey nearly as much information as Mac buttons. For instance, because they are identical rectangles, there's no default (highlighted) button. And because of their color scheme, these mutant buttons are never dimmed. You sometimes wind up repeatedly clicking on something that's actually disabled (since you have no visual clue). There are other oddities in the QuickImage software, too; toggle switches-controls where you're asked to choose one of two



Open a Window QuickImage, unlike its rival, permits multiple image windows (in addition to the Preview window, upper right). Not only can you compare takes, but you can apply special-effects filters to specific regions of specific windows, as in the monochrome window at lower right. Note the not-very-intuitive control panel, though (far right): try to guess what the icons do.



Rogue's Gallery The ColorSnap software includes what could be a very handy feature for cataloging the images you create: the Gallery. When you double-click on one of these thumbnail sketches, the program locates the corresponding PICT or TIFF file on the hard drive and, after a moment, displays it in a window at full size. It's buggy, though.

options—are handled inconsistently within the program.

But count your blessings: at least the software is *structured* simply and intuitively; at least you always know where you're going and what's happening. And the manual is terrific.

The ColorSnap software, on the other hand, is a sprawling landscape of oddly implemented features. Its Gallery feature in particular—a potentially useful keyword-searchable image database—is filled with software design errors. Choose a menu item, and nothing happens. Two consecutive menu commands bring up the exact same dialog box. And there's no Window menu, so it's entirely possible for a small window (such as the Gallery) to get permanently lost behind a larger one, making you save and close (continues)

# ONE SIMPLE DECISION, EIGHT GREAT APPLICATIONS.

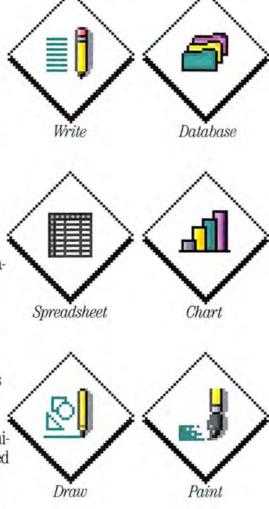
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Communications

Outline

the larger one just to view what's behind it.

### No Manual Transmission

But at least somebody probably looked over the ColorSnap's software before shipping it; that's clearly not the case with its manual. The typos are one thing-that, for some unhappy reason, is par for the course in Macintosh manuals-but this manual goes far beyond. It refers to commands that don't exist. Paragraphs end mysteriously in midsentence. Illustrations don't match the screen. After a few pages of this, you stop trusting it-and you get angry. On a piece of publicdomain software you could forgive this slapped-together effect, but not on something that set you back a thousand bucks.

There are trade-offs everywhere in the feature sets of these two packages. ColorSnap takes far less time to capture the image, but QuickImage lets you have more than one image on the screen at a time, so you can compare takes. ColorSnap has its Gallery but doesn't let you select just a portion of the image to copy or save (Quick-Image offers a standard selection marquee). Both companies have one or two excellent technical-support staffers; both can sometimes be hard to reach (although Mass Micro's number is toll-free). The QuickImage has a multiple-exposures feature that snaps the shutter several times in succession (at a rate you specify), creating an image each time—theoretically, a great feature for animators. Trouble is, the QuickImage takes ten seconds to shoot a frame (even if you tell the program to take them, say, every two or five seconds)-and what's the use of snapshots taken that far apart?

On the other hand, the Quick-Image lets you have multiple open windows. In other words, you have the luxury of comparing successive attempts at capturing an image, by viewing all of them on the screen at once. Or you might open several windows containing the same image—one color, one black-and-white, one dithered, and so on—as you hunt for just the right effect.

The QuickImage is clearly the welldocumented, more carefully designed and reliable product; the fact that it is \$300 cheaper than the ColorSnap and comes bundled with a stripped-down version of Photoshop only makes it more attractive. The ColorSnap's feature list is longer, and the actual digitizing process is much faster. But nobody should be subjected to the unpolished software and almost insultingly slapdash manual. Neither manufacturer has quite mastered the Macintosh interface, but the maker of the QuickImage has at least mastered the art of quality control.

-David Poque

See Where to Buy for contact information.



Multiple-Resolution Monitors

### L-VIEW MULTI-MODE

Pros: Sharp focus; six resolutions; pop-up menus; large cursor and menu fonts; hot keys; screen saver; screen capture; online help; optional OCLI antiglare screen; tilt-and-swivel stand; power indicator; controls easy to access. Cons: Inflexible configuration; no gray-scale option.

Company: Sigma Designs. Requires: Mac SE. List price: Display system \$1999; with OCLI panel \$2299.

### **QUICKVIEW Z21**

Pros: Four resolutions; gray-scale option; virtual screens; pan; zoom; large menu fonts; hot keys; screen saver; online help; tilt-and-swivel stand; chemically etched antiglare screen; flexible configuration. Cons: Soft focus; no power indicator; controls hard to access. Company: E-Machines.

Requires: Mac SE. List price: Mac SE

Requires: Mac SE. List price: Mac SE or SE/30 display system \$1995; Mac II display system \$2490; 1MB upgrade \$425 (Mac II only).

If you are impressed by the Radius Pivot's quick-change act—from landscape to portrait orientation with a flip—wait till you set your sights on the chameleon CRTs from Sigma Designs and E-Machines. The L-View Multi-Mode and the QuickView Z21 switch resolutions at the touch of a button, displaying tiny text one second and oversize icons the next. It's like having multiple monitors in a single box.

The Sigma Designs L-View Multi-Mode is a monochrome monitor with a 19-inch-diagonal picture tube that can display 120, 92, 72, 60, 46, or 36 dots per inch. The E-Machines QuickView Z21, on the other hand, measures 21 inches diagonally with resolutions of 80, 72, 40, and 36 dpi. If you add a 1MB memory-expansion kit to its video controller, the Quick-View is capable of displaying 8-bit graphics with up to 256 levels of gray.

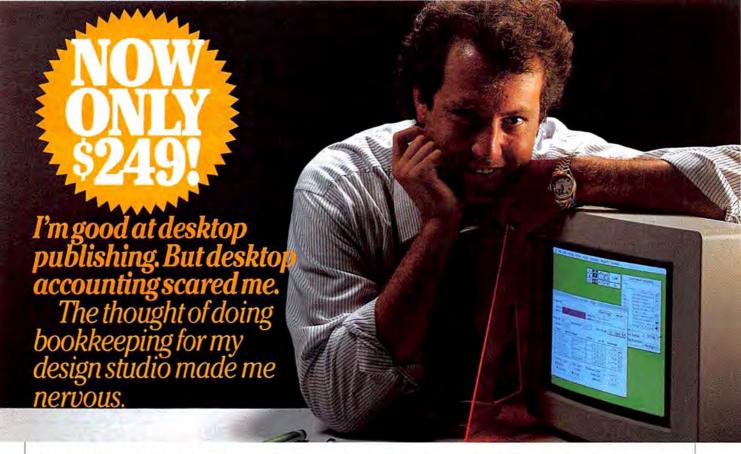
I tested both monitors on a Mac IIci, so installation was as easy as inserting the NuBus video controller, dropping some files into the System Folder, then restarting. Initial configuration is handled via special Control Panel devices (cdevs) provided with each monitor; thereafter you can change resolutions with user-specified hot keys. The L-View Multi-Mode cdev has a Next-like interface that makes it difficult to tell which options are enabled; standard check boxes would be better. The QuickView, in comparison, has separate and clearly marked controls for adjustments, configuration, and optional utilities.

Both monitors suffer from distracting jitters and pulsing if situated within a foot of another monitor, so be sure you have enough desk space to liberally separate displays. Furthermore, the L-View Multi-Mode must be situated to the right of any other monitors to avoid problems when switching resolutions. The QuickView is more flexible; it can go on either side and doesn't need to be the startup or main screen, as does the L-View.

### **Multiple Resolution**

Once properly configured, both monitors work exactly as advertised, allowing you to switch resolutions on the fly. Just press the appropriate hot key, and the screen is instantaneously redrawn at the new resolution.

A monitor's resolution determines how many discrete picture elements (pixels) the monitor can display in a given area, commonly measured in dpi. If WYSIWYG displays are important to you for desktop publishing, stick to 72 dpi; otherwise, use whatever resolution is best suited to the particular task at hand. At resolutions of less than 72 dpi, images appear (continues)



When I heard "balance sheet," I broke into a sweat. I know type, advertising, printing. Now I was forced to do our books.

No choice.

We were on our third part-time bookkeeper in eleven months, and she was called away suddenly. Sound familiar?

But I'm the boss and the buck stops with me. We had bills to pay, payroll checks to write, invoices to send, taxes to

set aside.

And deadbeats to collect fromonly I had no idea who owed us how much or for how long. Some suppliers may have even

thought of us as deadbeats. I needed to know our cash flow, and get a handle on all this. But I didn't have a lot of time.

Step one: find an accounting program that feels as familiar as our Macs, that starts out easy, but has lots of reserve fire-power for later on.

Ifound at Once! The manual looked orderly. I dug in...

### The familiar with the unfamiliar

atOnce! starts you off with a tutorial that uses HyperCard, one of my old favorites. I was at home.

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Numbers are my nemesis, but the tutorial was actually fun and got me comfortable. It takes you step by step through the program, and gives you some easy-to-swallow accounting basics so you're not reading a foreign language. There's context-sensitive help, just in case.

And while you learn, you can start to set up your books. So it doesn't come in a flash and you sweat a little. But you do it and you learn.

I started off light. Double-clicked on one of the default charts of accounts and my General Ledger was practically set up for me. Then entered a few client names in Accounts Receivable, to get an idea of what was coming in. Prepared six invoices—and at Once! calculated sales tax. Nice. Printed the invoices which I redesigned in at Once!—realign a field here, change a font there. The usual.

Then ran a Customer Aging Report to identify the slow-payers (I had no idea such a terrific thing was even possible).

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I discovered a key client who hadn't paid in two months. I called and collected and now he wants to know about at Once! I wrote payroll checks for the staff, and sent our bank a balance

sheet I printed out myself-no sweat.

From fear and loathing to passion.
Now I even study the management reports at Oncel generates.

I'm still an art director. But at Once! helped me become a better businessman!

### A hidden bonus made my day

When our bookkeeper returned, I showed her at Once! Now she even makes sure my plants are green. Putting the books on the Mac lets me take control.

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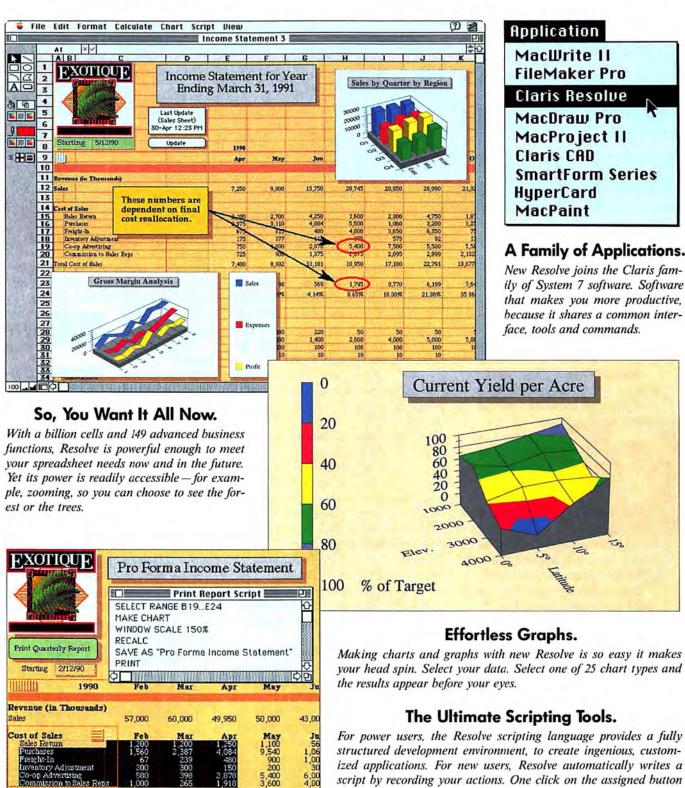
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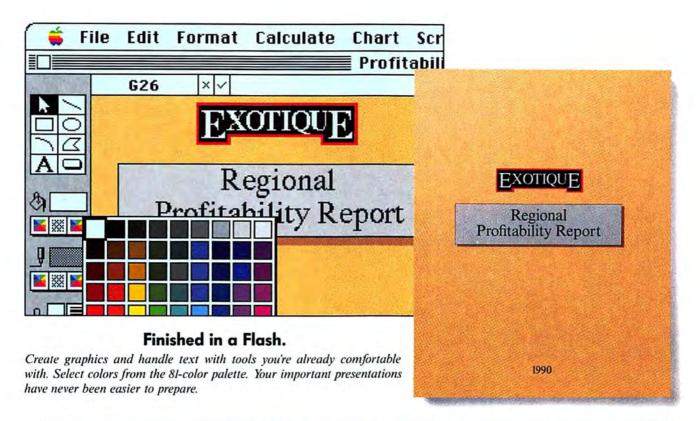
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ized applications. For new users, Resolve automatically writes a script by recording your actions. One click on the assigned button

automatically triggers the script.



### The System 7 Spreadsheet

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A spreadsheet was never the sort of thing to inspire fantasies. But then along came the new Claris® Resolve™ spreadsheet.

For the first time, Resolve lets spreadsheet power flow to freely and intuitively. It utilizes

your fingertips freely and intuitively. It utilizes interfaces, tools and commands familiar to anyone who's ever used a Mac. Nothing comes between you and complete spreadsheet performance.

Resolve is packed with clever, interactive features that help people quickly get their footing. Like context-sensitive help. Automatic scripting. One-step charting. Instant zoom-in and zoom-out. Even a built-in spell checker.

But lurking just beneath the surface are enough tricks to inspire any power user. 149 built-in functions to help solve any business problem. 25 kinds of charts and graphs to excite the most jaded audience. Elegant, built-in database functions so you can swiftly access your data. And advanced analytical solutions to impress the math wizards.

Here's just one example of the outstanding design of Resolve. With Resolve, you can modify graphs directly in your spreadsheet. You don't have to switch back and forth between spreadsheet and chart modes. Think of the time savings. Not to mention the ease.

Yet, perhaps the most shining quality of Resolve is how it exploits System 7's most powerful functionalities—Publish & Subscribe and Inter-Application Communication. With Resolve, you can put charts in other documents and files and link them dynamically—so when you change any information in the spreadsheet, all the linked charts change as well. What's more, you can create hybrid solutions, like creating a HyperCard® program to access a database, send data to Resolve, and create and display a chart. All automatically.

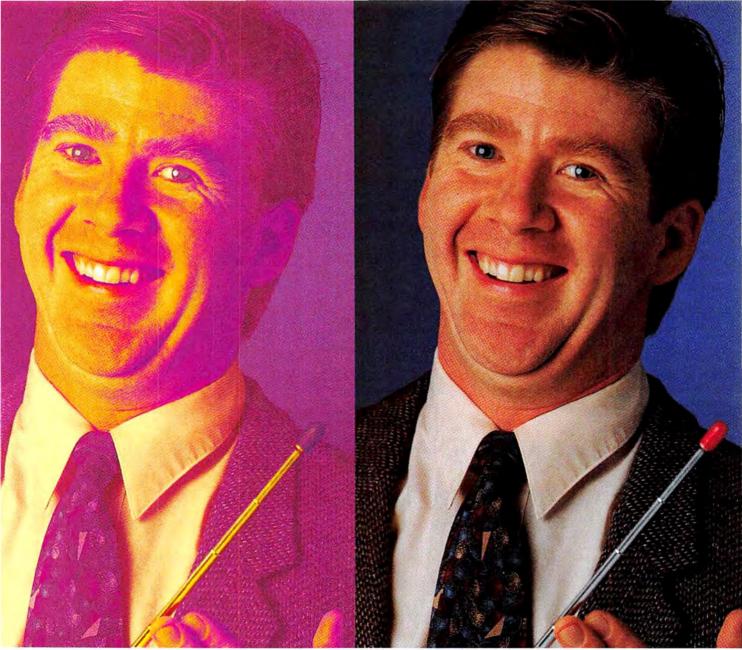
New Resolve is the latest addition to the Claris family of software for System 7-a new generation of applications that work together more simply, more powerfully, more gracefully than any software for the Macintosh ever has before.

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How the world sees you in Pseudo-Color

How the world sees you in Real-Color

Color Communicatest

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larger than normal, perfect for reducing eyestrain or giving a demo to a large group. Conversely, at higher resolutions everything is smaller, so, for example, you can cram more information on the screen in a spacious spreadsheet.

With the L-View Multi-Mode, when you switch among the six resolutions available, you also change the pixel dimensions of the monitor, from 1664 by 1200 pixels at 120 dpi, to 512 by 384 pixels at 36 dpi (the dimensions of the original 9-inch Mac screen). This is significant because applications rely on pixel dimensions to determine where to place screen elements such as dialog boxes and windows. Therefore you should launch applications only after you set the monitor to the resolution at which you intend to work; otherwise, alert boxes may appear off-screen, beyond the cursor's reach. With MultiFinder, of course, you can have a spreadsheet open at 120 dpi, then switch to HyperCard and change the resolution to 36 dpi. Just avoid switching resolutions within applications.

With the QuickView, the monitor's pixel dimensions are locked in at start-up based on your choice in the Control Panel. Changing resolutions has no effect on pixel dimensions. The picture simply zooms in or out, depending on whether you switch to a lower or higher resolution, respectively. When you zoom in, only a portion of the total picture is visible. To see the rest, you pan around by simply moving the pointer to the edge of the screen, then the area just beyond the bezel slides smoothly into view.

Pan and zoom work especially well with the QuickView's unique Virtual Desktop feature, which allows you to specify pixel dimensions greater than the physical screen. Basically, memory on the controller is used to simulate a screen too large to be displayed all at once (up to 10,240 by 960 pixels with the optional memory kit). But by panning, you can view different portions of the virtual desktop. (Conceptually Virtual Desktop is similar to Berkeley Systems' Stepping Out II, a utility that creates virtual desktops on any monitor, but which is considerably slower because it's implemented in software.) So that you don't lose your bearings on really big desktops, the menu bar can be locked to the top of the screen, dialog boxes can be automatically centered in the physical screen, and the panning feature can be turned off temporarily.

The 21-inch QuickView has the ability to display a maximum of 1,228,800 pixels (1280 by 960). In its 120-dpi mode, the 19-inch L-View Multi-Mode displays over 60 percent more information—1,996,800 pixels (1664 by 1200)—enough room for almost 2000 standard-size cells in Excel, for example. Granted, the text is quite small, but I personally prefer the ability to see as much as possible without having to pan around to get the big picture.

In addition to multiple resolutions, each monitor sports a host of nifty features. The L-View Multi-Mode has options for pop-up menus, enlarged menu-bar fonts and cursors, as well as simple screen-capture and screen-saver utilities. The QuickView also offers enlarged menu-bar fonts and a screen saver, plus the ability to fine-tune the brightness and contrast controls through software.

Sigma Designs' L-View Multi-Mode (left) and E-Machines' QuickView Z21



# **Image Clarity**

Fancy features aside, the true test of a monitor is how well it displays images. To my eyes, the L-View Multi-Mode appears both sharper and brighter than the QuickView, although the E-Machines monitor is by no means excessively fuzzy or dim.

I was unable to detect flicker at any resolution on either monitor, although admittedly the perception of screen flicker is subjective. A vertical scan rate of 65Hz—the screen is redrawn 65 times each second—is considered sufficient to eliminate flicker. The L-View Multi-Mode boasts a 92Hz vertical refresh rate at 72 dpi, but only 60Hz at 120 dpi. The QuickView checks in at 69Hz or 76Hz, depending on screen resolution.

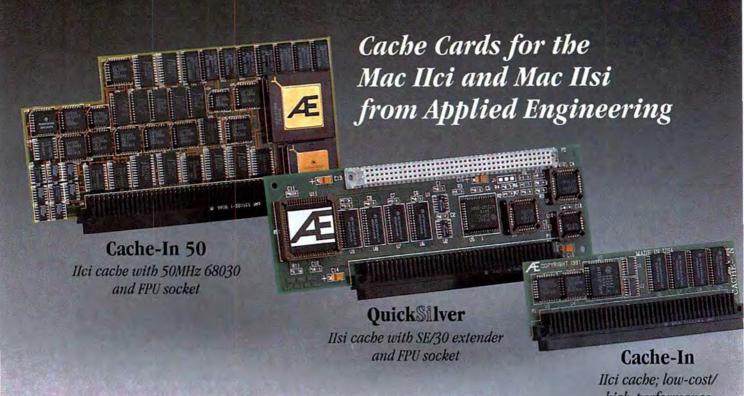
Although both manufacturers provide built-in tilt-and-swivel stands, ergonomically E-Machines loses out to Sigma Designs. The brightness and contrast knobs are inconveniently placed toward the rear of the Quick-View, the power switch is on the back, and there is no power indicator. On the L-View Multi-Mode, brightness and contrast knobs are up front but unobtrusive, the power switch is easily accessible on the right-hand side, and a power indicator is clearly visible on the front.

The L-View Multi-Mode meets European standards for very-low-frequency (VLF) electromagnetic emissions (see "The Magnetic-Field Menace," *Macworld*, July 1990) and battles glare with an optional OCLI screen. The QuickView, on the other hand, has a chemically etched screen with low curvature to reduce glare. While the screen does a good job at diffusing overhead glare, focus is a little softer as a result.

I found the Sigma Designs L-View Multi-Mode easier on the eyes and pocketbook. By tying resolution to pixel dimensions, its mode of operation is also conceptually easier to grasp, since you always have the entire desktop right in front of you. However, for certain niche applications, the virtual desktops of the E-Machines QuickView Z21 may be just what you need. It too is a fine, flexible monitor, although a bit pricey.

-Owen W. Linzmayer

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# NUMBERMAZE DECIMALS & FRACTIONS 1.01

Pros: Suits a wide age range; kids enjoy it; superb color graphics. Cons: Older kids might tire of the game before mastering the math. Company: Great Wave Software. Requires: Mac 512KE (400K disk version available). List price: Black-and-white version \$49.95; color version \$69.95.



In my 1989 review of Great Wave's wonderful Number-Maze program (*Macworld*,

August 1989), I listed two cons: "No large-screen or color support; doesn't cover fractions or decimals." Somebody at Great Wave must have been listening. The company's program, NumberMaze Decimals & Fractions, teaches decimals and fractions using the NumberMaze game format—and it comes in a dazzling color version. (The color version works on black-and-white machines too.)

# An Amazing Resemblance

Like its predecessor, NumberMaze Decimals & Fractions couches math drill and practice in a maze-game format. The student uses the mouse to move an object through a maze riddled with doors, gates, walls, and rivers. The object might be a buzzing bee lured by a honeycomb, or any other randomly selected creature.

When a playing piece hits a wall, the point of view on the screen changes from a relatively plain Pac-Man-style maze map to a meticulously illustrated head-on view of a gate. Different gates are based on different art styles; some are just beautiful. But to a kid, these gates are simply obstacles, and the only way to get past them is by solving the math problems that appear next to them.

Problems range from simple decimal place questions appropriate for young grade-schoolers ("Write as a decimal nine hundred and ninetynine") to complex fractional computation problems that will challenge teenagers, such as

14 ÷ 85/18 =

NumberMaze takes advantage of the sound capabilities built into System 6.0.7. A speech option in the File menu lets you choose whether the program recites the problems when they're displayed. Graphic obstacles respond to correct answers with animated sequences: doors open, curtains part, and boats cross rivers. There's lots of variety in these sequences, but not enough to prevent repetition, even in the same game.

### **Smart Mazes**

NumberMaze Decimals & Fractions responds intelligently to incorrect answers. The first mistake is answered with a cursor under the first incorrect digit. Additional mistakes cause the Help menu to flash, reminding the student that hints are available. Eventually the program reveals the correct answer. If a student makes repeated mistakes, the program suggests that the student might want to work on an easier level.

NumberMaze Decimals & Fractions provides several variations on the basic plot. Some walls have no gates; the only way to get past the wall is by locating a ladder and moving it to the wall. Some mazes are littered with apple cores and pop cans that must be picked up before the maze can be completed. An occasional whirlwind might pick up a playing piece and deposit it in another part of the maze. Each time a player reaches the goal—a house in the corner of the maze—a new decoration is added to a room in the attic.

A third-grader can start with the easiest level of NumberMaze Decimals & Fractions and work his or her way up sequentially, skipping forward or backward on command. Each com-



Problem Gate Each colorful gate in NumberMaze Decimals & Fractions can be opened only with correct answers to math problems.

pleted level presents an opportunity to print a certificate of completion. An older child can work with problems more appropriate for his or her grade level. There are dozens of mazes for each grade from 3 to 8, plus options for adult learners. Each curriculum is modeled after leading textbooks.

This program is designed to be used in either the classroom or the home. Special lab packs and network versions are available for classroom use. The program can record the progress of students in password-protected student files.

The accompanying CustomMaze Decimals & Fractions program enables teachers or parents to display or print files for individual students or the entire class. A teacher can even request printed problem sets for students to use away from the computer. When used with System 6.0.7 and sound-input hardware, the program allows you to customize its speaking voice. And the excellent manual has thorough instructions for the teacher or parent who wants to adjust the curriculum for special situations.

# Maze Praise

I asked my young software-testing team to compare this program with NumberMaze. They unanimously agreed that as much as they'd praised the original, Decimals & Fractions is even better. They especially liked the graphics and the added plot twists.

But they also tired of it more quickly than they did the original. After a few sessions they complained about the repetitious scenes and the tedious math problems. This isn't surprising, given all the time they spent playing the original Number-Maze—there's not a great deal of novelty here for a Number-Maze veteran. The older kids were the most vocal when boredom set in; cute mazes and buzzing bees just can't keep a teenager happy forever.

Nonetheless, this program is an important addition to the growing family of educational software for the Macintosh. It's an educationally sound, entertaining, and thorough approach to a neglected part of the math curriculum.—George Beekman and the Shoohedoohop Software Testing Team

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# Instrument-Control Software

# LABVIEW 2

Pros: Complete, efficient, highly evolved; easy to use; includes "virtual instruments" for all common applications. Cons: Large, complex package for professionals only. Company: National Instruments.

Requires: Mac Plus; 4MB of RAM; hard drive, List price: \$1995.



Macintosh users in science, engineering, and manufacturing control instruments

ranging from digital thermometers to laser beam profilers to factory-size machining stations. Only a handful of companies serve this market, perhaps because National Instruments (NI) took a big early lead in both data acquisition and interface programming and has energetically maintained that position over the years. NI's LabView 2 is formidable. It is the easiest icon-based programming system available, its interface-building facilities are relentlessly complete, and nearly every interface you can imagine has been packaged in one of LabView's libraries anyway.

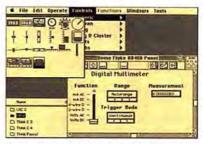
# I/O, I/O, It's Off to Work We Go

To make the Mac useful as a lab instrument, you must contrive to get data into the computer (with an analog-to-digital conversion board), represent the data in a convenient form for processing and graphic display, and also get control signals back from the Mac (digital-to-analog conversion) to control experiments or real-world machine functions. All the input/output functions and swapping data back and forth from registers on the Mac to buffers on the data-acquisition boards can, of course, be done in C, Pascal, or assembly language, but this is error-prone and uncongenial work. The software solution to this difficulty, substantially pioneered by NI, is the virtual instrument, or VI, a screen programmed to show the set of buttons, knobs, indicators, and connectors you would find on a real instrument. You can use one of the preprogrammed VIs in the package (there are more than 100 from NI, and still others from third parties) or construct one by connecting control-element icons from an assortment of palettes. The VI consists of the front panel that simulates an instrument, and a block diagram of control elements that constitutes the program defining the instrument. VIs and block diagrams can be simply modified and combined-you can hook up an NI I/O board, display your acquired data on a virtual Hewlett-Packard oscilloscope, and (particularly if your equipment uses the general-purpose interface bus, or GPIB, interface) program Mac-directed experiments.

## New for 2

This scheme is wildly superior in time savings and bug avoidance to textbased data-acquisition programming. Other vendors offer some similar programs-Analog Connection Workbench from Strawberry Tree, for example-but no one offers anything this size. LabView 2 includes more than 600 support files, for a full 20MB of software support. The program incorporates speed and convenience improvements. The main speed improvement is the inclusion of a compiler: the block diagrams are automatically compiled upon execution (for \$495 you can buy a run-time module and use it to distribute compiled VIs or other applications) and run about as fast as an MPW Pascal program. Since LabView 2 includes an impressive digital-signal processing (DSP) function library and routines for array/matrix processing, having a compiler means that you can do intensive number-crunching in LabView itself, rather than sending the data out to other programs. This is a serious numeric programming environment worth a few thousand dollars in its own right, with Hilbert transforms, every type of digital filter, statistical analysis, diagonalization of complex matrices, and a hundred or so other built-in capabilities.

Convenience has been enhanced principally by meeting Macintosh users' expectations better: Connections between elements now automatically stretch when you move them in block diagrams, cut-and-paste now applies to clusters of VI elements, scroll bars now let you move around in charts



Not Just a Fluke This Fluke Digital Multimeter is one of the virtual instruments in the LabView 2 package. The front panel is assembled from icons such as those in the Numerics palette, and functionality is programmed with a block diagram that's an outstanding example of object-oriented iconbased programming.

and graphs, and the set of control icons has been expanded to cover nearly every common type. For the cases, which should be rare at this point, in which you absolutely need to call C or Pascal routines, LabView now offers code interface nodes as a way to link the routines to your block diagrams. And now you can produce more-realistic front panels.

## The View for You

You don't need a Mac IIfx to write letters to Grandma, and you don't need LabView if you're just monitoring the temperature in your wine cellar once a day. Here's a quick decision algorithm: if you didn't know what GPIB was when you woke up this morning, it's quite possible that Lab-View 2 is overkill for your needs. For simple data-acquisition tasks, products (both hardware and software) from IDAC, Biopac, IOtech, World Precision Instruments, or GW Instruments will be cheaper and faster to set up at first. But there are good reasons why LabView is the standard at serious research organizations and instrument companies. It can handle any data I/O or processing task easily, it makes quick work of complicated interface or numerical-analysis problems, and offers, besides a brilliantly executed programming scheme, access to a vast array of canned solutions from NI and dozens of third parties. And if you have the kind of professional instrumentation and control needs LabView was designed to address, at \$1995 it's a remarkable bargain as well.-Charles Seiter

# **Educational Simulation Games**

# THE OREGON TRAIL

Pros: Thoughtful educational simulation; entertaining arcade sequences; outstanding color graphics. Cons: Some events are repetitive; students can choose to avoid educational aspects of the game; copy-protected. Company: MECC. Requires: Mac Plus; System 6.0.2. List price: \$49.95.

# WAGON TRAIN 1848

Pros: Same quality simulation as The Oregon Trail; innovative groupware aspect facilitates cooperative learning. Cons: Intermittent networking bug. Company: MECC. Requires: Two networked Mac Pluses: System 6.0.2. List price: \$379; additional fivestation packs \$99.



If there are classic educational software packages, MECC's The Oregon Trail is surely one. Nearly all the middle-school kids I know have played the simulation

game on Apple II computers at school (admittedly, I live in Oregon). What's more, they love it.

MECC's new version of The Oregon Trail includes several new features that take advantage of the Macintosh's additional capabilities; Wagon Train 1848 is a first-time-ever network version of the game.

# Setting Out on the Trail

Both games are a detailed simulation of the hazardous journey pioneers took from Independence, Missouri, west to Oregon's Willamette Valley. They're designed for kids age 10 and up. As in other MECC games, a password-controlled Management menu lets teachers and students access customizing options.

After entering a name and choosing an occupation, a player acquires clothes, food, wagon parts, oxen, and miscellaneous supplies for the trip. The amount of money he or she begins with depends on the chosen occupation; as in the real world, bankers, for example, have fatter wallets than do teachers. But players who finish the trip can earn higher point totals despite choosing less financially rewarding occupations.

Once outfitted with a wagon and supplies, it's time to begin the journey. Three window panes monitor the wagon's progress. The top one shows an animation of the trip; the middle one traces the route on a map; and the bottom one provides a play-byplay in a scrolling trail log (see "Wagons Ho!"). Some events are out of the players' control, but these games are not for passive potatoes. Players must continually take stock of conditions and make critical decisions. Stopped at the Kansas River crossing, they must decide whether to ford the river. caulk and float the wagon, or spend \$5 for a ferry ticket.

Interactive buttons labeled Pace. Rations, Buy, Trade, Guide, and Rest give players control over many of the excursion's parameters. My young caravan especially liked Talk, which brings up images of people along the trail who have words of wisdom to share; and Hunt, which temporarily turns the simulation into an arcadestyle shooting game. Occasional hunting is necessary to keep food on the table, but many kids choose it even when their wagons are stuffed with rations. Players who survive the hazards of the Great Plains and the Rockies are rewarded with another arcade-style treat: a shortcut raft trip down the Columbia River.

All is not fun and games. A player who makes foolish decisions (and sometimes even wise ones) can lose supplies, food, traveling companions, even his or her life-an element of realism that brings history to life as few textbooks can.

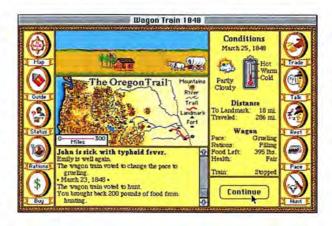
My testers unanimously praised the Mac version of The Oregon Trail, agreeing that its vivid graphics and added features make it far superior to the Apple II version. Asked if they learned from it, they responded less uniformly. Some said they just played it for the "fun stuff" like hunting and rafting; others said it helped them understand what it was like to be a pioneer in 1848.

# Circle the Wagons!

The two simulations are identical except for one critical detail: Wagon Train 1848 allows several students to join in the same simulation from networked computers: it may be the first groupware for kids. No file server is necessary; the lab pack comes with enough disks for five computers, with an option of buying additional fivestation packs.

Each computer represents one covered wagon in a wagon train. As students travel together, they can trade supplies, food, and the like with each other, send messages to each other, hold on-screen conferences, and monitor the status of all other wagons in the train. Decisions can be made either democratically or autocratically, depending on the chosen form of government. Either way, the group interaction-problem solving, negotiations, communication-tends to become the major focus of the game, overshadowing the hunting, rafting, and other favorites of the single-player game. Wagon Train 1848 brings cooperative learning to the small screen.

My testers played Wagon Train 1848 for hours. In the process, they (continues)



Wagons Ho! Wagon Train 1848 and The Oregon Trail have identical screens, but the groupware aspect of Wagon Train 1848 makes it a completely different experience.

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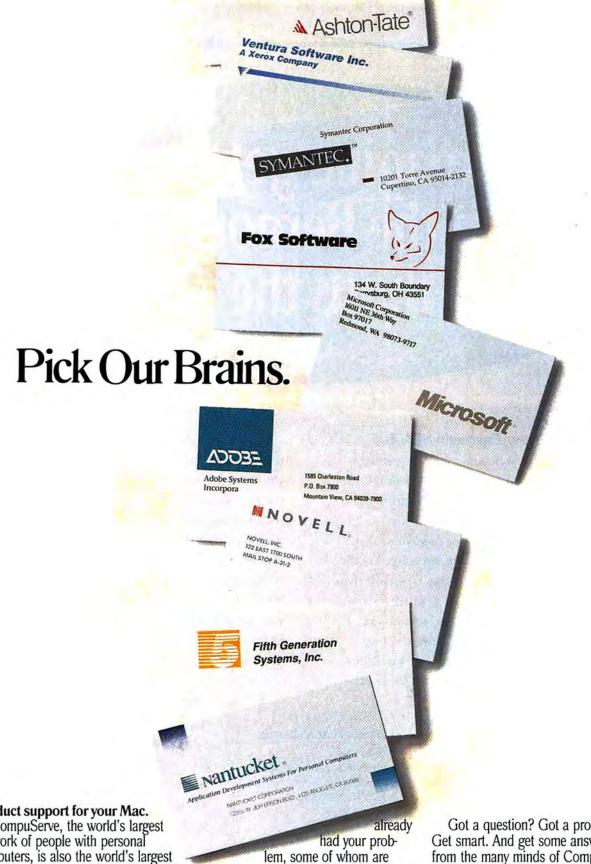
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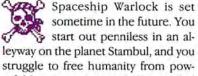
Circle 260 on reader service card

uncovered a bug that can spoil the experience. Sometimes network messages come across garbled, occasionally freezing a computer and locking it out of the game. (When this happens, the other players can continue the journey without the "missing" wagon.) MECC promises to fix the bug in a maintenance upgrade this fall. Let's hope so. Wagon Train 1848 pioneers an entirely new genre of educational software; it deserves to finish the journey.—George Beekman and the Shoobedoobop Software Testing Team See Where To Buy for contact information.

> \* \* Interactive Movie on CD ROM

# SPACESHIP WARLOCK

Pros: Ground-breaking color graphics and 3-D animations. Cons: Often slow. Requires: Mac II; 4MB of RAM; CD ROM drive; 13-inch or larger color monitor; System 6.0.2. MultiFinder not recommended. Company: Reactor. List price: \$95.



leyway on the planet Stambul, and you struggle to free humanity from powerful but (surprise!) evil aliens called the Kroll. Along the way you meet the beauteous but skeptical Stella, her starliner-captain father, and the nefarious pirate Captain Hammer and his mutant crew.

The creators of Spaceship Warlock, Reactor's Mike Saenz and Joe Sparks, rightly do not label it a game, instead calling it an "interactive movie" because the plot pretty much proceeds from A to Z with few diversions. However, it does have lots of standard adventure-game elements: problems to solve, mazes to navigate, and several places where you just have to blast those hulking-yet-so-unlovable aliens.

What sets Spaceship Warlock apart from other personal-computer adventure games is not its classic story line but its amazing high-resolution color graphics and three-dimentional animations. In one remarkable sequence, 3-D asteroids tumble past the windows of the spaceship. The boulders look so much like asteroids that I found myself wondering if the crew could pilot the ship past all the hurtling rocks. An added attraction is the totally unexpected and hilarious Robin Leach send-up near the beginning, and there are other humorous touches later in the game.

Not all adventure-game fans will find Spaceship Warlock completely absorbing: the interactive-movie format offers little room for different successful approaches to the same problem and affords only a few ways to make serious mistakes (mostly by getting killed in battle). That's not necessarily bad: if you've ever made a mistake in the adventure game Zork Zero, say, and had to start over several thousand moves later . . . well, need I say more. But if you demand a new challenge at every turn, if you have to find a puzzle or a clue in every new frame, you probably won't find Spaceship Warlock challenging as a game, though you may find it entertaining. Personally, I found its game aspect acceptable.

The main problems with Spaceship Warlock are its repetitiveness and slow speed. Too many times you are sent back to your quarters, only to be recalled soon after you get there. You can get around that by going to the nearest view screen and clicking on it; usually the captain then summons you right away. I must say, even as I was slogging along with my slowerthan-spec CD ROM drive (Reactor recommends using drives with a 380 milliseconds or faster access time). I was eager for the next alien encounter or the next asteroid belt. If the slowness really bothers you and you have a high-capacity hard drive, you can copy the 128MB of programs and data from the CD ROM onto your hard drive. The game then plays blazingly fast.

The best news for adventure-game fans is that Spaceship Warlock is lightyears ahead of Reactor's earlier effort on CD ROM, the erotic Virtual Valerie. If Reactor's next effort is even onetenth as much improved in its story line and robustness it will be fabulous. I recommend that Reactor offer a choice of male and female points of view in its next opus, since Spaceship Warlock fits a little too snugly in the category of "toys for boys."

# A Great Excuse to Buy a **CD ROM Drive**

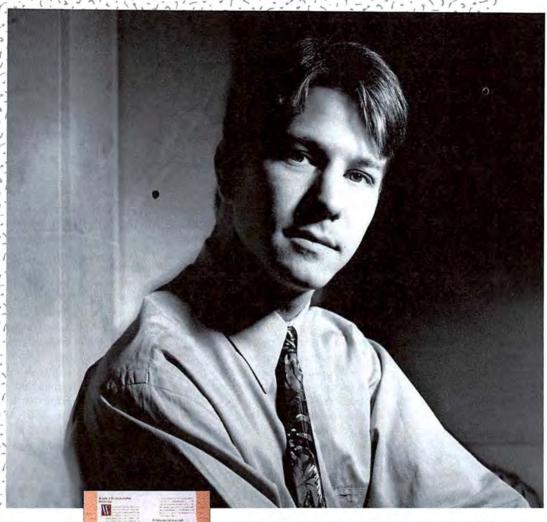
At its list price of \$95, Spaceship Warlock is costlier than most games. Since it takes only about 8 to 10 hours of playing time to get through (depending in part on the speed of the CD ROM drive), some might not consider it a good value. But given the tremendous amount of work that went into creating the 128MB of programming, music, sound effects, graphics, and so on, it's hard to see how Reactor could charge any less. After all, Spaceship Warlock is coffee-table software.

If you already have a CD ROM drive and you appreciate terrific graphics, Spaceship Warlock is a great candidate for your CD ROM library. If you don't yet have one, Spaceship Warlock is an excellent excuse for buying a CD ROM drive. For better or for worse, I found the thumping theme song going through my head in the shower. OH, ob-ob-OH, SPACEship WAR-LOCK.-Tom Moran



Your Best Friends in the Universe Captain Hammer of the Spaceship Warlock orders you to lead a boarding party of mutant space pirates onto an enemy battle cruiser.

# "QuarkXPress is a program designed from an artist's point of view."









# Mike Astrachan, Computer Graphics Specialist, Kuhn & Wittenborn Advertising

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# MASQUERADE 1.1

Spreadsheet Compiler

Pros: Easy way to construct financial applications; simpler than using "real" programming language; macros and charts on worksheet. Cons: Less than full Excel functionality. Company: Night Diamonds Software. Requires: Mac Plus; System 6.0. Recommended: Hard drive. List price: Version 1.13 \$695.

A spreadsheet compiler is a program that turns a spreadsheet-including formulas, macros, and charts-into a stand-alone application. On the PC side of the fence, several compilers appeared four years ago for the ubiquitous Lotus 1-2-3 worksheets; Masquerade now offers developers a way to include much of the scope and flexibility of Excel in compiled worksheet-based applications. Although it can also compile worksheets saved as SYLK files from Full Impact and Wingz, it's really designed as a way for Excel users to convert templates or "applications" in Excel into real double-clickable programs with their own icons.

The key points about these applications is that, unlike worksheet templates still coded in Excel, they do not require Excel itself to run, they are compact, and they cannot be changed by the end user. In Masquerade, the security aspect of compilation is further enhanced by password-based encryption, so curious users can't even inspect the application's resources with ResEdit.

# Application\$

This development environment, while encouraging, does not have the flexibility of generic applications such as MacApp, much less the power of a standard programming language. Although they can be used to solve eigenvalue problems in quantum physics, spreadsheets are really about money, and Masquerade applications will mostly be concerned with sales, income, expenditures, and financial controls. Since most third-party developers working with databases or spreadsheets ultimately focus on applications in these areas, Masquerade's

limitations shouldn't be a problem.

Here's the process. You start with a new worksheet or import one in SYLK format and develop the worksheet-or worksheets (Masquerade can handle linked sheets)-until it follows your design. In developing a worksheet that corresponds to an original Excel design, you must note four important differences: some Excel functions and macro commands aren't available, database functions aren't present, the worksheet itself can include charts (a big plus), and macros can be included or stored on a separate sheet (you store them on separate sheets if you need backward compatibility with Excel). Another interface difference, one that lets you create an "independent application" flavor, is Masquerade's menu-bar customization, a dialog box macro function, and the use of on-sheet buttons (push buttons for macro activation, radio buttons and check boxes for choice selection). It's also possible to add a help annotation for any worksheet cell.

The principal difference between Masquerade and a standard spreadsheet program is in the Compile menu, which offers Create Application as an option. In practice the compilation process is quite forgiving, compiling formulas in which you have made errors. The process can take less than a minute for a small worksheet (10 by 20 cells) consisting mostly of formulas and text, and ten minutes or more for complex linked sheets. I used a variety of samples from the Heizer Software collection of Excel templates ranging in size from 360K to 585K. The use of compilation, although nearly automated, requires

Folding Up the Sheets Under the Compile menu, Create Application calls up a dialog box full of compiler options. The compiler turns your worksheet (or linked sheets) into a stand-alone application with a generic application icon.

that you know a bit about Mac program organization, or at least have an understanding of what a resource is and why and when you need ResEdit. As a rule, all but the simplest worksheets require some modification to ensure that Masquerade can recognize all the functions and macros used in the Excel examples. If you are developing applications for use with Masquerade, you can usually avoid conflicts in the first place and make extensive use of buttons and custom menus to design more attractive applications. After compilation, you will want to test your application extensively to catch errors the compiler ignored, perhaps using the simulation mode to step through your work.

# Entomology

This is a new program, it's ambitious, and it understandably has some bugs. Window handling can be mysterious, charts sometimes fail to appear as expected, grid lines and frames get fragmented, and crashes seem to occur once an hour in steady use. But version 1.1 is a great improvement over 1.01, and Night Diamonds is conscientiously whittling down the bug list—there's close interaction between the customers and tech support.

# =SUM

If you have recorded a few macros, you can produce compiled versions of your favorite templates. If you want, for example, to design a multiperson expense account form for use on a network-say you want your sales staff to enter their expenses and have the program calculate reimbursements and print a report-the Masquerade approach is simpler database programming than 4th Dimension's, and much easier than starting from scratch in Pascal. Furthermore, your staff will only be able to enter data, with no possibility of tampering. If you want to design a basic dental-office accounting system for sale to small offices, you can get the job done faster in Masquerade than in alternative approaches. If you can live with some flaws while Night Diamonds works on polishing the program, you will find Masquerade a valuable programming investment.-Charles Seiter

# MANAGE the unmanageable

Ray Peddin hadn't felt so much in the hot seat since he completed his Air Force tour of duty in Vietnam.



As Director of Management Information Systems for Stanford University Clinic, he was responsible for replacing their existing computerized systems with more sophisticated technology.

The project was both complex and risky. The accounts receivable contained \$38 million, a perishable asset for which significant losses could be incurred if the conversion were not 100% effective. The last time the system was updated, millions of dollars had been lost, as well as the jobs of those responsible. Understandably Ray was nervous.

He turned to the professionals at Micro Planning International for assistance. An MPI consultant worked with Ray's team, the new system vendor, and an independent health care consultant, to coalesce their views of the project into one workable planacceptable to all involved. He trained team members in the principles of project management, as well as how to use MPI's state-of-the-art software to control the project. The plan was revised to resolve resource conflicts and a suite of custom reports for monitoring the project was developed.

Stanford Clinic's new Management Information System was up and running December 13, on target.

In Ray's own words, "I couldn't have done it without MPI. The consultant was an experienced professional and the software unparalleled in ease of use and sophistication."

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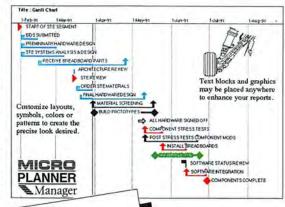
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# CD ROM Drives

# CDA-431

Pros: Good audio facilities; compact design; switchable SCSI termination. Cons: Driver software doesn't notice some disc ejections: documentation needs improvement. Company: Chinon America. Requires: Mac Plus. List price: \$795.

# PLI CD-ROM

Pros: Good audio facilities: switchable SCSI termination. Cons: No power indicator. Company: PLI. Requires: Mac Plus. List price: \$999.



Two new CD ROM playersone from Chinon, a relatively new player in the Mac mar-

ket, and one from PLI, one of the oldest suppliers of Macintosh hard drives-are the latest of a growing group of third-party CD ROM players available for the Mac (for a review of drives from NEC, Toshiba, and CD Technology, see Macworld, September 1990). I found that both these drives performed well, and although the Chinon unit is the lowest priced CD ROM drive Macworld has reviewed to date, it doesn't skimp on any essential features.

# **CDA-431**

The CDA-431 drive doesn't take up much room on the desktop because the external power supply sits on the floor. The drive's front panel has both power-on and drive-activity lights, as well as an eject button. The drive has excellent audio facilities, with a frontpanel headphone jack and rotary volume knob, and stereo line-level RCA-jack outputs on the rear panel. The drive mechanism is made by Chinon. The SCSI address is set with DIP switches.

The software that comes with the unit includes two drivers, one for the Macintosh Plus and SE, and one for the SE/30 and the Macintosh II family, along with files that allow recognition of CD ROMs in the High Sierra, audio, and ISO 9660 formats. You control the audio features of the drive with a desk accessory called CD Control, which resembles an audio CD player's remote control.

One bug 1 found with the driver software: if you use the eject button on the CDA-431's front panel, the driver software doesn't notice that the disc has been ejected, and it doesn't dim the icon of the CD ROM on the desktop. If you then attempt to double-click on the icon, you receive an error message.

With the CDA-431, Chinon includes a CD ROM disc from Educorp (version 2.0) that contains more than 500 megabytes of public domain and shareware software. I found this CD ROM to be a very mixed bag; although there are many useful programs and files on the disc, a lot of the files included, especially the clip art, are mediocre. There are also many duplications; Educorp could have used a bit more care in putting this collection together.

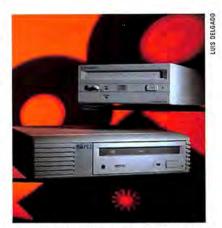
The user manual is generally complete, but lacks Chinon's address and phone number for technical support. A diagram of the rear panel also incorrectly identifies the two audio output jacks as "Power Jacks."

The CDA-431 is priced below the top-rated drive we reviewed in September 1990, the CD Technology Porta Drive, and has better audio facilities as well. However, the Chinon unit cannot match the speed of CD Technology's Toshiba mechanism, which is still the fastest drive Macworld has tested.

# PLI CD-ROM

The PLI CD-ROM is a zero-footprint unit, sized to fit under a Mac SE or Classic. Based on a Sony mechanism, the PLI drive has very good audio facilities. The front-panel headphone jack has a rotary volume control, and there are stereo line-level RCA-jack outputs on the rear of the unit. The PLI CD-ROM drive has a rotary SCSI-ID selection switch. The front panel lacks a power-on indicator, but has a light to show drive activity. Like the Chinon unit, the software includes an INIT for mounting CD ROMs, and a DA for controlling the drive's audio

The PLI CD-ROM was faster in my speed tests than the Chinon drive, and



The CDA-431 from Chinon America and the PLI CD-ROM from PLI

the difference is readily apparent when you use it. The general response of the PLI CD-ROM-in particular when launching files-feels quicker than that of the CDA-431, although the PLI CD-ROM, like all CD ROM players, is much slower than a magnetic hard drive. I did find, though, that setting the RAM cache to at least 64K in the Macintosh's Control Panel greatly speeds opening multiple files in succession, because the Macintosh does not have to reread the directory on the CD ROM each time I give it the Open command.

Both drives incorporate a welcome addition to external SCSI devices, namely, switchable SCSI termination. Using switches on the units, you can configure the drives as internally or externally terminated. I would like to see more drives using external termination.

# Best for the Bucks

Either choice is a good value in today's market. Chinon's CDA-431 unit wins points for taking up less desktop real estate, for the included software CD ROM, and for being the low-price leader among the drives Macworld has reviewed.

The PLI CD-ROM is a solid unit that was faster in our speed tests, but its suggested retail price is more than that of the CDA-431. If performance is the most important factor for you, then the PLI CD-ROM is the better choice between these two units (but test out a Toshiba-based player before

buying a drive).-Tom Negrino





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\* U.S. Only. International bundle version, (excluding Electric Image Animation System): \$8400. Suggested retail prices: Video Explorer (with RGB component input and output modules) \$8,000.00. ElectricImage Animation System \$7,500.00, LetraSet's ColorStudio \$995.00 and LetraStudio \$495.00. Time Arts' Oasis \$795.00, and MacroMind's MediaMaker \$695.00. Intelligent Resources and Video Explorer are trademarks of Intelligent Resources Integrated Systems, Inc.; Macintosh is a registered trademark of Apple Computer, Inc.; ElectricImage is a trademark of ElectricImage, Inc.; LetraStudio and ColorStudio are registered trade-marks of Esselte Pendaflex Corporation in the United States, of Letraset Canada Limited in Canada, and of Esselte Letraset Limited elsewhere; MacroMind is a registered trademark of MacroMind, Inc. MacroMind Media-Maker is a trademark of MacroMind, Inc.; Time Arts is a registered trademark of Time Arts, Inc. Oasis is a trademark of Time Arts, Inc. Copyright© 1991 Intelligent Resources Integrated Systems; Inc.

# Chart and Diagram Creation Software

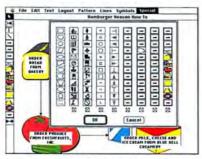
# TOPDOWN 3.0

Pros: Supports multistyle, multicolor text and text import; has new line paths; easier to use. Cons: Needs more complete tutorial; not fully System 7—compatible. Company: Kaetron Software Corporation. Requires: Mac Plus; System 6.0.2. Recommended: Hard drive. List price: \$345.

Just about any graphics package on the market can create charts and diagrams, but none does it better or more easily than Kaetron Software Corporation's TopDown.

A TopDown document is essentially a graphic description of how to get from point A to point Z. TopDown can be used to describe a business plan or to show how an accounting department works, how to defuse a bomb, or how to make a hamburger. Each step is represented by a predefined or custom graphic image, accompanied by text. You join symbols together, either manually or automatically, by using lines with arrowheads. To read the chart, the viewer finds the beginning and follows the arrowheads (images and symbols can also be numbered).

Often a step in a procedure requires further explanation. TopDown



Plentiful Palettes You can select which of the nine palettes will be displayed in the revolving palette at the far left of the screen (you move through the palettes by clicking on the arrows at the bottom). The nine palettes are, from the left: ANSI (American National Standards Institute) flowchart symbols, two palettes of icon symbols, two palettes of node connectors, and four custom-symbol palettes. The custom symbols are being used in the chart.

allows you to create a related step, or subset, as a separate drawing through its Create Next Level option. Any symbol can have a lower level, and those symbols that do sport a drop shadow for easy identification.

### **New Features**

The most obvious improvements to TopDown are in the new version's handling of text. Version 2.0 treated a text block as just that—a block: it was all one style and all one color (black). Version 3.0 allows any character in any text block to be any of eight styles and any one of eight colors. Providing you don't go overboard using them, these elements should help direct the reader's attention along the desired paths.

Another improvement is the addition of the text-import capability. You can now type a script in a word processor and have TopDown import the script and place the text inside a string of connected symbols.

TopDown has six new predefined line paths, for a total of nine (line paths provide options for routing lines among symbols). Each of the nine predefined paths is accessed by pressing the # key and a numeral key from 1 to 9, so it is now easy to experiment until you find the most logical and least congested route. Line paths can also be set manually.

# Easier and Better

You select symbols and other drawing elements from palettes. Two new palettes contain 24 node connectors, which are used to show how lines cross and connect to other lines. The new Select Palettes option lets you choose which of nine palettes are to be displayed (see "Plentiful Palettes").

TopDown enables you to attach Notecards, or comments, to each symbol in a drawing. You can choose a new option to make all symbols with attached Notecards outlined in gray.

Some of TopDown's new features also make the program easier to use. You can resize a symbol to accommodate text that exceeds the size of the symbol, and you can move symbols in small increments by using the arrow keys. The Undo command is now fully functional. In previous versions it didn't work in all circumstances, such

as when you wanted to restore deleted text. Now it does.

The program is compatible with System 7, though it doesn't take advantage of Publish and Subscribe, and supports Apple's TrueType font technology. According to the company, the next version, due out in the first quarter of 1992, will support more System 7 features.

TopDown keeps getting better. Version 3.0 has reached a new level of sophistication and ease of use—a remarkable feat considering its price hasn't increased.—Philip Bishop

See Where to Buy for contact information.



Baseball Game

# EARL WEAVER BASEBALL 1.5

Pros: Excellent simulation; can control pitcher and batter; provides a variety of ballparks; addictive.

**Cons:** Missing many attractive features of MS-DOS version; copy-protection scheme; disappointing digitized sounds.

Company: Electronic Arts.

Requires: Mac Plus; System 6.0.4.

List price: \$49.95.

In the MS-DOS league, Earl Weaver Baseball garnered rave reviews, but when it was

transferred to the Macintosh league, the simulated baseball game lost something on its fastball. The first clue is the documentation: a 66-page MS-DOS manual and a 12-page Mac supplement. Things get worse. The first item in the Mac document is headlined "Rained Out." It details all the MS-DOS features Electronic Arts left out of the Mac version, including pitching practice; park editing; frameby-frame slow motion; team and league editing and creating; printing; and features for creating, drafting, and trading players. The player and team statistics are also limited, and there is no support for color. I wish they hadn't told me. I wish they'd produced a Mac-only manual and just told me what I was getting, not what was missing. I mean, who wants to go to a baseball game knowing it's going to be rained out?

(continues)

# The Evolution of CAD

From the beginning of time, man has tried to express himself through graphics.

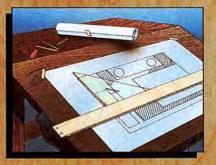
In the beginning man had to use primitive tools for creating graphic designs.





In the 15th Century design tools were quill ink pens and crude styles of paper.

By the 18th Century man had advanced to the drafting table with the T-squares, slide rules, precision ink pens and the dreaded eraser.





In the 20th Century the first CAD programs were very slow and extremely difficult to use, not to mention the expense of buying

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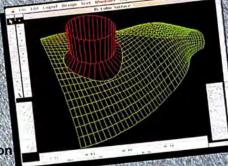
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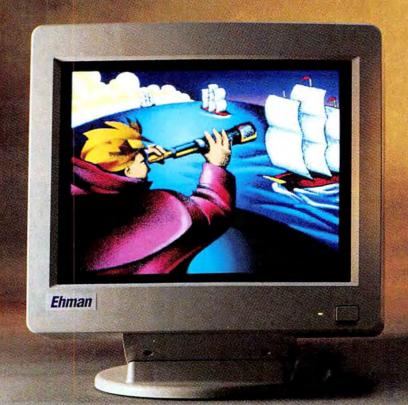


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End user circle 337 on reader service card

# Our Newest Introduction.



Color monitor illustration by Rob Mageira

Since 1985 Ehman has been a leader in providing high quality peripherals to the Macintosh market. Our hard drives, monochrome monitors and removable drives have been a mainstay

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Now allow us to

Now allow us to introduce the newest

All hard drives come bundled with your choice from two utility software packages and a 2-year warranty.

\*Disk Doubler not available with 45MB removable

member of our family; 20 inches of 8-bit and 24-bit color in high quality, 72 DPI monitors that end users will love, and budget watchers will adore.

The new Ehman 2-page color monitors are as affordable as they are practical. Backed up by a one year warranty and our 30 day money back guarantee, the price tags once again demonstrate Ehman's commitment to value on the most popular peripherals.

The other members of the family are just as cost conscious. From the lightning fast "highly recommended" 660MB drive (*Macworld*, July 91)



# No Introduction Needed.

"At \$899, Ehman's Two-Page Monochrome display is an excellent buy."

MACWORLD, MAY, 1991

"If you want a full-page display, we recommend the Ehman: it's rare to find such high quality and low price (\$499) in the same monitor."

MACWORLD, MAY, 1991



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\* Fits Macintosh models SE/30, II, IIcx, IIci and IIfx Fifth Generation Systems, Inc. 10049 N. Reiger Road Baton Rouge, LA 70809 Tech Support: (504) 291-7283



Circle 364 on reader service card

Play Ball The stage is set for a match between a team of National League and American League stars from the years 1900 to 1930. In the right-hand pane, pitcher and batter duel; they can be controlled by the computer or the player. The left-hand pane grows larger when the ball is put into play.

# The Skies Brighten

Though you do arrive at the ballpark soggy, before long the skies brighten. First, though, Electronic Arts has a special kind of torture for you. It's called the Codewheel—two pieces of round cardboard, one a ¼-inch larger than the other, fastened together at the center. Each time you launch Earl Weaver Baseball you must enter a number from the Codewheel in order to start the program—Electronic Arts' answer to copy protection. It's fun the first time around; thereafter it is annoying. Lose the Codewheel and the game is over before it begins.

Soggy—and now a bit frustrated—you arrive at the ballpark. But which ballpark? You get to choose from 32 fields. You can, for example, decide to play in Boston's famed Fenway Park, complete with it's imposing "Green Monster" (the 37-foot-high left-field wall).

You can begin the game right away, but most users will probably want to customize the game. Set Ground Rules allows you to choose one of four skill levels, plus make the all-important choice: You Manage, You Play, or Earl Manages. Choose You Play and you get to swing the bat and hurl the ball (with a little help from the keyboard or the mouse). This decision may also make real-time simulation a literal fact, because a You Play game can last almost as long as the real thing. In You Manage and Earl Manages modes you can select an option that allows only one pitch per batter, which greatly speeds up proceedings. Also in the Manage modes you get to make decisions such as whether to steal second or pitch around a batter.

## **Excellent Animation**

The game is played on a split screen. The left pane is an aerial shot of the ballpark and players and includes a working scoreboard—which not only shows the score, but also who is batting, as well as other details of the match. The right pane shows the pitcher and the batter (see "Play Ball"). The animation is excellent and provides for a lot of honest-to-goodness fun and excitement. When a ball is put into play, the aerial view enlarges to fill both panes.

A pitch in Earl Weaver Baseball is made up of three actions controlled by either pressing keys on the keyboard or moving the mouse. One action selects the type of pitch (for example, a fastball breaking to the right), the second selects the location in the strike zone where you want to throw the pitch, and the third initiates delivery (or you can select another option, such as a pickoff attempt). The level of control is remarkable, although in the beginning you'll need to refer to the manual to recall which option is which. Moving the mouse to select options is also an art that takes some mastering.

Instant Replay and Slow Motion Replay let you review a play. And you can take batting and fielding practice, though not, as noted earlier, pitching practice. Earl Weaver Baseball comes with an eight-team Old Timers League comprising the great names of baseball from the turn of the century to 1975. For \$19.95 you can buy a disk containing all 26 major league teams, players, and stadiums from 1989.

There are oodles of statistics to keep the most insatiable stat-head happy. The digitized sounds, though, will please few: a hit ball sounds like radio interference, a home run is greeted by silence, and an umpire growls "Outta there!" But if you're into baseball, you'll suspend disbelief and shelve criticisms. You'll want to try just one more time to get that curveball past Yaz or to launch a bomb over Fenway's "Green Monster." I did.

This is a good program—but it could be a lot better.—Philip Bishop See Where to Buy for contact information.

# 一 六 -

# Networked File-Transfer Utility

# MAC-TO-MAC 1.0.1

Pros: Good security options; runs in background; provides messaging capabilities. Cons: Doesn't copy selected folders, only files. Company: Caravelle Networks Corporation.

Requires: Mac Plus; AppleTalk networks: System 6.0.1: 1MB of RAM: bard.

work; System 6.0.1; 1MB of RAM; hard drive. List price: 5-pack \$250; 10-pack \$350; 50-pack \$1500; site licenses available.



Caravelle Networks Corporation's file-transfer pro-

gram has many of the features I like to see in a file-transfer program and will likely give Gizmo Technologies' Send Express a run for its money.

Mac-to-Mac consists of one INIT and two desk accessories, Mac-to-Mac FileShare and Mac-to-Mac TextPhone. The FileShare DA enables you to connect to another Mac on the network and transfer files to and from your Mac. The TextPhone DA is a network "chat" accessory that allows you to trade messages with a remote Mac; TextPhone also includes an answering-machine option for storing incoming messages while you're away from the Mac.

# Mac-to-Mac FileShare

The most important part of Mac-to-Mac is the FileShare DA. It has a full complement of folder-based access privileges to protect your files. The most basic level of disk-access control is via a user-defined password. You can assign read-only privileges, and you can set access privileges for indi-(continues)



Setting Privileges Security control is assigned either on an individual folder basis, as shown in this screen, or for an entire disk. You assign disk privileges by selecting the Disk Privileges button in the lower-right corner of the window.



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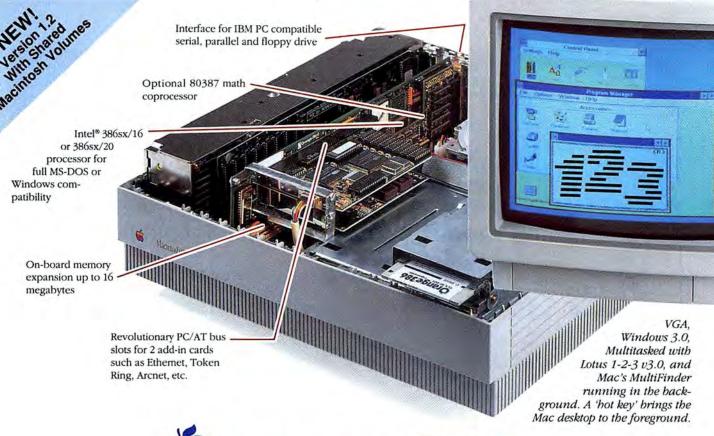
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It isn't easy being a Macintosh® user with PC clones networked all about you. Especially if you must run an MS-DOS® based program whose data files are controlled by a network. However, with an Orange 386 card *inside* your Mac, you can directly connect to any PC dominated network with complete compatibility.

How? Simply put an Ethernet, Token Ring, Arcnet card, etc., into a PC/AT slot located on the Orange386, and run your networked PC program. The Orange386 provides the ideal connection to the network, and its built-in Intel® 80386 processor and on-board RAM ensure that your MS-DOS programs run properly.

# ... Run Your Critical PC Software

The Orange386 is actually a second computer functioning independently *inside* your Macintosh. In VGA mode for example, you could be running an MS-DOS based program such as MS-Windows\*, while simultaneously executing a Mac program. A 'hot key' moves you back and forth between platforms in a true dual processing environment.

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With Orange386 your choices are: 16 or 20 mhz SX processor, up to 16 MB RAM, optional Intel 80387 math coprocessor, PC serial port, PC parallel port, PC floppy disk port, and two PC/AT expansion slots for VGA, network cards, etc. The Orange386 offers an environment of virtually unlimited hardware flexibility. But more importantly, your MS-DOS software will execute up to 10 times faster with the hardware based Orange386 as compared to PC software emulation packages.

For the ultimate in MS-DOS compatibility, put a PC network *inside* your Mac with Orange386.

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- Improperly installed files
- Duplicate files

Conflicts

The INIT Adobe Type Manager is known to conflict with the application flustrator 88 1.83.
This conflict can be resolved by upgrading to flustrator 88 1.83 or later. Contact Adobe at (415) 961-0911 for upgrade information.

The INIT Rival 1.1.6 is known to conflict with the INIT DiskDoubler 3.1.
This conflict can be resolved by upgrading to DiskDoubler 3.1.1 or later. Contact Salient Software at (415) 321-5375 for upgrade information.

Incompatibilities

The application Disk First Aid 1.4.3 is not compatible with System 7.0.
System 7.0 requires Disk First Aid 1.5 or later. Contact your local Apple dealer for upgrade information.

The application Font/DA Mover 3.8 is no longer needed because its functionality has been incorporated into System 7.0.
You may want to remove the application Font/DA Mover 3.8 from your hard drive to save disk space.

Duplicate Files

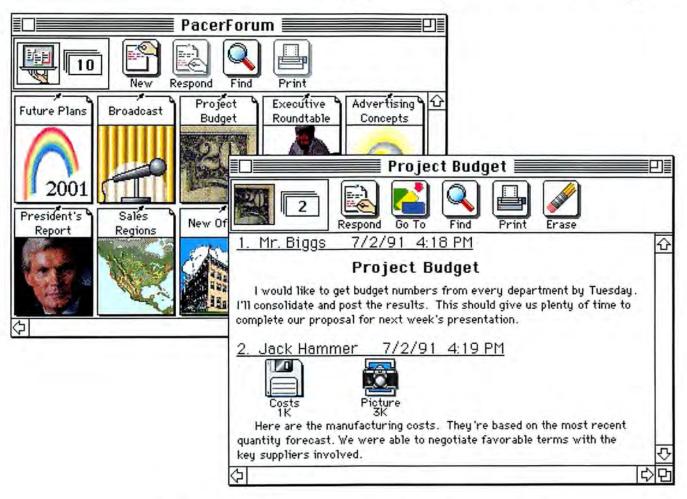
You have 2 copies of the application TeachText 1.1 on the volume HD 40. They can be found in the following locations:

HD40 System Folder-Aidus Folder TeachText
HD 40 Applications TeachText

Contents

View ○

# Get Your Workgroup Working.



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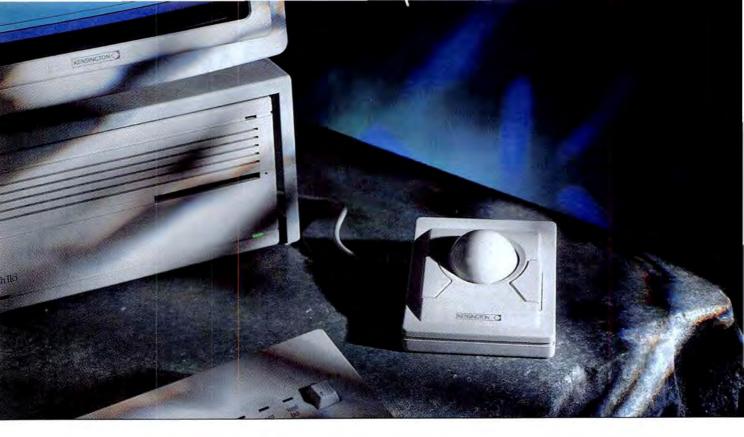
PacerForum is an interactive networked bulletin board that lets you post notices and solicit responses from your co-workers. You can announce the latest company news. Develop a design. Or monitor a schedule. All in a simple, organized fashion.

Using a colorful graphic interface, PacerForum lets you attach files, pictures and sounds to create multimedia messages that get results – fast. It's the ideal way to distribute software updates, send

documents through the approval cycle and build collaborative lists.

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# CLAIMS Vs. ACCLAIMS

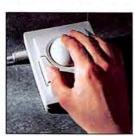
A lot of manufacturers say they have the best trackball, but only the Kensington Turbo Mouse\* has the awards to prove it.

MacUser gave it the coveted Five Mice. And the readers of Macworld magazine voted it "Best Input Device" — not just once but *four* years in a row.

What makes Turbo Mouse outshine the rest? Superior optical hardware and unique software are the difference.

A light click sends the signal quietly and instantly.

One button transmits a normal mouse command. The other locks the button in the



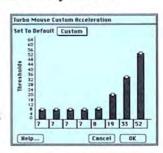
down position for extended selection and graphic applications. You decide which button performs what function.

Press both buttons simultaneously, and our time-saving chording feature executes one of seven useful commands such as "save," "print," "quit," or "undo."

Navigating the screen is easy. A comfortable ball position makes the cursor easy to move.

And a smooth ball movement means no jumping or sticking.

What's more, Turbo Mouse has unique software that lets you adjust both acceleration and double-click speed to exactly match the



way you work. Move the ball slowly and the cursor moves pixel-by-pixel. Move it fast and it speeds across even the biggest screen.

The next time you read another claim for a trackball, remember the one that has earned all the acclaims. Turbo Mouse.

For a free brochure, and the dealer nearest you, call 800-535-4242. Outside the U.S.A., call 415-572-2700.

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KENSINGTON.

vidual folders, but not for files (see "Setting Privileges"). The privileges parallel those used on AppleShare servers—open folder, view list of files in folder, read files from folder, write files to folder, and overwrite files in folder. In addition, you can protect individual folders with their own password.

I tested Mac-to-Mac over Ether-Talk and LocalTalk networks. Even on LocalTalk networks, the speed of file transfers was adequate. And the fact that Mac-to-Mac operates in the background makes it a handy way to transfer files between Macs.

The file-transfer interface resembles that of Apple's Font/DA Mover. Your Mac's disk appears in one window, and the remote Mac appears in another window. You simply shiftclick to select the files to be transferred, select the destination folder (by opening it on the remote Mac window), and start the transfer. You cannot transfer an entire folder's contents by selecting the folder, however. According to the company, the next version of Mac-to-Mac will include an option to transfer an entire folder. You can create new folders on the local and remote Macs to handle any new files. Mac-to-Mac's logging option keeps track of all files sent and received while you are away from the Mac.

I did, however, run into a problem on occasion. Mac-to-Mac did not know that it had completed a session. After completing a file transfer, I disconnected the Mac, but the remote Mac behaved as if it were still connected (a flashing icon at the Apple menu indicating that the remote Mac is busy). When I tried to reconnect to the remote Mac, I received a message that it was still engaged in a session.

## Mac-to-Mac TextPhone

Mac-to-Mac supports an answering machine for phone-style text communications. With the answering-machine feature, callers can leave text messages that you can read later. TextPhone also has the ability to use MacinTalk to "speak" your messages to you. Since it uses MacinTalk, not everything is fully understandable unless you read the message at the same time.

## What It's Not

Mac-to-Mac is not a substitute for a file server or a peer-to-peer network operating system. It's a file-transfer utility. If you want to work with a file, you must transfer it to your Mac. You cannot keep one copy of a file in one location and share usage across the network.

And TextPhone is not a substitute for an E-mail system. It's meant for one-on-one communications and requires that both Macs (sender and receiver) be turned on in order to work. TextPhone's answering-machine feature makes it more useful than an ordinary phone or chat application, though.

Even with an AppleShare file server on our network, I found Macto-Mac to be a useful adjunct, especially when I am looking for a file that is on someone else's Mac.

## -Dave Kosiur

See Where to Buy for contact information.



# M.Y.O.B. 2.0

Pros: Provides flexible invoicing; inventory record keeping includes ability to account for manufactured items. Cons: No payroll module.

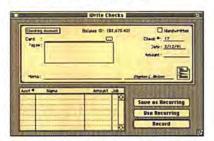
Company: Teleware. Requires: Mac Plus; hard drive. List price: \$249.

Tired of running your business out of a shoe box? Or (0) B with one of those easy-to-use checkbook programs that don't actually do much? Maybe it's time you stepped up to a real business-accounting program-one that generates standard business forms, keeps detailed records of your assets and liabilities, and uses double-entry bookkeeping to produce accurate financial statements. M.Y.O.B. 2.0 includes five basic modules-Checkbook, Sales & Receivables, Purchases & Payables, Inventory, and General Ledger.

The Checkbook module essentially works like a computerized checkbook: you record checks in a window that resembles a check, and you record deposits in a window that resembles a deposit slip. M.Y.O.B.



Balance Sheet M.Y.O.B. gives you the option of producing such financial statements as a balance sheet in both tabular and graphical form.



Writing Checks You use this window to record your checks.

updates checking-account balances, prints checks, and records income and expense amounts. Business owners can start off using just the Checkbook. However, if you just want automated check-writing, you'll probably be happier with a checkbook program like Intuit's Quicken (\$59.95).

The Sales & Receivables module generates customer invoices and monthly statements. It also tracks unpaid customer invoices and payments. M.Y.O.B. includes two invoice forms: one for products sold and one for services provided. Also, you can choose whether to print invoices on preprinted forms or on your own business letterhead.

The Purchases & Payables module is basic, but it does everything most businesses would ever need: it generates purchase orders, tracks unpaid vendor invoices, and lets you set up invoices for paying vendors—something you'll do later with the Checkbook module.

The Inventory module provides some handy inventory-management tools. It keeps detailed records of both the dollar value and the units of inventory. And it lets you easily price and reprice items. The module even has a simple bill-of-materials feature called Autobuild. Autobuild, usually used by manufacturers, records si-(continues)



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As a power user, you can count on Microtech to bring you the latest technology in memory solutions. Our 4MB and 16MB modules give your computer the power boost you're going to need with System 7.0.

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multaneous decreases and increases in different inventory items. For example, a business that makes skateboards out of roller-skate wheels and mahogany planks decreases its inventory of roller-skate wheels and mahogany planks and increases its inventory of finished skateboards whenever it manufactures its product. Autobuild can record all these changes in one fell swoop. One noteworthy weakness of the Inventory module, however, is that it forces you to use the average cost per unit to value your inventory-this can be a problem if you want or are required to use another costing assumption, such as last-in-first-out (LIFO) or firstin-first-out (FIFO).

Finally, the General Ledger module acts as a central repository of financial information. It collects information from all the other modules and lets you enter any additional financial data-for example, money borrowed from a bank, stock sold to investors, or asset depreciation. The General Ledger then uses all this information to prepare the balance sheet, which lists assets and liabilities; and the income statement, which calculates profits and losses. The program does not prepare the third standard financial report, the cash-flow statement, but this omission isn't as remarkable as it sounds. Cash-flow statements are notoriously difficult to prepare with a computer and are usually available only with accounting programs that have built-in report writers.

Besides the five basic accounting modules, M.Y.O.B. also provides Administration and Card File modules. The Administration module defines miscellaneous accounting settings such as your company name, your M.Y.O.B. password, and the beginning and close of your fiscal year. The Card File module maintains an address list of the people with whom you do business, so that after you enter a name on checks, purchase orders, invoices, and statements, the person's address automatically appears. You can also use the Card File to print mailing labels.

Given these features, then, who should use M.Y.O.B.? As a C.P.A., I recommend the program to small

businesses with, say, somewhere between \$200,000 and \$1,000,000 in sales. Businesses of this size usually need more than just a computerized checkbook, but they don't need all the horsepower of a fully featured business-accounting program like the Great Plains Accounting Series. In comparison, businesses doing less than \$200,000 in sales probably don't need to bother with a system that uses double-entry bookkeeping. But businesses with more than \$1,000,000 in sales will want an accounting program that has a few more features.

# -Stephen L. Nelson

See Where to Buy for contact information.

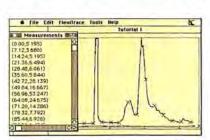
Graph-to-Number Converter

# FLEXITRACE 1.01

Pros: Detailed numerical analysis of published charts and graphs; excellent help and tutorial. Cons: Can't read some murkily printed color area charts. Company: Tree Star.

Requires: Mac Plus. List price: \$249.

A few years ago Tree Star introduced its first product, the novel program FlexiGraph. FlexiGraph (\$149) lets you draw line, pie, or bar charts freehand, and then converts the artwork into a table of numbers. Besides its legitimate uses, FlexiGraph provided a stern test of character, making it simple to fudge business or scientific results. As if to restore the karmic balance, Tree Star has introduced FlexiTrace, a program that lets you check published data by converting scanned charts to tables of numbers. You can scan charts from scientific or engineering jour-



X and Y Mark the Spot This screen shows the numeric table FlexiTrace produced from the graph at right. The program is adept at filtering grid lines, speckles, and tilts from the original artwork as well.

nals, pen-and-ink-based scientific chart recorders, the stock market pages, or newsmagazines.

Tree Star's execution of the concept is remarkably clean. Basically, you scan a chart into FlexiTrace as a 72-dots-per-inch PICT or MacPaint file. To clean up most scanned graphs, FlexiTrace removes little spots, spikes, and unwanted grids, and smooths data. You then redimension the graph if necessary (or select log coordinates), pick a sampling rate, and invoke the Trace command. The program outputs an x, y table as tabbed text to the Measurements window (see "X and Y Mark the Spot"). The captured data can be sent to the Clipboard and then to a spreadsheet or statistics program. You can also override the trace function and direct the program to measure areas and distances between points.

# Interpreting Charts

Tree Star clearly experimented with hundreds of scanned graphs in working out its filtering algorithms. A smudged 2-by-2-inch stock chart from an ancient Value Line review yielded clean data, and a scatter chart with six types of nearly indistinguishable tiny markers was also successfully interpreted (after doing some hand tinkering while following FlexiTrace's manual). As the quality of your scans gets worse, they necessarily become harder to trace. For example, a photocopy of a multicolor area chart that comes out looking like layers of mud isn't easily scanned and interpreted.

If you want to investigate business trends from data in journals or newspapers, FlexiTrace is exactly what you need (along with a scanner and a good regression program). If you want to digitize precomputer instrument scans, spectra, pen plots, or chart-recorder output from various devices, FlexiTrace is effectively your only convenient choice. And if you want to scrutinize published research results, the program is invaluable. The company that developed a product that could be abused as the slickest way to fake data has now completed the cycle by offering a program that's the best way to keep everybody honest.

# -Charles Seiter

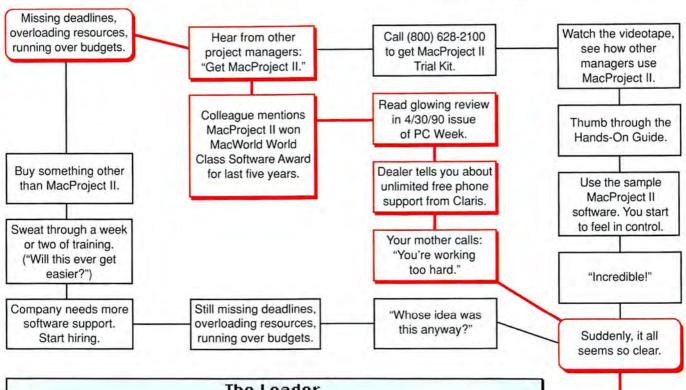
# Application

MacWrite II FileMaker Pro

# MacProject II

MacDraw Pro Claris Resolve HuperCard Claris CAD SmartForm Series MacPaint

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\*Source: International Data Corporation, April, 1990. †Refundable by Claris with proof of purchase of MacProject II.

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# Public Utilities

# SHAREWARE PRODUCTIVITY-ENHANCERS GROW UP

o wonder commercial software developers

command 3-digit prices. After all, they have to pay for the programmers, the lawyers, the ads, and the phone calls. And 50 cents for the disk. On a budget? Go generic. In the software world they

call it *shareware*; in many cases it is written by the same programmers who write commercial software. But because you get shareware from online services like America Online or CompuServe, you don't pay for manuals, mailing, or marketing—you don't even pay for the disk. You just send the programmer the requested token of appreciation: maybe \$25, maybe a postcard.

You might notice that this month's column doesn't seem to include any dogs; that's because all these programs are either popular online or ultra-useful, and I consider them grossly underpublicized. You can download these from America Online, CompuServe, or almost any other online service, or you can get them from a user group.

# Switch Boot 1.0

Are you cautiously trying out System 7 but finding yourself switching back to System 6.X frequently (because some program is System 7–shabby)? Then you're probably spending half your life opening the Startup Disk control panel to switch partitions or hard drives.

Not anymore. Switch Boot (by John Mancino, free) is an INIT whose window appears when you press the S key while the computer is starting up. It lists all your volumes or partitions. Select the one you want to boot

from, and hit the enter key. That's it no control panel, no fuss. Switch Boot even has a Shut Down button in case you're overcome with indecision and want to forget the whole thing.

BY DAVID POGUE

# Compact Pro 1.30

Compact Pro (formerly Compactor) is like StuffIt: it encodes any file or folder into a compressed format called an *archive*. Archives usually take up much less disk space than original files and take less time to transmit with a modem.

But Compact Pro (Bill Goodman, \$25) is more efficient—it takes less time to compress a file by the same amount—than StuffIt Classic or Stuff-It Deluxe. For better or worse, Compact Pro also has far fewer options, making it easier for many of us to use. Furthermore, the clarity of the manual runs circles around many commercial manuals.

Compact Pro can make self-extracting archives that expand when double-clicked (adding 13K to the archive's size). And under System 7 or with MultiFinder, Compact Pro compresses in the background.

The commercial, INIT-based compression programs DiskDoubler and SuperDisk compress more efficiently still, and decompress files on the fly (without requiring a trip to an application). But for the money and the simplicity, Compact Pro is it.



# Pixel-Flipper 1.3

If you own a color or gray-scale monitor, you probably know how to change it to black and white: open the Control Panel, wait, click on Monitors, wait, and so on. There had to be a better way. First there was Switch-A-Roo, a nifty, free shareware F-key that switches between two color depths (say, black and white to 256 colors) when you press a key combination.

But now there's the Pixel-Flipper cdev, which is more useful yet (Chris Sanchez, \$10). Instead of toggling between just two settings, Pixel-Flipper pops up a menu anywhere you click, from which you choose any setting: black and white, 4-bit, 8-bit, whatever. If you have multiple monitors, you can change each one independently. In any case, Pixel-Flipper is fast, slightly less awkward to use than an F-key, and about a million times more convenient than the Control Panel.

## RamDisk + 2.11, AppDisk 1.2

A RAM disk, you might say, is the flip side of virtual memory; it treats mem-(continues) ory as disk space, while virtual memory treats disk space as memory.

RAM delivers information to the Mac dozens of times faster than a physical disk can; anything you put onto a RAM disk, therefore, runs much faster than it normally would—perfect for programs that access the disk a lot.

RamDisk + (Roger Bates, \$20) is the best RAM-disk shareware program because you can set it to autocopy a set of files onto the RAM disk it creates. It also has online help, a good sense of humor, and clearly the most sophisticated programming. Bummer: it doesn't run under System 7.

For 7-savviness, you will want the clever AppDisk program (Mark Adams, \$15). The Mac thinks AppDisk is just another open application—so you can "eject" your imaginary disk just by quitting AppDisk. A feature that autosaves your data back onto a real disk makes AppDisk safer than most RAM disks.

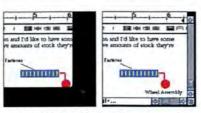
# MaxAppleZoom 1.3

This cdev (Naoto Horii, \$25) works only on single-monitor Mac II systems using a 4- or 8-bit Apple Display Card and the standard Apple 13-inch color monitor. Put MaxAppleZoom (MAZ) into the System Folder and try not to let your jaw hit the floor.

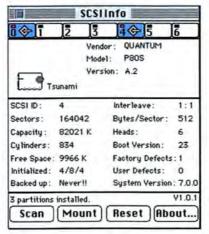
You know the ¾-inch black band around the perimeter of a monitor? MAZ eliminates it, filling every single pixel behind the glass with usable image, right up to the plastic collar. Suddenly you've got a 704-by-512-pixel screen instead of 640-by-480—as though you traded up to a monitor that's 17 percent bigger.

Other than your mood and productivity, this masterpiece doesn't affect a thing: software and hardware never know it's there. (On my Mac, MAZ even likes System 7.) Makes you wonder: if all of that screen area is usable, why does Apple leave the dark border around the edges?

If you're already a MAZ user, you discovered that the program abruptly stopped working one day this summer. By the time you read this, MaxAppleZoom 1.4 may have been released—or the geniuses of the shareware world may have written a patch that brings 1.3 back to life.



THE BIG SCREEN MaxAppleZoom substantially increases the amount you can see on a Mac II monitor by eliminating the black band all the way around the screen (before, left; after, right).



SCSI SLEUTHS In the event of a SCSI snafu, cdevs can be invaluable. SCSIInfo (above) gives more details, but SCSIProbe gives you better information on your SCSI universe.



TEMPER, TEMPER Temperament, whose control panel is shown here, cleans up after Microsoft Word. You can even teach it to delete the detritus from other programs.

### QuitFinder FKey 1.2

The Finder is really a program, just like PageMaker or MacPaint. What MultiFinder does is run the Finder and other programs simultaneously, so you can rotate among them easily.

But for owners of 1- or 2-meg Macs, if the Finder is hogging a whole program's worth of memory, what's the value of MultiFinder? That's where QuitFinder steps in (Eric C. Thauvin, free). It's an F-key; you install it with Suitcase II, MasterJuggler, or a shareware FKey installer. When you press

#E-shift-0, the Trash Can disappears—you've just quit the Finder, safely and easily, just as you'd quit any other program. You're left aloft in your chosen programs with lots more memory available. When you cycle through the open programs, you never have to slog past the Finder.

When you quit everything, the Finder safely relaunches itself. The only wrinkle: to launch new programs, you have to use On Cue, Hand-Off, DiskTop, or another file-launcher. Otherwise, QuitFinder gives new hope to owners of 1MB Macs, and new memory to everybody else.

# SCSIInfo, SCSIProbe

Crisis quiz: You power up the Mac, but the hard drive icon doesn't appear. Who ya gonna call?

For starters, call up SCSIInfo (Bob Easterday, pay what you want). It's a SCSI detective; it tells you the make, model, capacity, partition info, and SCSI address of every SCSI device attached to the Mac (addresses 0 through 6), and more. It has a Mount button that can often bring a SCSI device that's acting flaky online (SCSI is like that).

Without SCSIInfo, you'd be utterly at a loss to know why a drive isn't mounting; the cdev at least tells you whether the Mac is "seeing" a drive, giving you a head start in solving the problem. You might prefer the cleaner-looking SCSIProbe (Robert Polic, free); while it omits some of SCSIInfo's info (such as Interleave and System Version), it does display all seven SCSI addresses, including that of your ever-lovin' Mac, which is always at position 7.

# Temperament 2.0

Okay, there's not much to this cdev (John Rotenstein, free). All it does is sit there and devour all those Word Temp files that Microsoft Word leaves in its wake.

Can you imagine a big software company wasting its time writing something this simple and this good? No way.

Contributing editor David Pogue is an efficiency addict, utilities fiend, and shareware junkie in Manhattan.



This printer is so fast it knocks out the competition cold

Lease Only \$64/Mo

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- 35 resident fonts
  - Mac/DOS compatible
- 2 MB RAM upgradeable to 10
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- SCSI port for adding a hard drive
- Auto switch between 4 optional paper trays

# Panasonic Laser Printer...52,088

This Panasonic KX-P4455 laser printer includes 2 paper trays, genuine postscript, 11PPM, Appletalk & cable. This one's great!

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# Olympia NP60 Dot Matrix Printer... 288

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# T-16 Color Monitor...\$1,688

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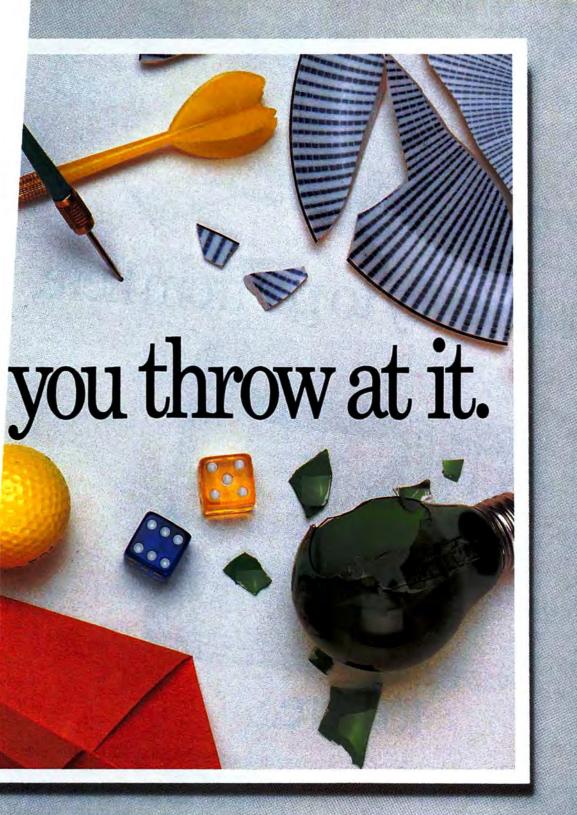
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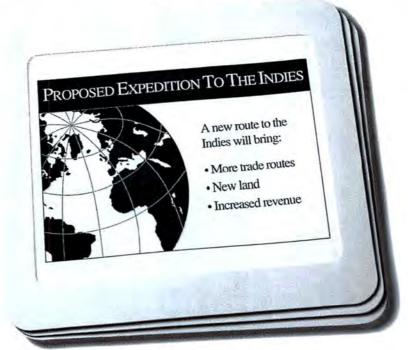
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## NEW PRODUCTS

## **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

## **BLP Elite Printer**

PostScript printer that comes with 17 PostScript fonts, 2MB of RAM, and built-in AppleTalk for sharing files over a network. Provides a control panel for configuring the printer and for monitoring its status. Has user-adjustable sleep mode. \$1599. GCC Technologies, 617/890-0880.



**BLP Elite Printer** 

## Character Scanner

Full-page desktop scanner that functions as sheetfed and hand-held scanner. Compatible with all major



Character Scanner

OCR software. Scans in 64 levels of gray, and has selectable output resolution of 100 dpi to 400 dpi. \$599. Computer Friends, 503/626-2291.

### The ColorArtist Scanner

18-bit color/gray-scale hand scanner that provides 400-dpi gray-scale resolution. Comes bundled with RainbowPaint color-paint and imaging software. \$795. Marstek, 714/833-7740.



The ColorArtist Scanner

## Laser Access Switch

Autoswitch that allows two to four Macs to share printer or other peripheral. Bidirectional switch enables one computer to share up to four peripherals. Can be used in conjunction with line extenders and buffers. Four-port parallel model \$169.96; two-port parallel model \$119.95. Solectek, 619/450-1220.

## LightningScan Compact

Portable scanner that connects to disk drive port. Device weighs 5 ounces and is slightly larger than a deck of cards. Includes SnapGuide scanning guide



LightningScan Compact

that prevents side-to-side swaying. Scans images up to 4.2 inches wide and has settings for 100, 200, 300, and 400 dpi. Comes bundled with ThunderWorks image-editing software and desk accessory for scanning graphics or text from within any application. \$369. Thunderware, 415/254-6581.

## **Ovation Projection Panel**

Color LCD projection panel capable of displaying live video without an add-in computer video board or external adapter boxes. Permits connection of optional powered speakers. Sound level from a VCR or other audio source can be adjusted from the bundled Ovation hand-held remote control unit. Works with Mac and IBM-compatible personal computers. \$8495. Proxima Corporation, 619/457-5500.

### PassProof for the Mac Ilsi

Data-security hardwaresoftware combination that

consists of PassProof software disk, lock that fits in disk drive, two keys on a key ring with a serial-number tag, floppy-port plate. SCSI-port plate, tamperproof Mac II case screw. tamper-proof plate screws, and a custom screwdriver. A hardware-locking device, a round key-lock, prevents physical access to the Mac's drive. Metal security plates prevent floppy and SCSI port access. Software protects against unauthorized system access and contains password protection, screen-locking, and user-access tracking features. 1MB min. memory. \$99.95. Kensington Microware, 415/572-2700, 800/535-4242.

## Platinum 400MB Hard Disk Subsystem

Internal and external 400MB mass-storage subsystems. Internal version is fully compatible with Mac Ilcx and Ilci computers. Includes CMS SCSI utilities 6.0, which supports passwords, partitioning, and A/UX; Symantec's SUM II utilities for data recovery, data encryption and backup; documentation; and a one-year warranty. Internal model \$3799; external model \$3999. CMS Enhancements, 714/222-6000.

## Workgroup Laser Printer

10-pages-per-minute laser printer with 50 resident Hewlett-Packard Series II (continues) fonts, dual-bin paper handling, and custom controller. Can be upgraded to PostScript page-description language compatibility. Designed for the needs of small to medium-size workgroups, and comes with two board slots that can accommodate a full library of HP-compatible fonts on smart boards. \$2595. Mannesmann Tally, 206/251-5653.

## SOFTWARE

## **Edit Master Mac**

Computer-based videotape-editing system for professional video editors. Offers pull-down menus, 999-event dual-list management and cleaning capability, and ability to create lists in a variety of formats. Provides sync roll recording and dynamic tracking. Also provides longitude timecode and vertical-interval time-code frame editing. 2MB min. memory. \$4500 to \$16,000, depending on configuration. CV Technologies, 201/784-3355.

## **EPS** Exchange

Utility that allows user to import Aldus FreeHand 3.0 drawings into Adobe Illustrator 88 and Illustrator 3.0 for editing and printing, while retaining details of original artwork. 1MB min. memory. \$149. Altsys Corporation, 214/680-2060.

## GeoVista

Presentation software for creating maps representing geographic areas within the United States. Maps can be used to display sales, marketing, and demographic information. Enables user to enter information directly from the keyboard, or to display information contained in any major database or spread-

sheet. Maps can be exported in Paint or PICT format, or printed directly by GeoVista. 1MB min. memory. \$249. Newton Technology, 617/630-0145.



GeoVista

### **Golf Teacher**

HyperCard-based golf tutor that incorporates animation, text, and sound to increase user's knowledge of playing golf. Explores basics of the game, covering grip, swing, hooks, and slices, as well as advanced techniques used in short game, sand play, and putting. 1MB min. memory. \$34.95. FYI Publishing, 817/599-3362.

### Harbor Master

Software for predicting ocean tides and tidal currents. Displays information about tidal currents at 2900 tide locations worldwide. including 2300 locations in the continental United States, Alaska, and Hawaii. Has an option to display multiple tide tables, calendars, and graphic windows. Has a toggle switch to move between standard time and daylight time, the ability to display the tide table or current data in a calendar format, and an option to save annotations to text files, and graphics to PICT format. 1MB min. memory. \$149. Zihua Software, 408/372-0155.

## Help

Utility for diagnosing Mac configuration problems. Analyzes hardware and software configuration to detect potential or existing problems, and suggests actions to fix any detected problems. Generates reports that include charts and tables that the user can customize to show summary or detail information about each topic. 1MB min. memory. Single user \$149; 10-pack \$795. Teknosys, 813/620-3494.

### InterPlot

Application that enables scientists, engineers, and other technical users to plot two-dimensional data and perform traditional and graphical data analysis. Includes a palette of tools for on-screen integration, differentiation, statistical operations, and other mathematical operations. Provides scrollable plot windows that are one printed page in size, multiplot page layout, and object-oriented drawing tools. Automatically propagates x and y error values. User can select fill patterns and colors for point and line styles; data labels can contain mixed fonts, superscripts, and subscripts. 1MB min. memory. \$99.95 plus \$5 s/h. Scientific Visions, 301/593-0317.

## Jazz through MIDI

Self-teaching jazz-improvisation course. Collection of 60 jazz sequences that includes popular jazz standards with rhythm accompaniments and solos. User selects music and loads it into sequencer, then follows the music on a keyboard, using chord chart provided with program. 512K min. memory. \$45.95. New Sound Music, 313/355-3643.

## MasterKey

Utility designed for recovering forgotten or un-

known passwords in Microsoft Excel, Wingz, and WordPerfect. Generates password-recovery reports for Mac and MS-DOS files, has online help screens, and provides technical-support line. Program can be used only with access code supplied with manual. 1MB min. memory. Version for use with Wingz \$135; versions for use with WordPerfect and Microsoft Excel \$165 each. New Visions, 405/523-1639.

## Microsoft Schedule+

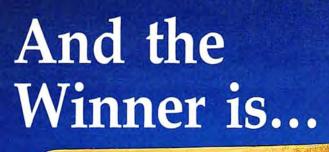
Time-management program built on the architecture of Microsoft Mail for AppleTalk Networks 3.0. System is integrated with Microsoft Mail to enable workgroups to share individual calendars. Users can view appointments and book meetings from directly within Microsoft Mail and can access network and personal user lists maintained on Microsoft Mail. Includes privacy protection. 1MB min. memory. 5 nodes \$195; 20 nodes \$775. Microsoft Corporation, 206/882-8080.

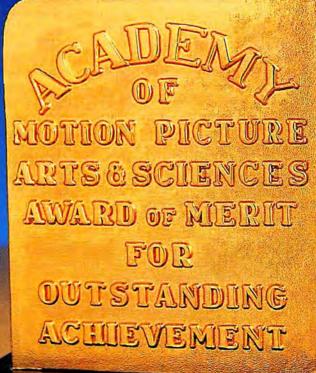
## Pax Imperia

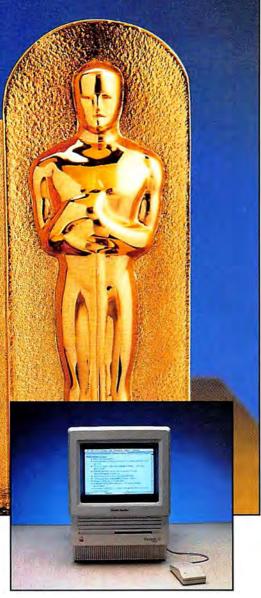
Simulation game in which users build space empire. Can be played by an individual, by multiple players on single computer, or by up to 16 players over network. User selects a galaxy in which to build an empire. Players choose planets on which to create simulated societies, with military- and (continues)



Pax Imperia







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## Quick Art Herbs

Collection of more than 150 clip art images of baskets, flowers, herbs, and berries. All drawings can also be modified in a paint program. 1MB min. memory. \$34.95. Wheeler Arts, 217/359-6816.

### Radar

Protocol-independent network-management software that gathers information about CPUs and printers on a network. Software can control printers; search a network for specific items, based on various user-selectable criteria; and generate customized reports based on the information gathered. Network data displayed in graphic format. 1MB min. memory. 50 users \$399; 51-199 users \$499; 200 or more users \$599. Sonic Systems, 408/725-1400.

## ReadingMaze

Reading software for children from preschool through second grade. Incorporates more than 300 early words. Increasingly challenging mazes invite kids to learn and practice basic reading skills. Player moves through rooms of illustrated house to search for objects that



ReadingMaze

may help to solve picture, letter, word, and sentence problems. 1MB min. memory. Black-and-white version \$49.95; color version \$69.95. Great Wave Software, 408/438-1990.

## Read My Lips

Multimedia utility that allows users of existing word processing, desktop publishing, and presentation software to annotate documents with voice and sound. Utility accepts prerecorded sounds in either snd or AIFF formats, or user can record voices or other sounds with a microphone and application's record function. User can record to and play back from disk. Supports any sound device that is compatible with System 6.0.7 or later, 1MB min. memory. \$119. Praxitel, 313/485-6278.

## Resolve

Spreadsheet for producing financial models, analyzing numerical data with charts and graphs, and publishing reports with charts and graphs to other documents. Supports 32-bit color for importing photographic images, supports a variety of color printers, and enables users to annotate worksheets with sounds. 1MB min. memory. \$399. Claris Corporation, 408/987-7000.

### Stack Enhancers

Software that integrates preprogrammed tools into HyperCard stacks, complete with all necessary buttons, fields, scripts, and icons. Enables user to create interactive HyperCard stacks without scripting. Provides tools for creating bookmark system, card index, travel guide, progress gauge, animated text, and

others. 1MB min. memory. \$69. Cheshire Grin Productions, 416/896-8077.

## SuperDisk

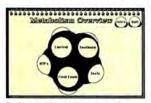
INIT for data compression that automatically compresses any file or folder the user designates with a .s extension or dragged into a .s superfolder. Does not change Finder information on compressed files; compressed files retain original type, icon, creator, and forks. Also creates autoexpanding files that can be opened on any Mac system, whether or not it is running SuperDisk. \$89. Alysis Software Corporation, 415/566-2263.

## SuperDuper

Automated disk-copy utility that can verify that copy is identical to original disk. Program writes unique serial number on each copy disk. User is free to make selections from the menu bar or to switch applications under MultiFinder while utility is in use. 1MB min. memory. Standard version \$79; autoloader version \$79; autoloader version \$150. NeoConcepts, 408/899-4821.

## Sychem1: Metabolism Overview

Interactive learning software for students of biochemistry. Can be used as complement to biochemistry courses from high school through university level. Program is divided into six modules: energy production, energy consumption, control and reg-



Sychem1: Metabolism Overview

ulation, textbook, test questions, and final exam. Modules contain multimedia interactive animations of biochemical processes. 2MB min. memory. \$39.99. Irvine Interactive, 619/431-8860.

## Temath

Set of numeric and graphic tools for exploring mathematical concepts and problems. Includes reflection, root-finder, curve-intersection, tangent-line, and arclength tools. Also includes a matrix calculator that performs matrix arithmetic and solves systems of linear equations, and an expression calculator. 1MB min. memory. \$39.95. Brooks/Cole Publishing Company, 408/373-0728.

## Tristan

Pinball game whose background is a picture of Tristan, the knight from the Arthurian legends. Uses representation of paddles and mazes as in real pinball games. User operates paddles using various keys on the keyboard. 1MB min. memory. \$69.95. Amtex, 613/967-7900.

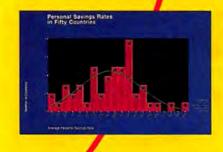
## What Time Is It?

HyperCard 2.0-based program that helps children learn to tell time. Children place clock's hour and minute hands to correspond to digital clock display, or enter numbers in digital clock display to correspond to analog clock. Minutes before and after the hour can be entered. Includes context-sensitive hints at every step. Computer speaks the time with digitized sound. Five levels of difficulty. For ages 4 through 10. 1MB min. memory, \$14.95. Arch Cape Software, 301/680-8004. (continues)

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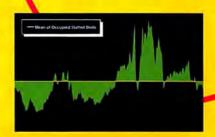




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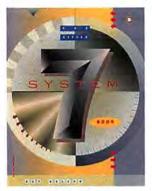
follows to create a graphic icon, cartoon, silhouette, and company logo. Book focuses on general computer drawing techniques rather than drawing with specific programs. Written by Deke McClelland. \$24.95. BusinessOne Irwin, 708/798-6000.

## HyperCard 2 in a Hurry

Book that introduces fundamentals of HyperCard 2 through series of self-study,



HyperCard 2 in a Hurry



The Little System 7 Book

hands-on sessions. First two sessions introduce HyperCard 2 as tool for information storage and retrieval, and four remaining sessions illustrate essential techniques and tips for building a variety of HyperCard stacks. Class-tested by students. Covers debugger. Written by George Beekman. \$20.25. Wadsworth Publishing, 415/595-2350, 800/876-2350.

## The Little System 7 Book

Brief but detailed guide to System 7. Covers virtual memory, desk accessories, new Finder and control panels, and TrueType fonts; gives advice on multitasking, customizing the desktop, creating aliases, file sharing, and networking. Includes one chapter on tips and one on troubleshooting. Written by Kay Nelson. \$24.95. Peachpit Press, 415/527-8555, 800/283-9444.

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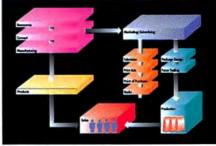
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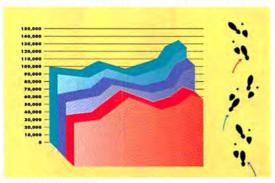
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## Quick Tips

Making tools for SIMM removal, organizing Word 4 table commands, creating quick crop marks, and more

BY LON POOLE

ome people still think price and an extra hole are the only differences between a 1.4MB high-density floppy disk and an 800K disk. They send tips about drilling or cutting out an extra hole in an 800K disk and reinitializing to boost its capacity.

This is false economy. Although the disks may look alike if you pull open the metal shutter, the coating that magnetically stores the programs and documents is not the same. A 1.4MB disk's coating must resist demagnetization more strongly than an 800K disk's coating because initializing at the higher capacity packs the magnetic bits in the coating closer together. When you initialize an 800K disk at 1.4MB, its magnetic bits may eventually demagnetize one another. Moreover, drilling or cutting a hole may cause particles of plastic to fall inside the disk housing, where they can scratch the disk surface. In addition, pushing an 800K disk to higher capacity makes it more susceptible to external magnetic fields (such as a magnetic paperclip dispenser with a paper clip sticking out the top). Don't risk your hard work to save a few bucks-initialize disks at their rated capacity.

## **Keeping Columns in Line**

I use Microsoft Word 4 on a Mac IIci and am annoyed that tables and business forms frequently do not line up when printed. Words and numbers that appear nicely formatted on the screen wander to the left and right as much as three or four character positions. How can that be avoided?

Norman C. Peterson Santa Monica, California A Sounds like you're lining up columns in tables and arranging items in forms by pressing the space bar. Use the tab key instead, and set the position of tab markers in each paragraph's formatting ruler. For more information, look up Tabs, Show Ruler, Paragraphs, and Tables in the manual.

The software that controls the printer, called the printer driver, observes tab settings precisely, but it may adjust the blank spaces between words. The printer driver usually adjusts word spacing on fully justified lines and in documents printed on a LaserWriter or another PostScript printer when the Page Setup command's Font Substitution option is turned on. It may also adjust spacing to account for the difference between screen (72 dots per inch) and printer resolution (300 dpi on a LaserWriter).

### Centesimals Too

At the Puerto Rican Cycling Federation we use Excel 2.2 and Works to compute the riders' results. The programs can handle hours, minutes, and seconds, but for certain events we need centesimals too.

Manuel Domenech San Juan, Puerto Rico

A You can keep time to the nearest hundredth of a second in Excel 2.2 or 3.0 (but not Works) by keeping your times in four separate col-



umns—one for hours, one for minutes, one for seconds with centesimals, and one that combines the other three columns. The following formula combines hours from cell B2, minutes from cell C2, and seconds with centesimals from cell D2.

## = TEXT(TIME(B2,C2,D2),"h:mm:ss")& TEXT(D2-TRUNC(D2),".00")

To add up a set of times, use three SUM functions to total hours, minutes, and seconds separately. Then use a formula like the one above to combine the totals. To average a set of times use a formula like this:

=TEXT(TIME(0,0,(B10\*3600+C10\* 60+D10)/R0WS(B2:D9)), "h:mm:ss")&TEXT((D10-TRUNC (D10))/R0WS(B2:D9),".00")

Here cell B10 contains the total hours, C10 the total minutes, and D10 the total seconds for the times to be averaged. The ROWS formula computes the number of times to be averaged, assuming one time per row. (continues)

## HOW TO

### **JClock Removal**

Last spring I installed a helpful INIT called JClock that displays the current time in the menu bar. Now I want to remove the clock because it obscures the icons that appear when I use MultiFinder. I tried dragging the INIT out of my System Folder and even reinstalling my system software. I can't guess what the trouble is, but I hope you can!

Byron E. Crews Minneapolis, Minnesota

A JClock installs itself in the System file, so you must throw away your System file before reinstalling the system software. Otherwise the Installer dutifully copies JClock to the new System file. After reinstalling the system software, you must also reinstall all fonts and desk accessories you have added to the System file.

Instead of reinstalling a new System file, you can remove JClock from the existing one with Apple's ResEdit utility. Make a backup copy of the System file. Using ResEdit, open the System file you want to fix, open the INIT resources, select the JClock INIT (it probably is ID=4), choose Clear from the Edit menu, and quit ResEdit, saving changes when asked.

## **SIMM Brackets**

TIP: Recently I installed a new pair of SIMMs to increase my Mac's memory. Removing the case to get at the SIMM sockets was easy, but spreading the retaining clips to release the old SIMMs caused lots of frustration and sore fingers. I was tempted to use a screwdriver but thought better of it. Instead I made a tool from an ordinary tongue depressor by cutting off one end at a 45-degree angle.

Al Teplow Oakland, California

Be very careful when removing old SIMMs because those retaining clips break easily. A nonmetallic letter opener or a watercolor brush handle works well. A popsicle stick cut as you describe should also work. Repairing a broken clip means replacing the entire SIMM socket (an Apple dealer will probably insist on replacing the whole logic board).—L.P.

## Toner Shake-Up

TIP: If the toner in your GCC PLP

II, PLP IIs, BLP II, or BLP IIs laser printer seems to be running out prematurely on the left side of the page, you may not have to replace the toner cartridge immediately. Instead, dim the lights in the room so you don't damage the photo-sensitive drum inside the printer, and take the toner cartridge outside or to a trash can. Shake the cartridge vigorously for a couple of seconds to redistribute the toner. The next time you print it should look as if you just bought a new cartridge.

William Rogers Long Beach, California

For its laser printers, Apple suggests gently rocking the cartridge from end to end to redistribute the toner along the length of the cartridge. —L.P.

### **Button**, Button

TIP: In FileMaker Pro, I like to make buttons for commands I use frequently, because clicking a button is faster than choosing a menu item. But I found that some commands could not be assigned to a button. For example, the New Request command, which lets you specify additional criteria when finding records, isn't on the pop-up menu of commands that can be assigned to buttons. Then I noticed that the New Record command-which has the same keyboard equivalent as New Request (#-N)can be assigned to a button. I made a button and assigned it the New Record command. It functions as a New Record button when I am browsing or as a New Request button when I am finding. So if a command you want to assign is not on FileMaker Pro's list for buttons, see if a listed command has the same keyboard equivalent.

Jeanette Foshee Boone, Iowa

## **Handy Table Commands**

TIP: I find myself frequently using Microsoft Word 4's inconvenient Cells and Tables commands. I greatly increased my productivity by using the Commands command to put 18 table-related commands in my Work menu (see "Work Table") which I now use exclusively as a Table menu.

Don Beck Stow, Massachusetts (continues)

## QUICK CROP MARKS

o quickly create accurate crop marks that are smaller than the page size in page-layout and drawing programs—such as Aldus Page-Maker, QuarkXPress, Aldus FreeHand, or Adobe Illustrator 3.0—try this tip from Scott Jones of El Cerrito, California.





 Draw a rectangle the size of the area you want cropped.
 Select it and send it to the back.





2. Draw a straight line exactly along the top border (using snap-to guides if you want) that extends half an inch or so beyond the sides of the rectangle. Set the line thickness to the weight at which you want the crop marks to print. Duplicate that line and drag it to the bottom border. Do the same with the left and right borders. Select all four lines and send them to the back.





3. When you are ready to print, enlarge the rectangle to give as much space between the crop marks and the image as you desire. Then set the box's line and fill colors to white (or paper color). TI made PostScript® printing affordable.



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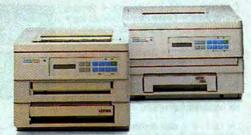
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I put table-related commands in my Document menu because I use my Work menu for opening frequently used documents. Many Word users are unaware that they can customize Word's menus with the Commands command, which lists many commands not on standard menus.—L.P.

## The Right Style

TIP: When you import a Word file into a QuarkXPress file with the Get

Text command's Include Style Sheets option turned on, styles from the Word document don't replace Quark-XPress styles of the same name. As a result, the formats of paragraphs with those styles change to match the QuarkXPress style definitions. In particular, the QuarkXPress Normal style replaces Word's Normal style. This can cause major problems because

Word defaults to the Normal style, and people typically base styles they create on Normal without changing the style name.

To work around this problem, use Word's Define Styles command to rename the Normal style to Normal,n (see "Style Renaming"). Then import the Word document into QuarkXPress as usual. The Normal,n style remains intact because its name doesn't exactly match the QuarkXPress Normal style.

Within QuarkXPress, you can easily make the style sheet definitions from the Word document apply to the QuarkXPress Normal style and to styles based on it. In the Style Sheets dialog box, select the Normal style from the scrollable list of style names and click the Edit button to get the Edit Styles dialog box for the Normal style. Then use the pop-up menu to set the Based On option to Normal,n.

Ward Barnett Minnetonka, Minnesota (continues)

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## Work

Insert Table... Table to Text...

Show Table Gridlines Table... Cells...

Merge Cells Split Cell

Insert Columns
Insert Rows
Insert Cells Right
Insert Cells Down
Insert ¶ Above Row %%...

Delete Columns Delete Rows Delete Cells, Shift Left Delete Cells, Shift Up

Cell Borders... TLBR Single Cell Border TLBRM Single Cell Border

WORK TABLE You can turn Word 4's Work menu into a Table menu by using the Commands command to add table-related commands to it.

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## HOW TO

## Start-Up Stuff in System 7

TIP: With System 7, system extensions (formerly called INITs or startup documents) go in the Extensions folder, and control panels (formerly called Control Panel devices or cdevs) go in the Control Panels folder. Both special folders are inside the System Folder. But some older extensions and control panels don't work inside the special folders. I work around this by putting aliases of such items in the System Folder itself.

> Russ Nelson Portland, Oregon

I do just the opposite: I put the recalcitrant extensions and control panels directly in the System Folder. System 7 automatically installs extensions and control panels located directly in the System Folder as well as those in the special Extensions and Control Panels folders. As a result, I don't need to put aliases of those extensions in the Extensions folder. I do make aliases of all control panels residing directly in the System Folder and put those aliases into the Control Panels folder. The aliases let me access the control panels in the System Folder by opening the Control Panels folder (from the Apple menu).

Whereas older system software installs system extensions and control panels only in alphabetical order, System 7 installs them in three groups, alphabetically within each group. It starts with the Extensions folder, goes next to the Control Panels folder, and finally installs extensions



STYLE RENAMING To make sure a Word document's Normal style won't be redefined when you import the document into QuarkXPress, use Word's Define Styles command to change the name to Normal.n.

and control panels it finds in the System Folder itself. This change in the installation sequence can cause problems for older system extensions and control panels.—L.P.

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Lon Poole answers readers' questions and selects their tips for this monthly column. His two most recent books are Amazing Mac Facts (Microsoft Press, 1991), a collection of the best published tips; and Macworld Guide to System 7, IDG Books, 1991).

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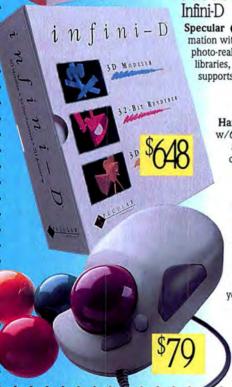
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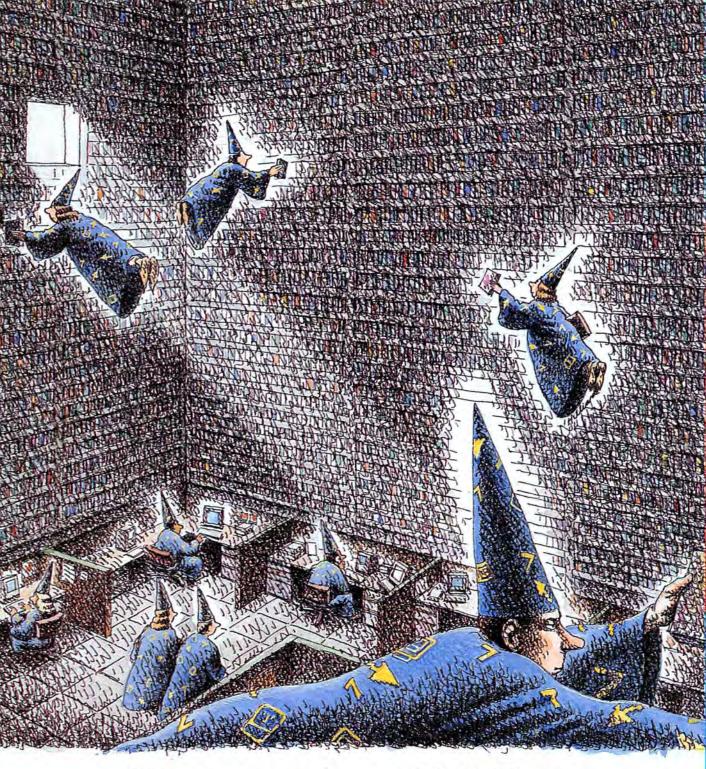
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above; pretty nifty, eh?). Painter supports the Wacom pressure-sensitive stylus. And at only \$299, the price is as realistic as the results you get. Just look for the paint can.



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## Getting Started with Customizing Databases

How to fine-tune your electronic filing system for accuracy and efficiency

The Lucy Show," in which the zany redhead was secretary to a bank president, one Theodore J.

and the second of the second o

Mooney? Few things pushed Mr. Mooney's blood pressure to the

bursting point more than being unable to fathom Lucy's ditzy

filing system, in which the Jenkins file was under "N" ("because he's such a nice man") and the Smith file was under "T" ("you meet with him on Tuesdays"), but Lucy could always find things in a flash.

There's a moral to this story: The best filing system is one that's tailored to the way you work. This also applies to the electronic filing systems you can create using database managers such as Claris's FileMaker Pro, ACIUS's 4th Dimension and File Force, Odesta's Double Helix, ProVue's Panorama, or the data-management features in Microsoft Works and Excel. Most database managers provide dozens of features that enable you to customize a filing system-to help ensure the accuracy of your data and to help you locate, sort, and print it more easily.

But many database users don't bother to investigate these customizing options; instead they rely on the data manager's preset, out-of-the-box settings for entering, storing, sorting, and printing information. If you are a member of this group, you aren't getting the most from your software, and you are probably working harder than you need to. This month I examine the ways you can customize a database with most Macintosh data-

base managers. "Customizing a File-Maker Pro Database" shows how to apply these concepts to the most popular Mac data manager, Claris's FileMaker Pro.

BY JIM HEID

## Preparing the Fields

Database customizing begins with choosing the appropriate types of fields for the data you store. (In database parlance, a *field* is a single piece of information, and a group of related fields form a *record*. Think of a Rolodex file: one card compares to a record, while the individual pieces of information on the card—name, address, phone number—compare to fields.)

When you create a new database, you give each field a name that reflects its contents, such as Last Name or Zip Code. You can also specify what kind of data that field holds—text, numbers, or dates, for example. Most database managers are preset to create text fields, and if you're in a hurry to start filing, you might just accept that setting as you define each field. Don't do it—think about the type of data each field will hold, and specify field types accordingly.

Choosing the right field type is especially important when you know those fields will hold numbers or date



values. Although you can store numbers or dates in a text field, it isn't a good idea. Most data managers can apply calculations to the values in a number field—adding a sales tax percentage to a subtotal to arrive at a grand total, for example—but they can't calculate numbers stored in a text field. And if you store date values in a text field, the database manager can't sort the dates accurately. To a text field, "August" comes before "March," but a date field knows better.

Using the right types of fields also helps ensure your database's accuracy. A data manager won't let you enter a nonnumeric value (such as a lowercase *l* instead of a 1) in a number field, nor will it permit you to put impossible dates such as February 31 in date fields.

When creating a database for addresses, many people make the mistake of using a number field to hold zip codes. Eight states (as well as Puerto Rico) have zip codes that be-(continues)

## HOW TO

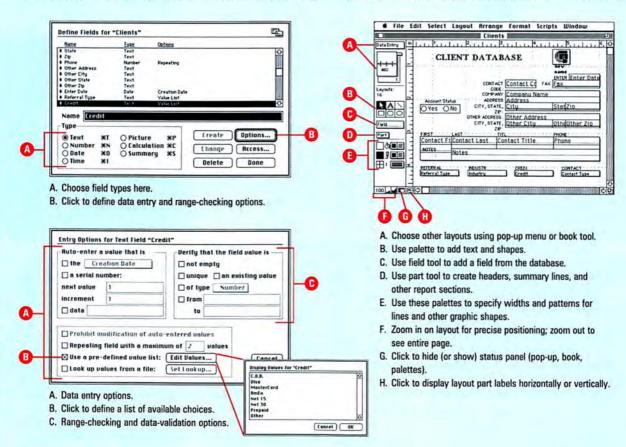
## **CUSTOMIZING A FILEMAKER PRO DATABASE**

ere are some ways to apply the customizing techniques described in this column to a FileMaker Pro database. For these examples I've used a simple client database, but you can apply these tips to any type of database.

Phase 1: Defining fields and entry options. FileMaker Pro provides a variety of field types, and choosing the right one is a matter of clicking on a button or, faster still, typing a % -key shortcut when defining the field. To specify a range, a list of choices, or other data entry options, click on the Options button or simply press the return key right after defining the field.

Phase 2: Laying out forms and reports. FileMaker Pro lets you create as many layouts as you like and switch between them using a pop-up menu. The program names a new layout with a number (Layout 1, Layout 2, and so on); rename it something more descriptive. To create radio buttons or check boxes for a field based on a list of values, select the field and choose Field Format from the Format menu, then choose the desired options. You can also use a layout to provide several screens of help information. Name such a layout Help, and users can view your online help by choosing its name from the layout pop-up menu. Many of the sample databases included with FileMaker Pro use this technique.

Phase 3: Creating scripts and buttons. The example button shown here, when clicked on, executes a FileMaker Pro script



gin with 0, and a number field generally lops off a *leading zero*, leaving just the last four digits. And many non-U.S. postal codes contain a mishmash of letters and numbers. (Using a text field for zip codes will also allow you to enter a hyphen if you use ninedigit zip codes.)

Can you change a field's type if you realize that, say, a text field really should be a date field? Generally, yes, but depending on the program, you may lose some or all of the data in that field. For example, ACIUS's File Force and 4th Dimension retain the contents of a changed field type, but Odesta's Double Helix erases them. FileMaker Pro retains the first 255 characters of each field if you change a text field to another type. Clearly, it's far better to determine each field's type *before* you start entering data.

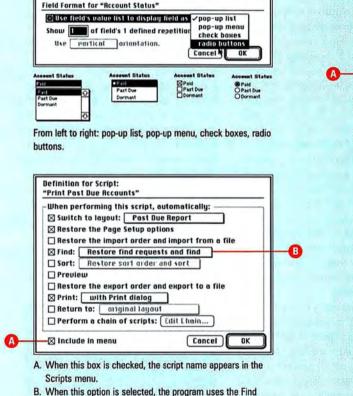
## **Accuracy Counts**

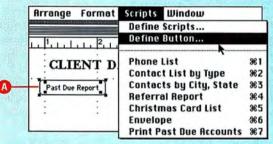
A database is only as useful as it is accurate. A typo in a field can cause a record to be sorted incorrectly, or not found during a search. And if the field contains numbers—an employee's hourly wage, an item's price, or its quantity—the inaccuracy could cost you money. No database manager can ensure 100 percent accuracy, but most programs have features that

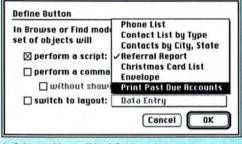
that finds all clients whose accounts are past due and then prints a report listing their names. The first step in setting up an automated activity is to create the script: choose Define Script from the Scripts menu, give the new script a name, and then check the steps that the script should perform. Uncheck the Include in Menu box when you do not want the script's name and X-key shortcut to appear in the Scripts menu. Uncheck the box if you want the script to be executed only when a button is clicked on.

After defining the script, you can assign a button to it. First, create the new button by typing its text and then drawing a round-corner rectangle large enough to accommodate the text.

For a flashier look for buttons that perform common functions such as adding a new record or searching, copy one of the button designs from FileMaker Pro's Buttons template. Or create your own design in a paint or draw program, copy it to the Clipboard, and then paste it into the desired form when in layout mode. (If you want the custom button to contain a text label, be sure to make the button large enough.) Next, while still in layout mode, select the button and choose Define Button from the Scripts menu. In the Define Button dialog box, click on the Perform a Script check box, and then select the desired script's name from the pop-up menu. Click on OK, switch back to browse mode, and try the new button.







A. Selected objects will be defined as a button.

guard against certain kinds of mistakes and that make it easier to enter frequently used information.

options that were in effect when the script was created.

Entry-checking features are data entry proofreaders that compare what you enter to a list or range of acceptable values. Say you're creating a personnel file containing a Department field. If your company has four departments, you can specify that the program reject anything other than their names (see "Labor Savers"). Many programs also let you specify input patterns, series of characters that affect text you type. For example, an input pattern for a Telephone Number field might read (nnn) nnn-nnnn. When you enter data into a field with this pattern, you can simply type ten numbers, and the data manager inserts the parentheses and hyphen for you. And if you type anything other

than ten numbers a message notifies you of the error.

Range checking ensures that numbers or dates are within a specified range. If you know the price of a Type A Widget is always between \$10.95 and \$12.95, you can assign that range to the Price field. Attempt to enter a price outside that range, and you'll see an error message.

(continues)

## HOW TO





LABOR SAVERS Automatic data entry and data-validation options reduce repetitive typing and help eliminate inaccurate data. At top, a pattern for a phone-number field is being specified with ACIUS's 4th Dimension. At bottom, Odesta's Double Helix's flag fields can hold only one of two possible values—here, "male" or "female."

In many databases, the contents of certain fields stay the same from one record to the next. (Most of a company's employees may live in the same state, for example.) To streamline data entry, most programs can enter data into certain fields for you when you create a new record. Most programs can also carry over information from corresponding fields in the previous record. For those times when the data differs, you can replace automatically entered data by simply backspacing over it. And ProVue Development's Panorama and forthcoming Panorama II boast a love-itor-hate-it feature called clairvoyance-if you type "San F" and a previous record contains "San Francisco," the program inserts the rest of the text for you. You can override the guess by simply continuing to type, or you can just turn off the feature.

Certain types of fields—ones that list marital status, sex, or whether an account is past due—contain one of only two possible values. Other types of fields are based on a rigid list of values—such as the list of colors available for Type A Widgets or the expense categories in a budget database. Most database programs allow you to specify these kinds of restrictions, and

to select a value from a list of options by clicking on on-screen buttons or check boxes. Use these multiplechoice features to improve accuracy and eliminate the drudgery of repeatedly typing the same values.

## Changing the Look of Things

When you start a new database, most programs create a simple on-screen form you can use to start entering and retrieving data. But preset forms bear nothing but fields and the labels that identify them. By creating and switching between several customized forms, you can make the database easier to work with and print its contents in a variety of formats.

Macintosh database managers have layout features that encroach on desktop publishing territory (see "Designing Data"). You will find onscreen measuring rulers and T-squares and tools for drawing lines, circles, and boxes. You can also add text and graphics such as a company name and logo. And you can change the font, style, and size of fields and labels.

But all these layout tools make it easy to create graphically tasteless forms. These won't present your data in the best light, and they make data entry—never a picnic anyway—more arduous. Since most data managers let you create numerous forms and switch between them, I recommend creating separate forms for data entry and for printing.

Make the data entry forms simple, without a lot of extraneous text and graphics. If several people will be entering data, consider adding help text to guide less experienced users through the process. Try to position fields so that you can review data and move between fields without having to scroll; besides showing an entire record at once, this helps prevent people from accidentally skipping over fields they can't see. And use fonts that are designed for the Mac's limited screen resolution, such as New York and Geneva. Laser-printer fonts such as Times and Helvetica aren't as legible on screen.

For forms that you'll use for laser printing, the opposite applies—avoid fonts such as New York, Chicago, and Geneva, which don't laser-print well. Many graphic designers recommend sturdy, sans serif fonts such as Helvetica and Franklin Gothic for forms. Position fields to take advantage of the paper size you're using; since scrolling isn't an issue for printing, don't let yourself be hemmed in by the size of the Mac's screen. If you are printing on preprinted forms such as invoices or label stock, use the program's rulers to position items so they appear in the proper place. Throw in some graphic embellishments if you like; let your creative juices flow—but not gush.

One more noteworthy point about field formatting concerns the way a data manager displays numbers—particularly currency values that are calculated by the program. Most data managers calculate numbers that are accurate to up to 15 decimal places-impressive, but overkill for currency values, which are usually limited to two decimal places. If you print an invoice or any form in which some currency values are calculated by the data manager, specify that those numbers be formatted as currency values-with a dollar sign preceding them and with only two numbers after the decimal point. This ensures that you won't see strange values such as \$25.94847267.

## Tying It Up, Tying It Down

Now that you have done some serious fine-tuning, what's left? Creating



DESIGNING DATA This FileMaker Pro layout contains elements common to most database reports: fixed text (the word invoice and the labels Bill to and Ship), fields and field labels, and borders and lines to group together related pieces of information. The list of items purchased is generated from a group of repeating fields, fields that can hold numerous separate values within each record. Repeating fields are ideal for an invoice's list of items purchased because one record represents a single purchase of numerous items.

on-screen buttons or pull-down menus that allow anyone who uses your database to conduct common types of searches or to access various forms and reports with a click of the mouse.

Say you search a client database every Friday to print a list of new orders. With most data managers, that involves choosing a Search or Find command, typing search criteria, clicking on a button or choosing another command, then choosing Print. Automating repetitive chores like these makes the database more convenient to work with and enables inexperienced users or temporary employees to perform complex jobs without having to know every nook and cranny of the program.

Basic filing programs such as Microsoft File and Software Discoveries' RecordHolder Plus don't have the features needed to automate tasks, but nearly every other data manager offers some step-saving capabilities. Panorama, Microsoft Works, and Excel all have macro recorders. When you activate recording, the program records your actions, creating macros you can save on disk and replay later. Panorama and Excel let you list macros in a menu and create on-screen buttons that play macros when clicked on. Both programs also let you create your own dialog boxes that you might use to get information (such as some text to search for) or to display messages.

But the kings of database automation are programmable database managers, such as Double Helix, 4th Dimension, Blythe Software's Omnis 5. Oracle Corporation's Oracle for Macintosh, and Fox Software's Fox-Base+/Mac. These powerhouse programs provide programming features that let you create your own dialog boxes, menus, windows, buttons, and other Macintosh interface elements. Consultants, developers, and data processing professionals use these programs to create turnkey database applications that they customize to meet the needs of specific professions or departments so the end users won't have to.

These powerhouse programs are also *relational* database managers: they enable you to establish links







ELECTRONIC ADDRESS BOOKS Address-book programs such as Portfolio Systems' DynoDex (shown here), PowerUp Software's Address Book Plus, and After Hours Software's Touch-Base combine basic data-management features with the ability to dial the telephone and to quickly print mailing labels, envelopes, rotary-file cards, and custom address books. At top is DynoDex's data entry form and Just Names window, which lists only the names in a database and lets you jump to a given record by clicking on its name. At middle, the Print Options dialog box lets you specify the format for a custom phone book. At bottom is a sample phone book in the Print Preview window.

among numerous files and create forms and reports containing data from them. These database-management programs also support Structured Query Language, or SQL. An English-like data-retrieval language developed in the 1970s by IBM, SQL is popular in the minicomputer and mainframe worlds. Data managers that support SQL enable developers to create Macintosh front ends for databases that run on huge computers, so that users can access those powerful but formidable systems through a friendly Mac interface.

But few people need the full range of features programmable databases provide, and most are understandably intimidated by the complexities of relational-data management. Flat file programs—so named because they work with just one file at a time—such as FileMaker Pro and Panorama combine the most commonly used data-management features with more accessible programming capabilities. And like high-end database managers, they support networks, allowing an office to share a single database.

If your data-management needs revolve around names and addresses, you might consider an electronic address-book program such as Portfolio Systems' DynoDex, PowerUp Software's Address Book Plus, or After Hours Software's TouchBase (see "Electronic Address Books"). All three sport basic address-book essentials such as automatic phone dialing and the ability to format and print envelopes and labels. TouchBase also provides more advanced features, including customizable fields and search criteria, as well as network support that allows an office to share a single contact database. And although HyperCard doesn't have important datamanagement features such as different types of fields, it can search for and sort data, and it's easy to use and customize. And its free-form approach to fields may be more suitable for databases that contain a large amount of text.

But whichever database manager you use, take the time to learn its customizing features so you can finetune the databases and reports you create. Not only will you eliminate a lot of drudgery and make it easier to find and use your data, but—like Lucy—you'll end up with a system that fits your own peculiar needs, not someone else's.

See Where to Buy for contact information.

Contributing editor Jim Heid looks at a different aspect of Mac fundamentals each month. His latest book, Macworld Complete Mac Handbook, an updated and expanded collection of more than 40 Getting Started columns, was recently published by IDG Books Worldwide. Look for Offical Macworld Books nationwide at:

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## Insights on Adobe Illustrator

## TIPS AND TRICKS FOR ILLUSTRATOR ADVENTURERS

BY STEVE ROTH

hen Adobe Illustrator first came out, it was

a revelation to Mac and PostScript users. The first truly professional illustration program for the Mac, it was as much a trail-blazer as those early PostScript printers (like the one I still use).

It's remarkable how much the program could do even then.

Now, two upgrades later, we're at version 3.01 of both Illustrator and the accompanying Separator. Though these tips work with version 3.0, I recommend getting the 3.01 upgrade for its increased stability and compatibility with other programs.

## Clone in Place

There's still one important command missing from Illustrator 3, an omission that often confuses people—the Clone command, which lets you make a copy of an object directly on top of the original. You can accomplish this by selecting the object, pressing \$\mathbb{X}\$-C, followed by \$\mathbb{X}\$-F (paste in front).

### Copy and Move Incrementally

Illustrator lets you move an object incrementally using the cursor keys, and you can copy an object and move the copy by holding down the option key and dragging the object with the mouse, but how do you combine the two—keyboard movements and the copy/move trick? To copy an object while moving it incrementally, hold down the \$\mathbf{x}\$, option, and shift keys while moving the object with the cursor keys.

## Giving Templates the Brush-Off

It's always been annoying that every time you open a new file, Illustrator



insists on asking which template you want to use—even if you're not planning on using one.

To avoid the annoyance of that extra dialog box, just hold down the option key while choosing New from the File menu, or just press option-\$\mathbf{X}\$ -N. The same holds true when you're opening a file that has a template. If you want to get rid of the template, hold down option while choosing Open, or press option-\$\mathbf{X}\$-O.

## **Kerning and Tracking Values**

Illustrator 3 provides some of the best type controls around, including the critical areas of kerning and tracking. If you want to see what kerning and tracking values have been applied to text, either click on an insertion point or select a range of text, then hold down the option key. Illustrator displays the kerning and tracking values in the lower-left corner of the window (see "A Question of Values"), but you

won't be able to edit them there.

## Kerning on the Edge

One unusual feature of Illustrator's kerning is its ability to kern letters in from the left and right edges of a text block. Just place the text cursor at the beginning or end of a line (except at the beginning of the first line of a text block), and kern

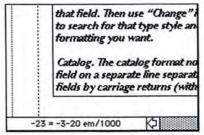
characters in from the edge using the option and the right arrow keys (see "Kerning Edges"). This feature makes it easy to position individual lines of text precisely, without moving the whole text block.

## **Transforming Your Guides**

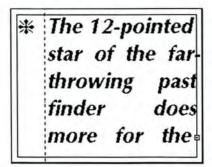
The Illustrator manuals make clear that you can grab a guide and move it by holding down shift-control. What they don't make clear, and what is hard to see on screen, is that when you shift-control-click on a guide, that guide is selected; you can then rotate it, move it, and skew it to your heart's content.

(continues)

## HOW TO



A QUESTION OF VALUES When the cursor is inserted in text or a range of selected text, hold down the option key to see the kerning and tracking values in that text.



KERNING EDGES The bottom four lines in this text block have been kerned over from the edge to allow for the hanging dingbat.

## **Graphic Tabs**

While Illustrator 3's paragraph formatting is a step up from previous versions, there's one thing that doesn't seem to work—tabs and tab stops. In fact, though, you can take advantage of a great hidden feature that Adobe calls graphic tabs. This feature lets you use any shape to define the tab stops for a block of text (see "Graphic Tabs"). You can use a normal straight line or an angled or curved one, with some limitations (discussed below). Before we cover those, however, here's a step-by-step run-through of the procedure.

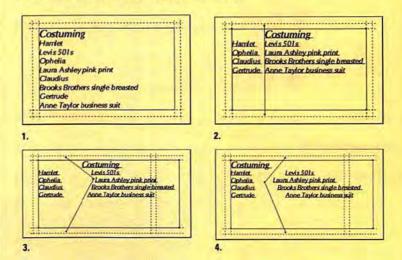
Create a block of text by dragging out a rectangle with the text tool and then typing. Make it a numbered list, a table, or some other piece that needs accurate tab alignment. Place tabs before any text that needs to be tab-aligned.

At this point, each tab that you insert causes the line to break—like a carriage return. Don't worry, be happy, and go on to the next step.

Using the pen tool, draw a vertical line through the text block at the point where you want the second column to align.

## **GRAPHIC TABS**

1. Type some text and insert tabs before the text that needs to be aligned. For the moment, the tabs act like carriage returns, pushing the ensuing text to the next line. 2. When you draw a vertical line, select it with the text block, and choose Make Text Wrap. The vertical line acts like a tab stop. 3. You can change the shape of the graphic tab stop. Here an anchor point was inserted and dragged over. 4. All paths act like they're closed for the sake of text wrap, so you have to choose shapes carefully.



3. Go back to the pointer tool to select both the line and the text block (by shift-clicking or by dragging a selection rectangle with the selection tool), and choose Make Text Wrap from the Type menu. The text after the tabs now aligns with the vertical line you drew.

You can also use irregular shapes instead of a simple vertical line. You can create an angled line, for instance, or even a bezier curve. Be aware, however, that for the purposes of text wrap, all Illustrator shapes act as closed objects. So the text will wrap to the edge of the closed shape even if you didn't actually close it.

## **Downloadable Fonts in EPS Files**

When you save an Illustrator EPS file that uses many downloadable fonts, and then place the EPS file in Page-Maker or QuarkXPress, you often run into printing problems because these programs can't manage printer-font memory within EPS files. To solve the problem, use the Create Outlines command (Type menu) to convert the text in the document to paths.

Since this method removes any calls for downloadable fonts from the

EPS file, the page-layout program doesn't have to deal with printer-font memory. One caveat: type converted to outlines can make for some large and complex paths—sometimes beyond the ability of a PostScript device to handle—so make sure to check Split Long Paths on the Save/Print option in the Preferences dialog box and type the imagesetter's final output resolution into the Output Resolution text-edit box. As you should always do when splitting paths, create a backup copy of the document before you print or save.

## Start-Up Files that Work

Adobe makes clear in its manuals that you can create a file called Adobe Illustrator Startup, which contains all your favorite fonts, patterns, colors, and the like, and all those goodies will be loaded whenever you start up Illustrator. This is great because adding a bunch of fonts to the menu, one at a time, is the most troublesome thing about Illustrator. What the manuals don't make clear is that you have to actually use an example of each font, pattern, or color in the Adobe Illustrator Startup file. You



GRAPHIC STANDOFF Adjust the left or right indents of a text block to modify the standoff of a text wrap.

can't just add it to the menu and expect Illustrator to remember it. So when you go through the trouble of adding all your fonts, remember to format at least one character using each font, then save the Adobe Illustrator Startup file.

#### The Graphic Standoff

When you wrap text around an object, Illustrator doesn't seem to have an easy way to set the text-wrap standoff from that object. But it's actually pretty simple to set the left and right standoffs. Click in the text block that you want to adjust, and set the left or right indent in the Type Style dialog box. You get this dialog box by choosing Style under the Type menu item (see "Graphic Standoff").

#### **Rotating Angles**

When you work with rotated objects, it's often difficult to get Illustrator's tools to work with you. With a rectangle that's rotated 33 degrees, for instance, horizontal and vertical scaling can make for some mean trigonometry. To solve this problem, change the Constrain angle in the Preferences dialog box to match the angle of the rotated object. The Constrain angle affects your shiftconstrained mouse movements and the orientation of the horizontal and vertical axes in the Transformation dialog boxes-most important, the scaling and skewing dialog boxes.

Now, with your Constrain angle set to 33 degrees (or whatever value you've chosen), it's a piece of cake to scale that rectangle "horizontally" or "vertically."

Contributing editor Steve Roth is coauthor of Real World PageMaker 4: Industrial Strength Techniques (Bantam, 1990).

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Capacity	Internal	External	Mechanism
40MB	\$ 209	\$ 279	Sony
45MB	\$ 219	\$ 287	Fujitsu
52MB	\$ 248	\$ 299	Quantum
90MB	\$ 329	\$ 389	Fujitsu
100MB	\$ 349	\$ 409	Toshiba
105MB	\$ 385	\$ 445	Quantum
120MB	\$ 399	\$ 469	Connor
135MB	\$ 409	\$ 479	Fujitsu
170MB	\$ 625	\$ 678	Quantum
185MB	\$ 589	\$ 669	Fujitsu
200MB	\$ 649	\$ 729	Connor
210MB	\$ 677	\$ 758	Quantum

Aurora Large Capacity Drives				
Capacity	Internal	External	Mechanism	
357MB	\$1178	\$1278	Fujitsu	
440MB	\$1149	\$1249	Seagate Wren	
650MB	\$1479	\$1569	Seagate Wren	
680MB	\$1469	\$1559	Fujitsu	
1.2GB	\$2099	\$2199	Fujitsu	
1.2GB	\$2119	\$2219	Seagate Wren	
1 year warranty on la	arge capacity devices.		12.10	

Removable Drives			
Legend 45MB Syquest	\$ 515	Toshiba CD ROM	\$ 519
Sony Optical 650MB	\$2899	Manufacturer's warranty.	

EMAC Hard Drives						
Capacity	Model	External	Capacity	Model	External	
170MB	Impact	\$ 887	335MB	Metro	\$1590	
150MB Tape	Impact	\$ 650	670MB	Metro	\$2153	
170MB	Metro	\$ 914	1.3GB DAT	Metro	\$1906	
Manufacturer's w	arranty.					

II WICTOIASET	Printers	W/Appletalk	
PS17	\$1293	PS35	\$1590
XLPS17/XLPS35	CALL	Manufacturer's warranty.	

Accessories			
2400 Baud Modem	\$ 97	Ext. Full Height Kit	\$ 99
2400 MNP Modem	\$ 161	Ext. Half Height Kit	\$ 117
2400 V42 Modem 3	\$ 190	Internal Kit	\$ 21
9600 V42 Modem 3	\$ 438	External Terminator	\$ 8
Dove Fax	\$ 273	50/50 Cable	\$ 6
Dove Fax Plus	\$ 332	Syquest Cartridges	\$ 68
Sicos Cordless Mouse S	\$ 87	Sicos Track Ball	\$ 75
Sicos Rchable Mouse S	\$ 99	Sicos Crdls Track Ball	\$ 119
Sicos Fancy Mouse	\$ 75	EMAC Track Ball	\$ 86

Memory				
1MB Classic	\$	49	1MB SIMMS from	\$ 29
3MB Classic	\$	118	4MB SIMMS from	\$ 142
5 year warranty on memor	y kits.			

Capacity	Туре	External
40MB	Zero Foot Print	\$ 475
40MB	Transportable	\$ 430
45MB	Syquest Removable	\$ 613
90MB	Syquest Removable	\$1049
100MB	Zero Foot Print	\$ 520
100MB	Transportable	\$ 739
200MB	Zero Foot Print	\$1086
200MB	Transportable	\$1109
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1GB	Full Height	\$3339
Manufacturer's warra	nty.	

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# WHERE TO BUY

#### A Guide to Products Featured in This Issue

This listing provides companies and phone numbers for products mentioned in this issue.

16" Trioitren Display: 19" Bual Mode Trinitron Display; 19" SuperMatch Color Display; 21" SuperMatch Two-Page Color Display SuperMac Technology; 408/245-2202; fax 408/735-7250. 20° Trinitron 8-Bit Color Monitor Ehman; 307/789-3830, 800/257-1666: fax 307/789-4656. **4Cast Digital Color Printer** Du Pont Printing and Publishing: 800/955-6555. 4th Dimension ACIUS: 408/252-4444; fax 408/252-0831. Adebe Expert Collection Adobe Systems; 415/961-4400, 800/833-6687; fax 415/961-1158. Adaha Illustrator Adobe Systems; 415/961-4400, 800/833-6687; fax 415/961-1158. Adobe Photoshop Adobe Systems; 415/961-4400, 800/833-6687; fax 415/961-1158. Adobe Type Library Adobe Systems; 415/961-4400, 800/833-6687; fax 415/961-1158. Agla Focus II 6SE Scanner Agfa Compugraphic Division: 508/658-5600. 800/822-5524; fax 508/658-6285. Aldus Digital Darkroom Silicon Beach Software; 619/695-6956; fax 619/695-7902. Aldus PageMaker Aldus Corp.; 206/628-2320. The American Heritage Electronic Dictionary The

Writing Tools Group, a

subsidiary of Wordstar

International; 415/332-

8692, 800/543-3873. AppleColor High-Resolution REB Manitar Apple Computer; 408/996-1010. Apple Macintosh 12" RGB Disgley Apple Computer; 408/996-1010. Apple Scanner Apple Computer; 408/996-1010. AVR 3000/65 Plus AVR; 408/434-1115, 800/544-6243; fax 408/434-0968. Business Color System RasterOps Corp.: 408/562-4200, 800/468-7600; fax 408/562-4065. Canon IX-30F Canon USA: 516/488-6700. 800/848-4123 CDA-431 Chinon America; 213/533-0274, 800/441-0222; fax 213/533-1727. ChromaVision CalComp: 800/696-3741. CM148M Hitachi America; 201/825-8000 ColorBoard 708+: ColorBoard 8LC; ColorBoard 8XLi RasterOps Corp.; 408/562-4200, 800/468-7600; fax 408/562-4065. ColorMax 8/24 Display System Sigma Designs; 415/770-0100, 800/933-9945; fax 415/770-0110. ColorPage T16 E-Machines; 503/646-6699, 800/344-7274; fax 503/641-0946. Color Pivot Radius; 408/ 434-1010, 800/227-2795; fax 408/434-0127. ColorSnap 32+ Computer Friends; 503/626-2291, 800/547-3303; fax 503/643-5379. ColorStudio Letraset USA; 201/845-6100, 800/343-8973; fax 201/845-4708. Cutting Edge 20" Trinitron 8-Bit Celor Meniter Cutting

Edge; 307/789-0582; fax

307/789-8516.

DAtabase Baseline

Publishing; 901/682-9676, 800/926-9677; fax 901/682-9691 Designer/8 20" Color Display System Generation Systems; 408/734-2100, 800/325-5811; fax 408/734-4626. DesignStudio Letraset USA; 201/845-6100, 800/343-8973: fax 201/845-4708. Diamond Scan 14 Mitsubishi Electronics America; 213/515-3993. DirectColor/8 Radius; 408/ 434-1010, 800/227-2795; fax 408/434-0127. Double Helix Odesta Corp.; 708/498-5615, 800/323-5423. DrawingCard 2-Page Display System CalComp: 800/696-3741. Dynadex Portfolio Systems; 914/876-7743; fax 914/876-7747. Earl Weaver Baseball Electronic Arts; 415/571-7171, 800/245-4525; fax 415/570-5137. ELF, Armor Fairfield Engineering; 515/472-5551: fax 515/472-4359. F-Machines T19 E-Machines: 503/646-6699, 800/344-7274; fax 503/641-0946. E-Machines TX E-Machines; 503/646-6699, 800/344-7274; fax 503/641-0946. Expert Set Monotype Typography; 312/855-1440, 800/666-6897; fax 312/939-0378. File Force ACIUS; 408/252-4444; fax 408/252-0831. FileMaker Pro Claris Corp.; 408/727-8227. HexiTrace Tree Star; 408/371-8343; fax 408/371-8343. FuntMonger Ares Software Corp.; 415/578-9090; fax

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512/499-0888.

Mag-Not TYV; 415/961-1117. Masquerade Night Diamonds Software; 714/842-2492. MegaGraphics 2008/16" Color Display System; Mega-Graphics; 805/484-3799, 800/487-6342; fax 805/484-5870. MegaGraphics 2008/16" Color Display System (hi-res); Mega-Graphics 2008/19" Display System: MenaGraphics 3008 MegaGraphics; 805/484-3799, 800/487-6342; fax 805/484-5870. Mode32 Connectix Corp.; 800/950-5880; fax 415/324-2958. Multi-Sync 3D NEC Technologies; 508/264-8000, 800/632-4636. M.Y.O.B. Teleware; 201/ 586-2200, 800/322-6962; fax 201/586-2200. NumberMaze Decimals & Fractions Great Wave Software; 408/438-1990; fax 408/438-7171. Natmeg 19C Nutmeg Systems; 203/966-3226, 800/777-8439; fax 203/966-7972. Consis 5 Blyth Software; 415/571-0222, 800/843-8615. Optima Connectix Corp.; 800/950-5880; fax 415/324-2958. Oracle for the Macintosh Oracle Corp.; 415/506-4176, 800/345-3267. The Oregon Trail MECC; 612/481-3500. Panerama ProVue Development Corp.; 714/892-8199; fax 714/893-4899. PassProof Kensington Microware; 415/572-2700, 800/535-4242; fax 415/572-9675.

(continues)

#### PCPC II 19" Display System

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PC Scan 3000 Dest Corp.; 408/436-2700.

PC-VCR NEC Technologies: 508/264-8000. 800/632-4636

Pentax IQ Scan Pentax: 303/460-1600; fax 303/460-1628.

Personal Scan 200 Dest Corp.; 408/436-2700.

Phovos 600GS Prime Option: 213/618-0274. 800/282-9877; fax 213/618-1982

PLI CO-ROM PLI; 415/657-

2211, 800/288-8754. ProView/8 Mirror

Technologies; 612/633-4450, 800/654-5294; fax 612/633-3136.

PSI Omega Rip Screen USA; 708/870-1960.

Publish-It Easy Timeworks: 708/559-1300; fax 708/559-1399.

QuarkXPress Quark; 303/

934-2211, 800/356-9363; fax 303/377-6327.

QuickDex Casady & Greene; 408/484-9228, 800/359-4920: fax 408/484-9218.

QuickImage 24 Mass Microsystems; 408/522-1200, 800/522-7979; fax 408/733-5499.

QuickView E-Machines; 503/646-6699, 800/344-7274; fax 503/641-0946.

**Radius Color Display** Radius; 408/434-1010, 800/227-2795; fax

408/434-0127. Radius Color Display/21 Radius; 408/434-1010,

800/227-2795; fax 408/434-0127. RasterOps 8LC System

RasterOps Corp.; 408/562-4200, 800/468-7600; fax 408/562-4065.

RasterOps 8XLi System

RasterOps Corp.; 408/562-4200, 800/468-7600; fax 408/562-4065.

Scan 300/GS Abaton, a

Subsidiary of Everex Systems: 415/683-2226, 800/444-5321; fax

415/683-2151. Scan 300/S Abaton, a Subsidiary of Everex Systems; 415/683-2226, 800/444-5321: fax 415/683-2151.

ScanMaker 600GS

Microtek; 213/321-2121, 800/654-4160; fax 213/538-1193

ScanMaker 600ZS

Microtek; 213/321-2121, 800/654-4160; fax 213/538-1193

ScriptMaster Linotype-Hell Company; 516/434-2000, 800/842-9721.

Silverscanner La Cie; 503/ 691-0771, 800/999-0143. SmarTwo Scitex America Corp.; 617/275-5150, 800/858-0489; fax 617/275-3430.

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SuperMac Technology; 408/245-2202; fax 408/735-7250.

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StudioLink Du Pont Printing and Publishing; 800/955-6555.

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Thunderware: 415/254-6581, 800/628-0693; fax 415/254-3047.

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TonDown Kaetron Software Corp.; 713/890-3434.

TypeStyler Brøderbund Software; 415/492-3200, 800/521-6263.

17-3 Truvel, Division of Vidar Systems Corp.; 703/742-9500; fax

703/471-1165.

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Corp.; 617/275-5150, 800/858-0489: fax 617/275-3430.

Wagon Train 1848 MECC: 612/481-3500. M

Public domain software. freeware, and shareware are available through online information services; user groups (call 800/538-9696 ext. 500 for information on a local user group); or mail-order clearinghouses such as EDUCORP (800/843-9497, 619/536-9999) or the Public Domain Exchange (800/331-8125, 408/496-0624 in California).



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PI I SSP Cart	5	13

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Turbo BallS	12
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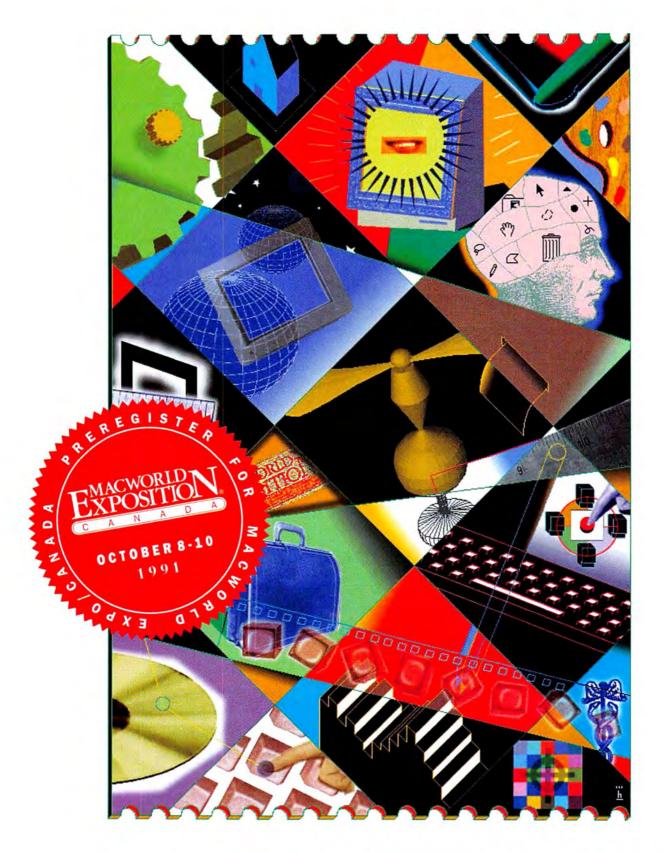
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Demonstrations and insightful
discussions on the features and fine
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report of the

opportunities and

obstacles 7.0 is creating.

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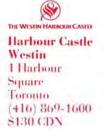
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Registration forms received after September 6 13 will be returned. No purchase orders accepted. Registration fees are nonrefundable.

U.S. and Canadian Attendees

Your badge will be mailed to you on or about September 20. Check box indicating where badge should be sent. All other



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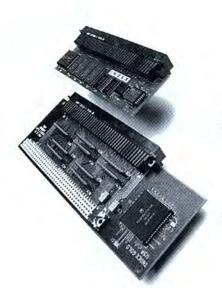
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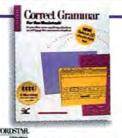
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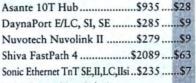


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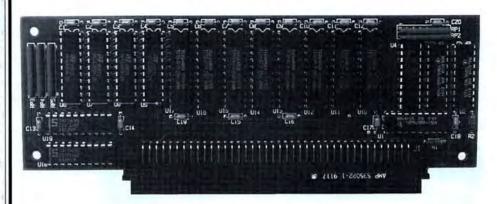
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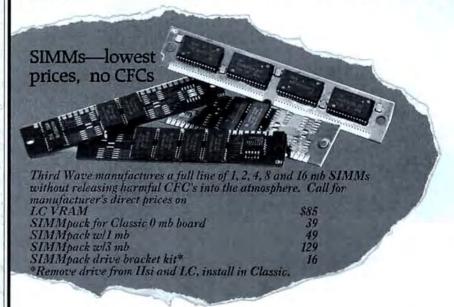


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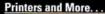
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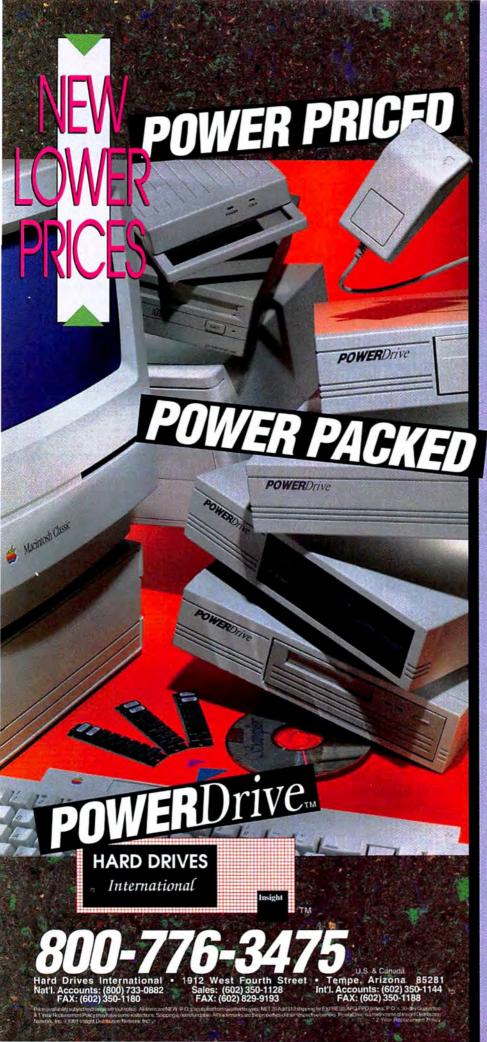
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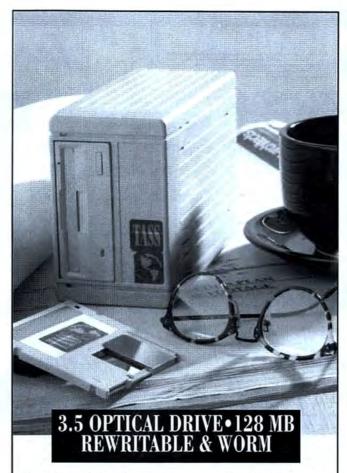
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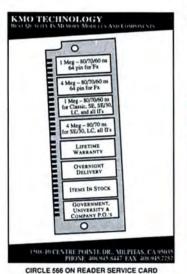
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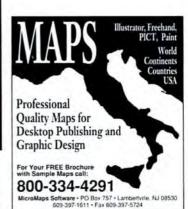
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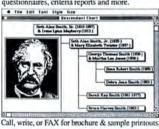
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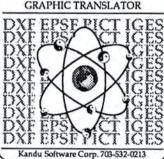
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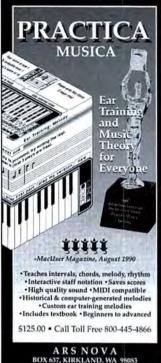
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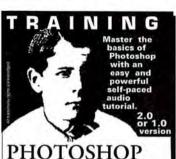
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64	4	5	Aldus PageMaker Aldus Corporation
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2 18	3 5	1 2	EDUCATION SOFTWARE  Kid Pix Brøderbund Software Where in the USA Is Carmen Sandiego? Brøderbund Software Reader Rabbit The Learning Company
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1	-	4	DataClub International Business Software

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Months on chart	Last month	This month	
•	Y	•	MASS STORAGE*
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			ADD-IN BOARDS
12 1 6 1 13	2 3 - 5	1 2 3 4 5	Pivot Radius FastCache Ilci DayStar Digital Macintosh Ilsi NuBus Adapter Card Apple Computer Apple Ile Card for Macintosh LC Apple Computer Radius TPD Interface Radius
18	1	1	UTILITY SOFTWARE SAM II Symantec Corporation
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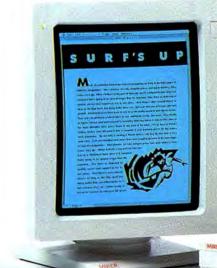
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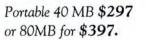
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Keyboard Slideaway with Macintosh IIci.

# SPACE THAT WORKS

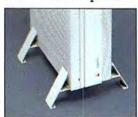
You're tripping over your keyboard. Your CPU needs its own desk. Your monitor is too low. That report you're working on has vanished. Paper is everywhere.

But don't give up.

What you need is some help from Kensington.
Increase valuable desk space with our new
Keyboard Shelf for the compact Mac, or with
Keyboard Slideaway® for the Mac II.

Both do more than just get your keyboard out of the way.

Keyboard Shelf's recessed storage compartent is ideal for holding pens, disks and other desk items. And Keyboard Slideaway extends a narrow desktop into a wider workspace.



Another way to increase your workspace is our sturdy Mac II stand. The perfect addition for anyone who wants to get their CPU off their desk and onto the floor.

For the compact Mac, there's Maccessories® Tilt/Swivel. With it, you can rotate your Mac up

to 100° and tilt up to 16° for just the right viewing position. And unlike other tilt/swivels, we've combined heavy duty plastic and



high density polyethylene for an ultrasmooth movement.

What's more, Kensington's products fit right in with the design of your Mac. The styling is complementary. The colors identical. Even the same materials are used.

Kensington.

Because you can't work efficiently if your space doesn't work.

For a free brochure and the dealer nearest you, call 800-535-4242, OR 415-572-2700.

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