62 NEW PRODUCTS: PAGE 193 • 22 PRODUCT REVIEWS: PAGE 148

MACWORLD

The Macintosh® Magazine June 1989 $3.95 Canada $4.95

The Mac in Film, Video, Animation

How Hollywood Works with the Macintosh Pages 108 & 116

Clues to Buying a Database: Seven Products Compared

Database Showdown: Three Top Contenders

Making IBM Work for Your Mac

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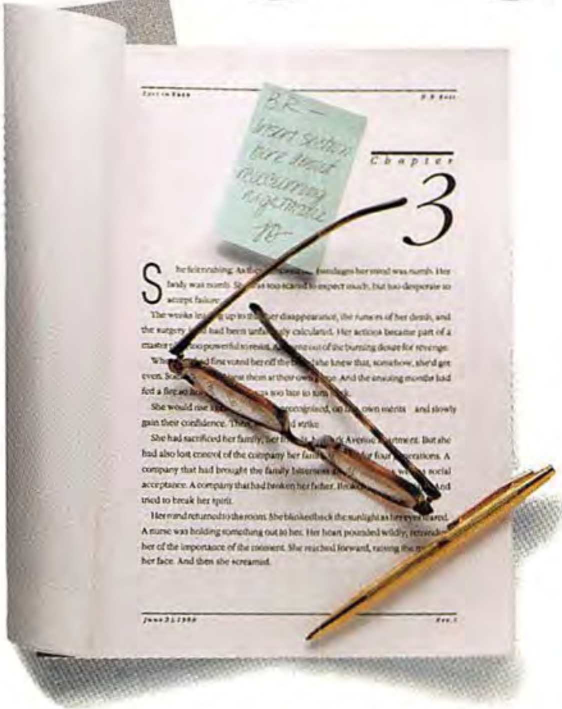

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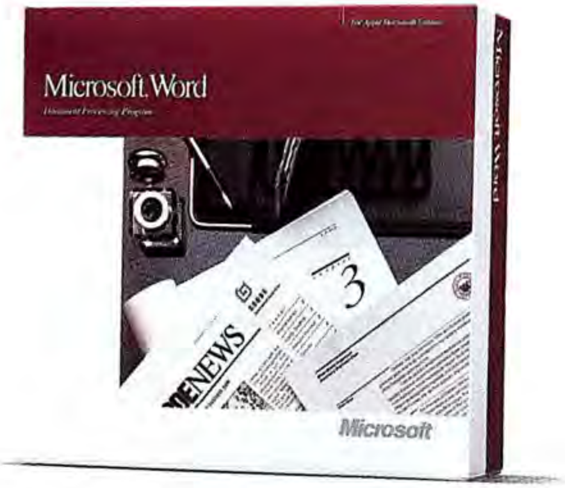

The expression that you can't please all of the people all of the time just got redefined.

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

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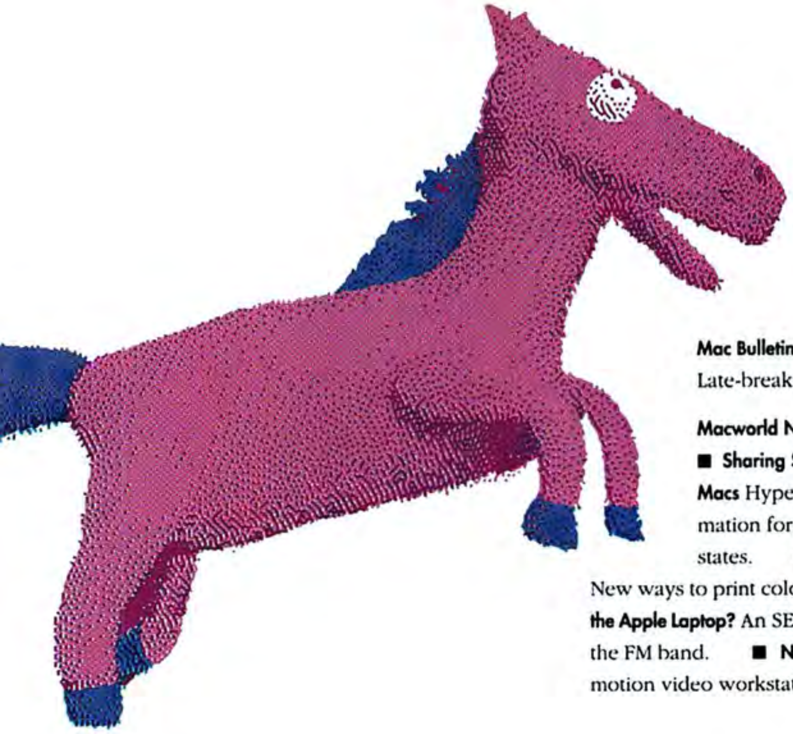
MACWORLD

The Macintosh® Magazine June 1989

Realistic-looking images, like this camera and these frames from Tin Toy, the Oscar-winning animated short, can now be done on a Mac (see Art Beat, p. 39). To learn more about Macintosh animation, turn to p. 108. To find out how the Mac is becoming a star in the film industry, see p. 116.

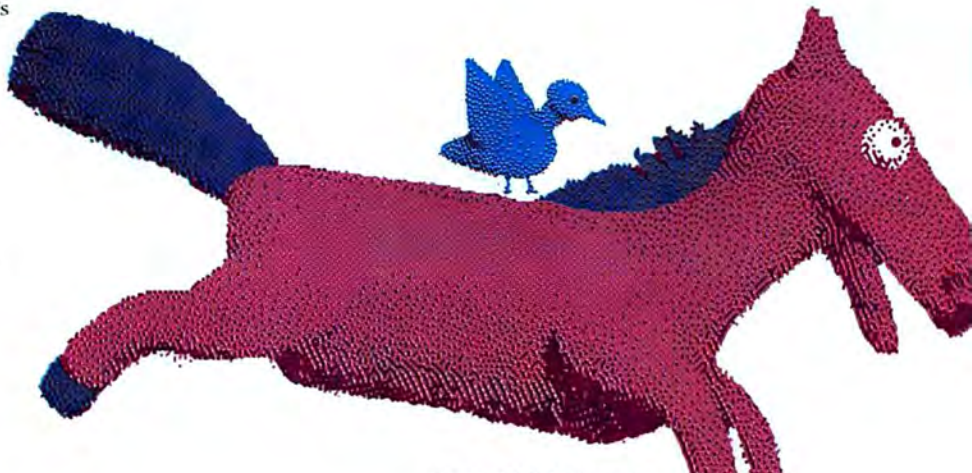
DEPARTMENTS



NEWS

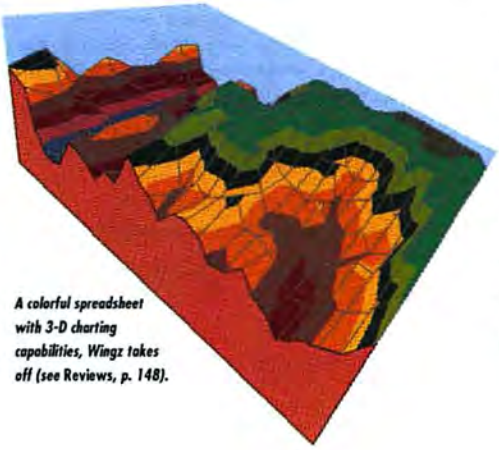
We put Panorama, File, and FileMaker through their paces. To find out which is the winning database, see p. 133.

FEATURES



The animated Macintosh—you can make graphics come to life with a wide range of animation software, p. 108.

REVIEWS



A colorful spreadsheet with 3-D charting capabilities, Wingz takes off (see Reviews, p. 148).

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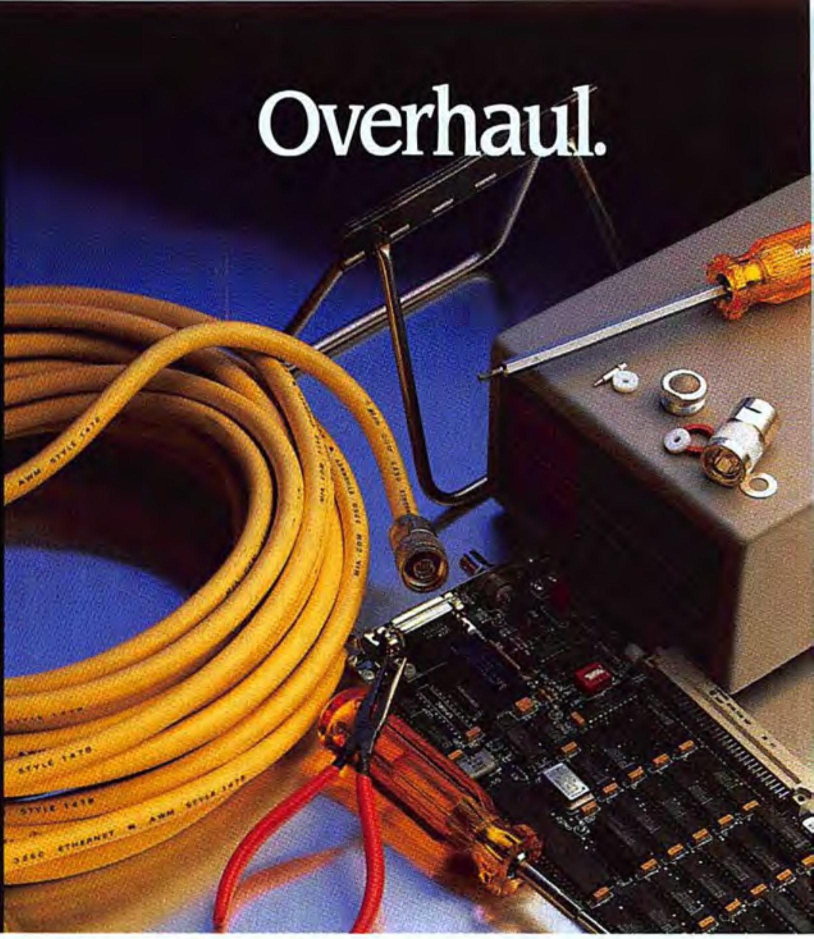
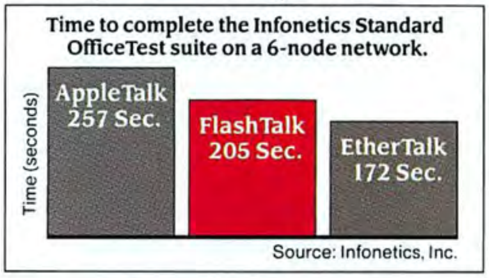
Publisher's statement can be found on page 10.



How to give Ethernet a run for the money.

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



Source: Infonetics, Inc.

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

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

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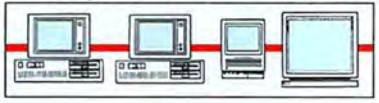

Actual performance of your network may vary depending on the quality and length of network cable, network size and configuration. To achieve best performance, you should connect a FlashBox to each Macintosh. Using FlashBox with bridges, gateways, or other AppleTalk-only devices may require network reconfiguration or the addition of repeating devices.
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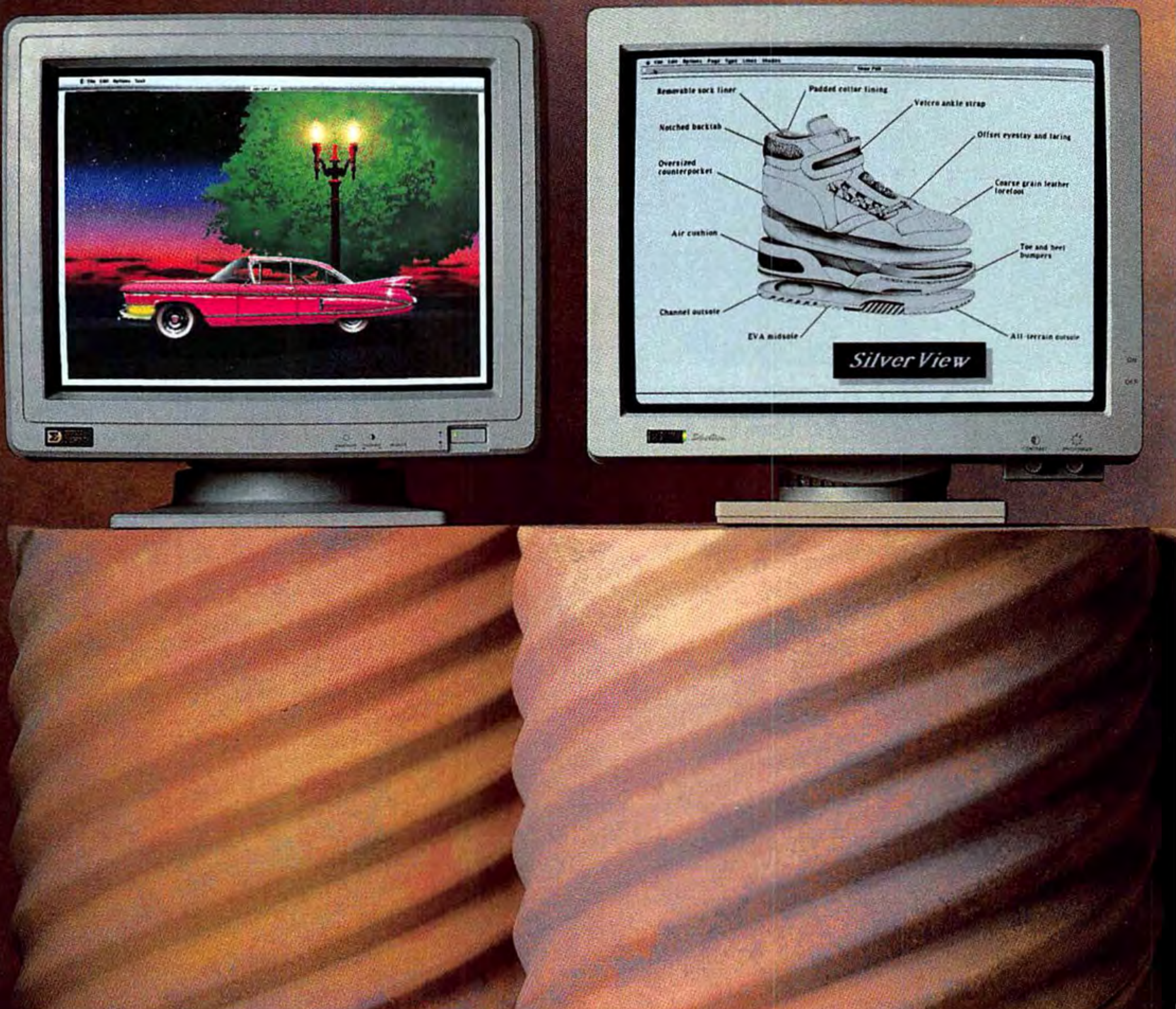

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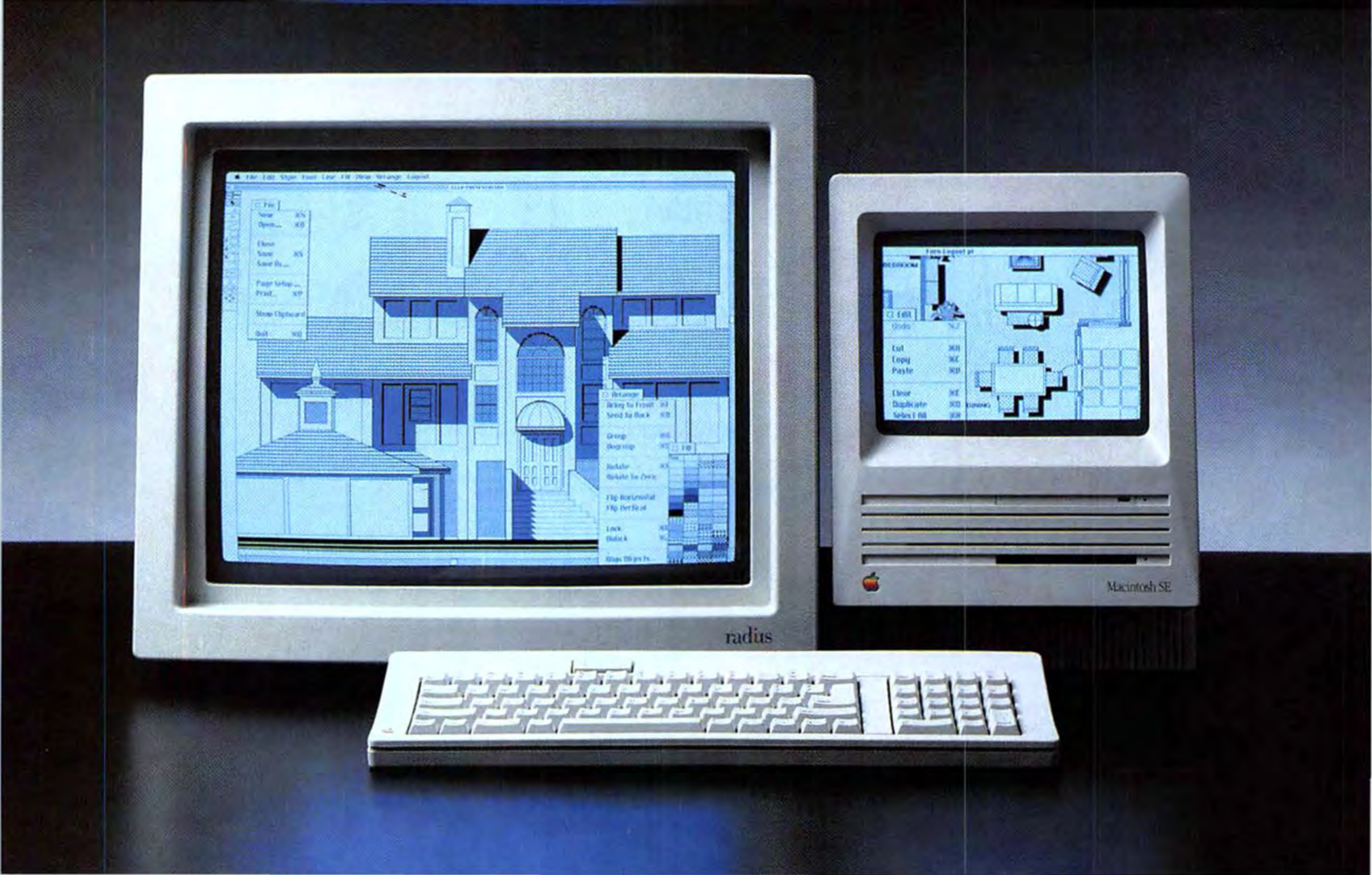
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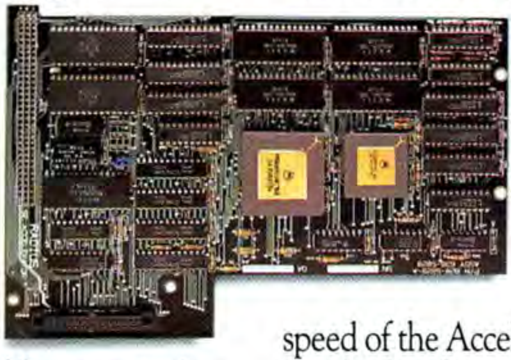

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Circle 21 on reader service card

MAC BULLETIN

INDUSTRY NOTES

Hard-Driving Lawsuits

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

Novell to Acquire Excelan

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

Networkers Collaborate

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

Microsoft Profits Down?

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

Ashton-Tate Falls Short

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

Apple Releases Color QuickDraw

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

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

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

Screamer in the Wings—50MHz 68030

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

Apple Wins Round One in Lawsuit

In March, Apple won a crucial pretrial ruling in its lawsuit against Microsoft and Hewlett-Packard to protect the look-and-feel of Apple's Macintosh from imitators. In the ruling, Judge William Schwarzer said Microsoft's 1985 licensing agreement with Apple did not completely cover the products challenged by the suit, notably Microsoft Windows version 2.03. Hewlett-Packard's NewWave operating environment, which functions in conjunction with Windows, employs some concepts strikingly similar to the Macintosh desktop. With the ruling out of the way, lawyers for Microsoft and HP lawyers will challenge Apple's copyrights head on, claiming the Mac look-and-feel deserves no legal protection since its concepts were first developed elsewhere, mainly at Xerox Corporation.

New Excel Version to Address Full 8MB

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

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

Anti-Viral Search and Destroy

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

(continues)

INDUSTRY NOTES

Aldus Posts Record Profit

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

Hughes to Buy Sytek

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

CASE Software Promotes Portability

CodeCheck, a $295 tool just announced for computer-aided software design in all major C languages, analyzes code for maintainability, style, and portability among MS-DOS, OS/2, UNIX, VMS, and Macintosh environments. From Abraxas Software, 503/244-5253.

Power Up Buys FastForms

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

VDT Report

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

Letraset Buys Fred

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

New ImageWriter LQs for Old

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

RasterOps Ships Color Board for SE/30

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

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

New EO Drive

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

Dove Lowers RAM Prices

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

Animation-Development Tool

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

Apple Slashes Prices in UK, Asia

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

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

Canon Adopts PostScript

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

The $19.32 Modem.

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

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

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by Shiva
We're Putting Networks To Work™

OK, we admit you can't buy a NetModem for $19.32. But if you divide the NetModem's $599 list price by 31 Macs on an AppleTalk network – the nominal limit – the cost per Mac is $19.32. Still the best deal around.
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Circle 421 on reader service card

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MacWorld, May 1989

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

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Compare the Value

CAPACITY	SPEED	PRICE
32mb	40ms	$599
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70mb	25ms	$899
84mb	15ms	$1099
110 mb	15ms	$1199
142mb	15ms	$1399
170mb	15ms	$1799
NEW 610mb	15ms	$3199
45R Removable Disk	15ms	$1199

Compare the Specs

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

Removable Cartridge Drive Available Now!

"Of all the drives tested, we recommend... La Cie's Cirrus Drive."
MacUser, March 1989

CIRRUS DRIVES: Compare the Features

Complete the "other" column to see if any other drive measures up.

	CIRRUS	OTHER
Drives require no initialization to start-up.	☑	☐
Hardware and software auto-park feature.	☑	☐
Software maps out bad sectors on hard disk.	☑	☐
Share volumes over LocalTalk or modem.	☑	☐
Software supports hard and soft volumes.	☑	☐
Share most serial devices over LocalTalk.	☑	☐
Change volume size without reinitializing.	☑	☐
Create file volumes on a fragmented disk.	☑	☐
Software compacts & defragmentizes files.	☑	☐
Software includes read, write & seek tests.	☑	☐
Software selection of the interleave factor.	☑	☐
Password protect and write-lock volumes.	☑	☐
Link up to 7 drives into one large volume.	☑	☐
Volumes support UNIX and other systems.	☑	☐
Drive compatible with accelerated systems.	☑	☐
6 SCSI driver choices for best performance.	☑	☐
Auto testing to determine best SCSI driver.	☑	☐
Drive won Industrial Design Review award.	☑	☐
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Circle 145 on reader service card

The Macintosh Way

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

by Jerry Borrell

The inside story is that Bill Campbell had to promise Ashton-Tate $500,000 in co-marketing funds to finish dBASE Mac. When Ashton-Tate finally shipped, a year later than promised to Apple, it still had the gall to demand the $500,000. Apple eventually settled the matter by giving Ashton-Tate some Macintosh II's. dBASE Mac was the best database money could buy.
—Guy Kawasaki, *The Macintosh Way*

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

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

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

ROBERT HOLMGREN

Quotations from chairman Guy

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

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

The concerns of small software developers about larger software companies are also expressed in Kawasaki's book. Big companies design software by committee. They do not innovate, they make decisions based on spreadsheet analysis, they acquire technology rather than develop new products, they move slowly, they have long-term corporate goals in sight (or, alternatively, they have quarterly financial goals in sight), and they absorb Apple resources that might be dedicated

(continues)

more usefully to small, innovative developers. Here is Kawasaki again, on the all-important process by which Apple decides whom to seed with prototype equipment. According to Kawasaki, the first developers to get the prototypes are "the companies that don't matter. Unfortunately, some prototypes go to the big-name MS-DOS companies because Apple thinks that they give Macintosh credibility. These units are wasted. Pearls before swine. All booster, no payload. Fortunately, these companies can be counted on one hand."

Baby boomers are now attuned to the rules of business. Who is going to make the next strategic product?

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

"The only company that came close to successfully threatening Apple is Microsoft," writes Kawasaki. "In 1986 Bill Gates told Apple that he would consider stopping Macintosh development if Apple pursued a copyright infringement suit against Microsoft.[1] Apple backed down because of the importance of Word and Excel to Macintosh. Temporarily, anyway. There is no doubt that Bill Gates can produce testosterone, and that's another reason that Microsoft is such a great company."

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

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

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

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

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

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

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

"The Macintosh Way" indirectly has a great deal to do with preserving the spirit of the Mac environment

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

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

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

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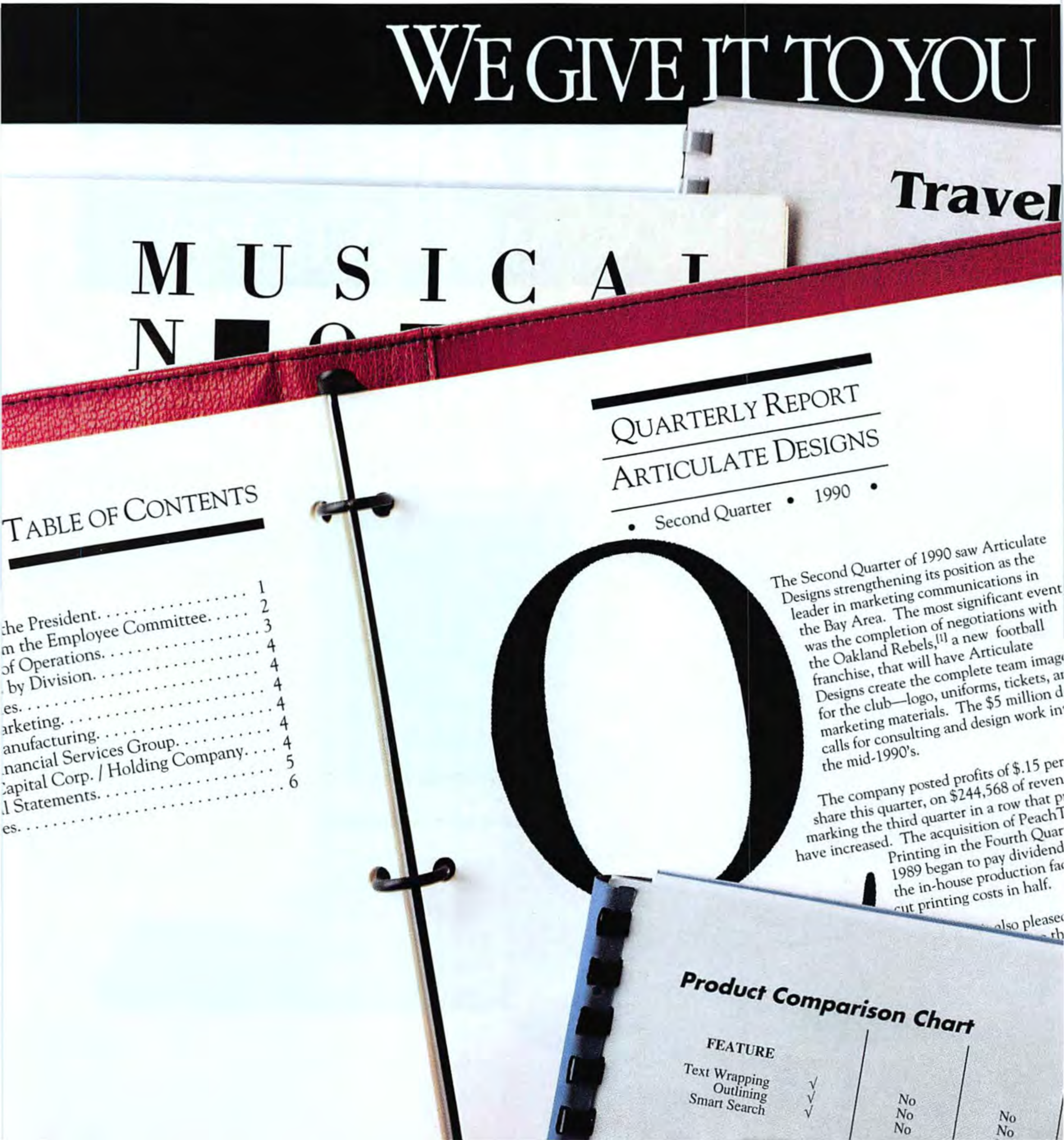
[1] ***Kawasaki uses footnotes throughout his text as a place for his choicest remarks. This one: "A copyright infringement suit is a way to create confusion in a marketplace until your engineering staff can get its act together."***

EVERYONE PROMISES TO TAKE FULL ADVANTAGE OF THE NEW MACINTOSH...



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QUARTERLY REPORT
ARTICULATE DESIGNS
• Second Quarter • 1990 •

The Second Quarter of 1990 saw Articulate Designs strengthening its position as the leader in marketing communications in the Bay Area. The most significant event was the completion of negotiations with the Oakland Rebels,[1] a new football franchise, that will have Articulate Designs create the complete team imag for the club—logo, uniforms, tickets, ar marketing materials. The $5 million d calls for consulting and design work in the mid-1990's.

The company posted profits of $.15 per share this quarter, on $244,568 of reven marking the third quarter in a row that p have increased. The acquisition of PeachT Printing in the Fourth Quar 1989 began to pay dividend the in-house production fa cut printing costs in half.

also please

Product Comparison Chart

FEATURE			
Text Wrapping	√	No	No
Outlining	√	No	No
Smart Search	√	No	No

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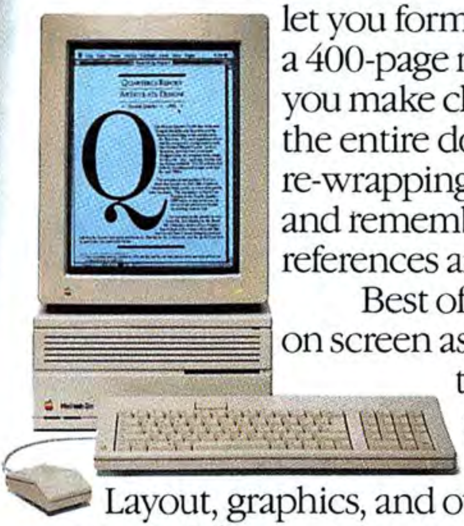

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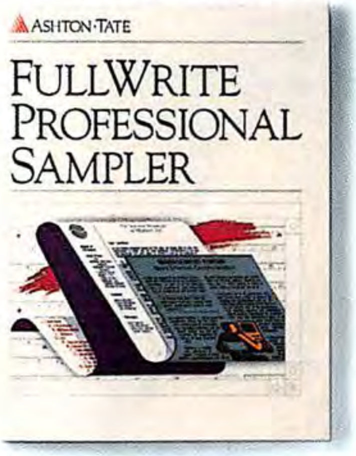

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WITH THE NUMBERS TO

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THE MEDINA GROUP
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As you can see by the accompanying chart, the introduction of our patented Hydraulic Valve System (design for middle- an tractors)
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Close-Up on Government Spending
1989 Outlays: $1,023 Billion
Defense
Entitlements
Services
Net Interest
15.6%
32.6%
3.9%
47.9%
Entitlements have become increasingly burdensome as a percentage of total government outlays. As a result, funds for social services have been reduced.
1985 Outlays: $946 Billion
28.2%
13.7%
18.7%
Finance
Annual Deficit
Addenda GNP
195.6
210.2
230.7
245.7
269.4
332.3
-2.8
-23.1
-23.4
-14.9
-6.2
-53.2
-73.7
-53.6
990.5
1057.1
1151.2
1285.5
1417.0
1523.5
1699.6
1935.8
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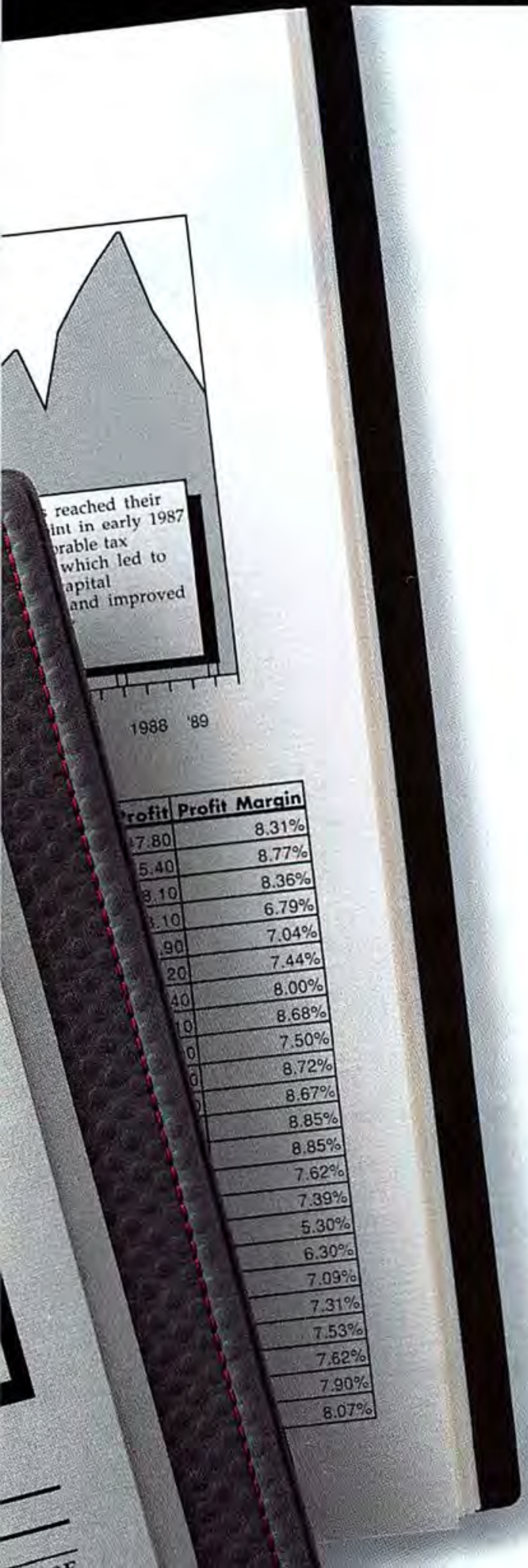

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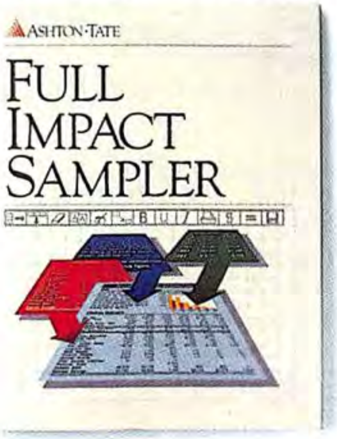

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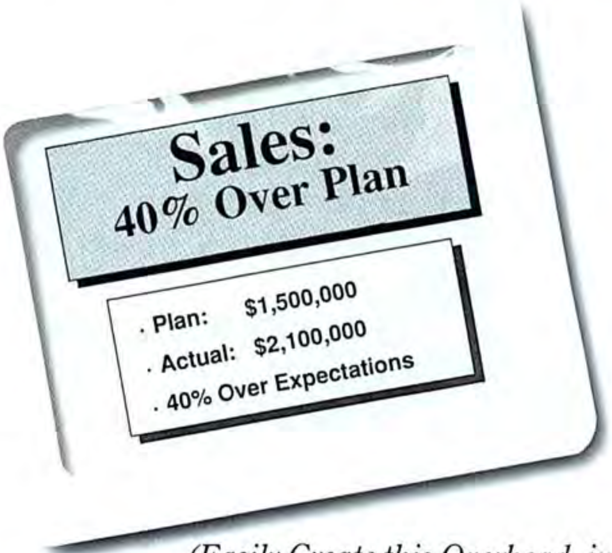

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LETTERS

A Forum for Macworld *Readers*

JOHN HERSEY

FreeHand Fights Back

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

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

Peter P. Beach
Newburyport, Massachusetts

An Unfair Match

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

Chris Hyatt
Pittsburgh, Pennsylvania

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

The Economics of Apple's Price Hike

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

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

(continues)

Corrections

A production error necessitates several corrections in the "Vital Statistics" table ("Picturing Statistics," April 1989). StatView SE+Graphics ($399.95), StatView II ($495), and StatView 512+ offer the following tests: Friedman, Wald-Wolfowitz, Mann-Whitney U, Kolmogorov-Smirnov, Wilcoxon signed-rank, Kruskal-Wallis, Sheffé, Pearson, and moving average; they do not offer McNemar and Cochran Q tests. Exstatix offers Friedman, McNemar, and Cochran Q, but not Wald-Wolfowitz. Data Desk Professional does not offer Wald-Wolfowitz, Mann-Whitney U, Kolmogorov-Smirnov, Wilcoxon signed-rank, or Kruskal-Wallis tests.

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

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

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

*DPI offers a $269 upgrade for the SE, not the Mac Plus (*Commentary, *April 1989).*

price down with them. When Bunnell says that supply and demand works for ordinary companies, but not for Apple, he's wrong.

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

Bradford Cornell
Los Angeles, California

Betrayed by Apple

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

Jeff Widmer
Delaware Water Gap,
Pennsylvania

It Can't Be That Fast

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

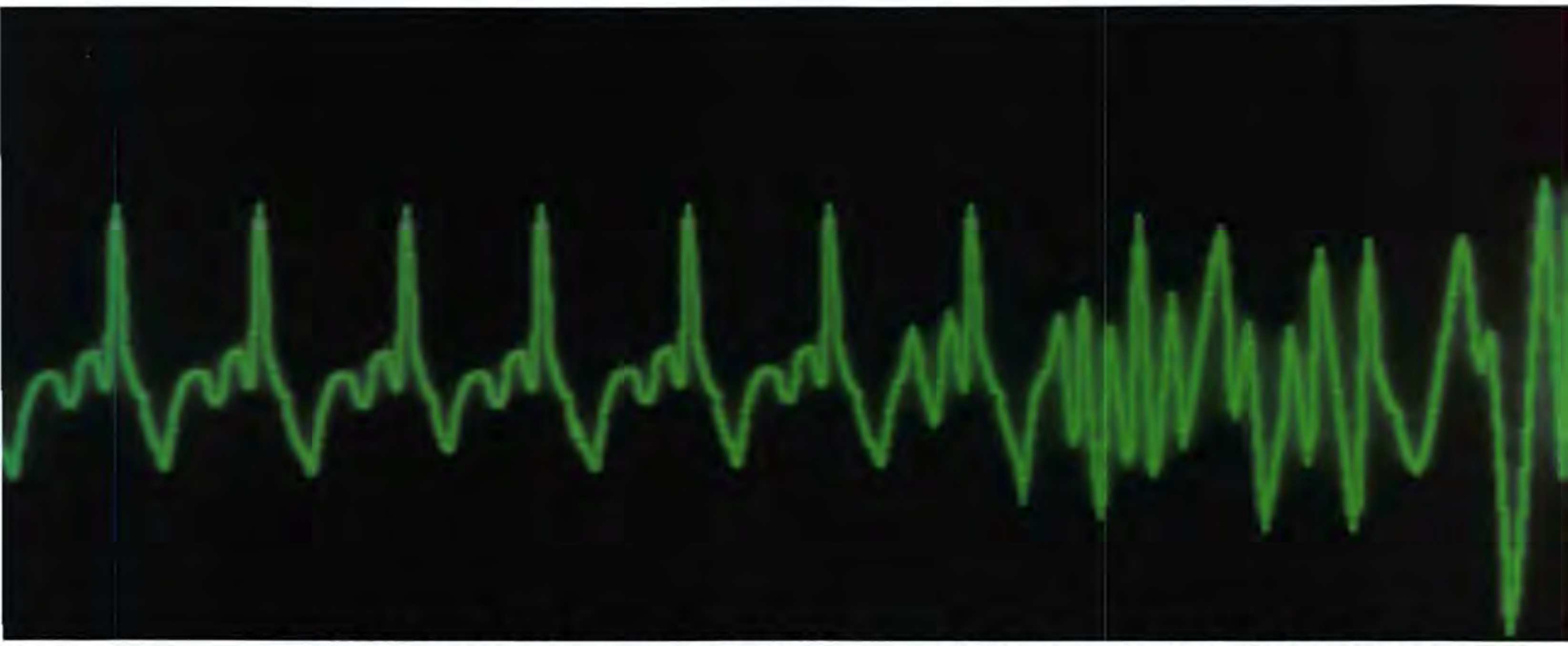
Nicholas Bodley
Wellesley Hills, Massachusetts

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

A Different Vision of Color Separation

I work with Scitex America's Mac-based design system, Visionary, and I've been listening to the concerns of designers for the last eight months. Most designers have little or no desire to learn the finer points of prepress production. They don't think in CMYK; they think in Pantone. I can see hosts of commercial printers tearing their hair out as they start getting separations from people who have read Steve Roth's article, "Color Separation Explained" [February 1989], and now "know all they need to know" about prepress. What designers want is a way to create fast, multiple iterations of their color pages that they can output to high resolution films. They want more control over the finished product, but they don't want to take responsibility for the final output. So why not let them do what they do best, and leave the mechanics of the printing process to the printers and the prepress people. They can work hand in hand with designers—if only the designers will let them. And the Mac is the perfect tool to allow this cooperation, if it is recognized for what it is. I love my Mac. But it isn't an Imager, and it never will be.

Laura Wamelink
Scitex America
Bedford, Massachusetts



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At Macworld we frequently separate Mac graphics on a Linotronic. Our designers love the short turnaround time; our production department takes the "responsibility"—just like they used to. And color correspondence is good. The point is, Mac separations are the only way most people can separate Macintosh graphics. Most of your comments apply to the separation of color photographs, which—as the article points out—is a new and perilous technology—Ed.

Dot versus Line Resolution

In Bruce Webster's review of the Apple Scanner [*Reviews*, February 1989], he says, "The top resolution is 300 dpi—fine if you're using a LaserWriter, but not so fine if your destination is a 600 (or 1200) dpi typesetting system." *Macworld* has performed a valuable service in imparting the sometimes painful lesson that printer dot resolution is not the same as halftone line resolution. You can't get 300-dpi line resolution on a LaserWriter (53 is the default), nor even on a Linotronic. Webster may know the difference, but his comments are misleading at best, as they seem to imply a line resolution of 300 for halftones.

Cleve Callison
Winston-Salem, North Carolina

Conflict of Interest?

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

Denis Winter
Conway, Arkansas

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

An Oval Peg in a Round Hole

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

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

Philip Van Cleave
Virginia Systems
Midlothian, Virginia

Shareware Has Its Price

In your February 1989 issue ["Beyond Word Processing"], a table lists software, publisher, and price. The shareware program F1F4 has no price listed, furthering the false impression that shareware is free. If it's free, it's public domain; if it's shareware, then pay fair. So what's the price?

Tony Vazquez
Brooklyn, New York

(continues)

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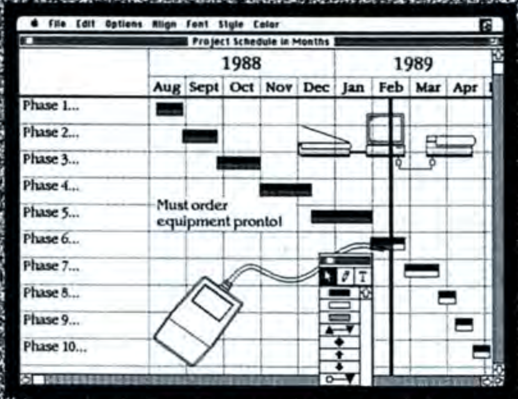
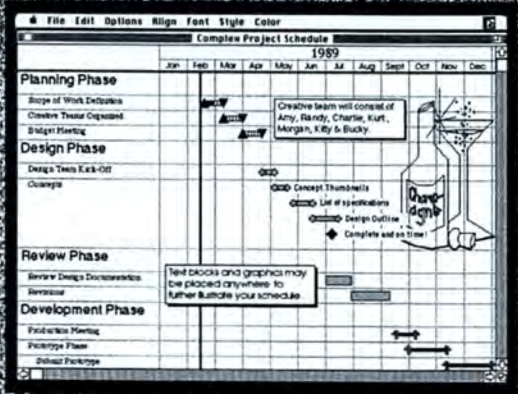
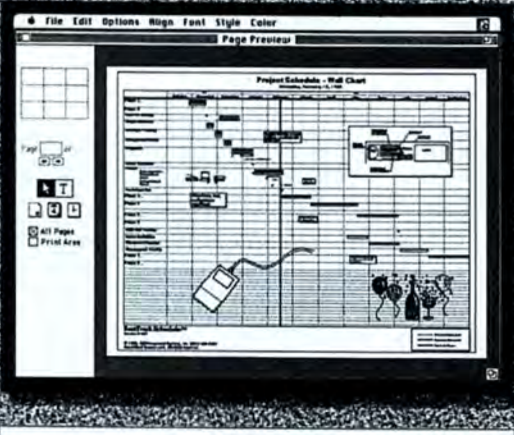

File Edit Options Align Font Style Color
Project Schedule in Months
1988
1989
Aug Sept Oct Nov Dec Jan Feb Mar Apr
Phase 1...
Phase 2...
Phase 3...
Phase 4...
Phase 5...
Phase 6...
Phase 7...
Phase 8...
Phase 9...
Phase 10...
Must order equipment pronto!


File Edit Options Align Font Style Color
Complex Project Schedule
1989
Planning Phase
Design Phase
Review Phase
Development Phase
Creative team will consist of Amy, Randy, Charlie, Kurt, Morgan, Kitty & Bucky.
Text blocks and graphics may be placed anywhere to further illustrate your schedule.


File Edit Options Align Font Style Color
Page Preview
Project Schedule - Wall Chart

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F1F4 contains no documentation or dialog box that asks for payment. We should have listed it as freeware.—Ed.

Not a Grammar Checker

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

Susan Osberg
Lexpertise
Salt Lake City, Utah

Give Me MacMoney

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

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

Frances Cherman
Santa Cruz, California

Mac-sumizing and Minimizing

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

Charles D. Eckerson
Raleigh, North Carolina

MacDraw II Update

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

(continues)

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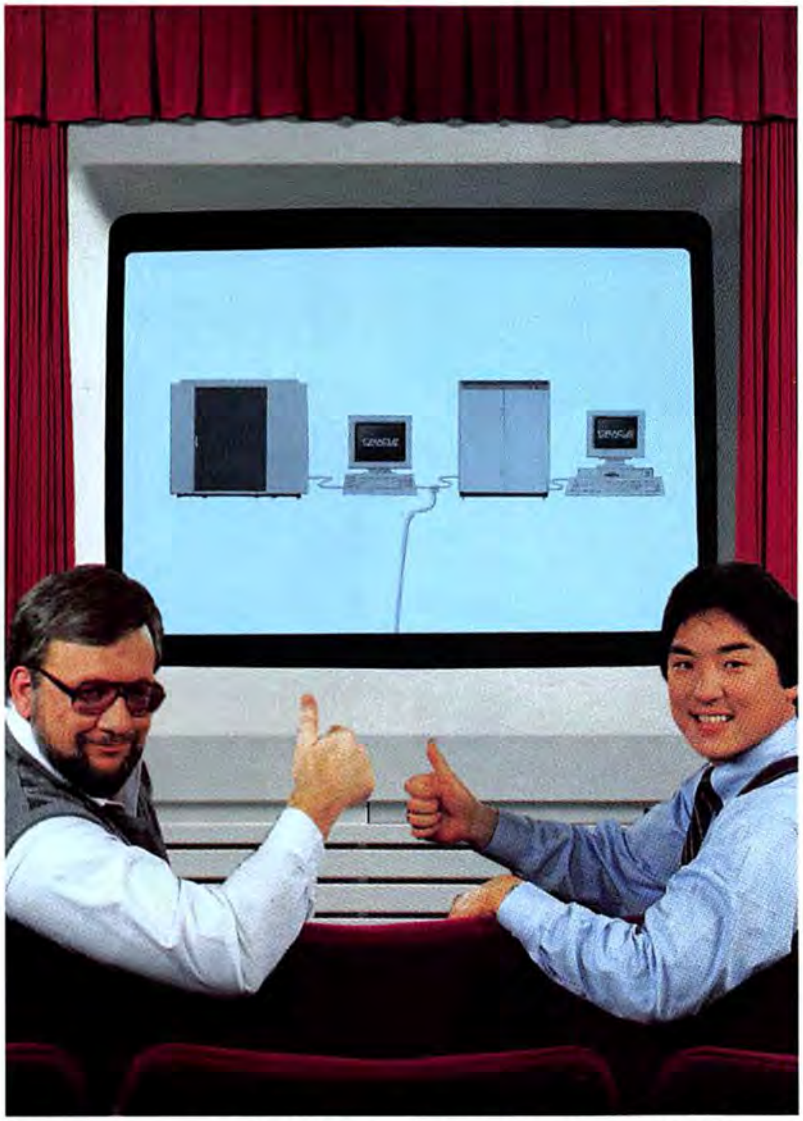

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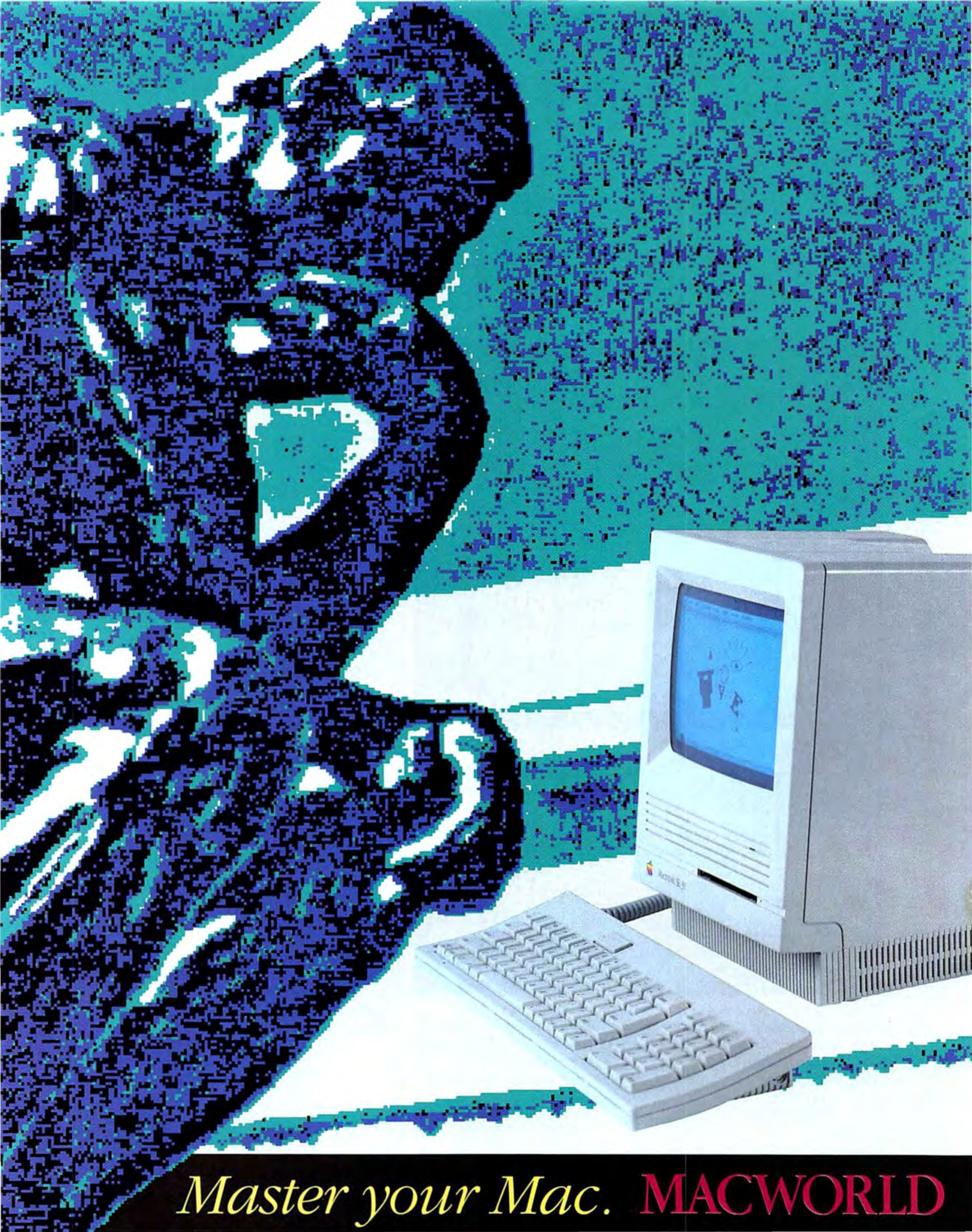
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MacDraw II graphics.
Donald Fucci
Athens, Ohio

According to Steve Pollock, MacDraw product manager, the LaserWriter IISC printer driver provides different internal options, including a highest-quality option (which does not allow the user to set certain Page Setup options) and a default quality option. Due to many user requests to select these options, MacDraw II 1.0v4 uses the default quality option. Claris is considering making this user-selectable in the future.—Ed.

Getting the Fax Straight

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

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

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

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

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

APDA Updates

We appreciate *Macworld*'s coverage of changes in APDA and other development-oriented topics (*Macworld News*, April 1989) but would like to clear up a few inaccuracies. C++ is not yet available from APDA, not even in beta form. When it is, it will be posted in AppleLink and the APDAlog. MacApp 2.0 is currently available in beta only. SADE 1.0 is shipping as part of the MPW bundles and is also sold separately for $75. It is not part of the base MPW Development Environment product (though Projector is). APDA's GEnie address is A.DEVELOPER3.
Wendy Tajima
Apple Computer
Cupertino, California

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

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

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A "Stunning" Achievement in Software Engineering

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

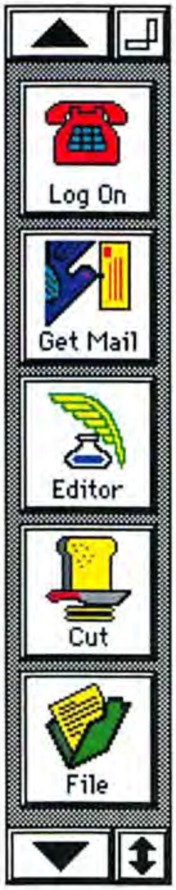
Here are seven reasons why, if you're serious about telecommunications, you should consider owning MicroPhone II:

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

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

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

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



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

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

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Circle 48 on reader service card

The essential Macintosh word processor.

BiPed Ltd
Office Memo

To: Maggie Colby, marketing

From: Dae Rampe, research

What do you think?

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

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

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

File Edit Font Size Style Format Spelling View
CelluShoe New Product Brief
B/I/P/E/D///L/T/D
NEW PRODUCT BRIEF
Page 2

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

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- 300 DPI resolution
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GRAPPLER LS list price: $149

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*Average total selling price. Printer suggested retail $995.00

Until now, Macintosh dot matrix printing has meant only two things: 9 pin, narrow carriage output for about $600, or high quality, wide carriage output for about $1400. The Grappler LQ opens up a world of dot matrix printers for the Mac, at a fraction of the cost. These include popular Epson, Okidata, NEC, Toshiba and Star Micronics models, as well as all compatibles.

Now the choice is yours!

For example, consider the Panasonic 1124 printer. With output at 180 DPI and the ability to run continuous feed or multiple part forms, this sturdy printer will get the job done with crisp and clear efficiency. The Grappler LQ uses a standard Apple printer driver so your printer will act the way your Macintosh expects it to, providing compatibility with hundreds of popular software titles (see Grappler LS above). The Grappler LQ gives you full 180 DPI output and allows you to print both portraits and landscapes (sideways on the page). And the Grappler LQ comes complete with cable, 3 fonts, Apple driver, Installer and a powerful spooler. All you supply is the Macintosh and the printer.

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The Panasonic® 1124 with the Grappler® LQ means

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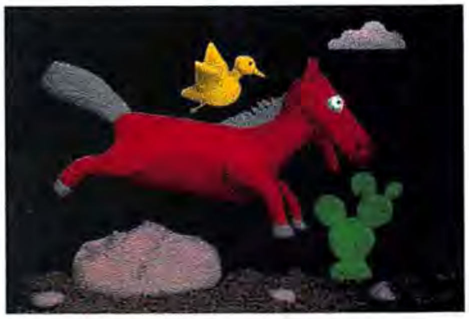
Circle 265 on reader service card

ART BEAT

by Deborah Branscum

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

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



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

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

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

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

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

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ArchiText	179.
Bright Star Technology	
HyperAnimator	99.
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HyperAtlas	64.
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HyperTutor	29.
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Family Matters	28.
Symmetry	
HyperDA	35.

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Tempo II	89.
Berkeley System Design, Inc.	
Stepping Out II	52.
Beyond, Inc.	
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Emerald City Software	
Lasertalk 1.0	187.
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FastBack	54.
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Pyro	15.
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Virex	69.
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GOfer	44.
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Sidekick 2.0	68.
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Exodus Software	
ExpressWrite	65.
Retriever	59.
Preferred Publishers	
DAtabase	75.
Vantage	59.
Solutions	
SmartScrap & The Clipper 2.0	46.
TENpointO	
Open IT!	49.

LANGUAGES

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Manx Software Systems	
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CAPP's Lightspeed C or Pascal	49.
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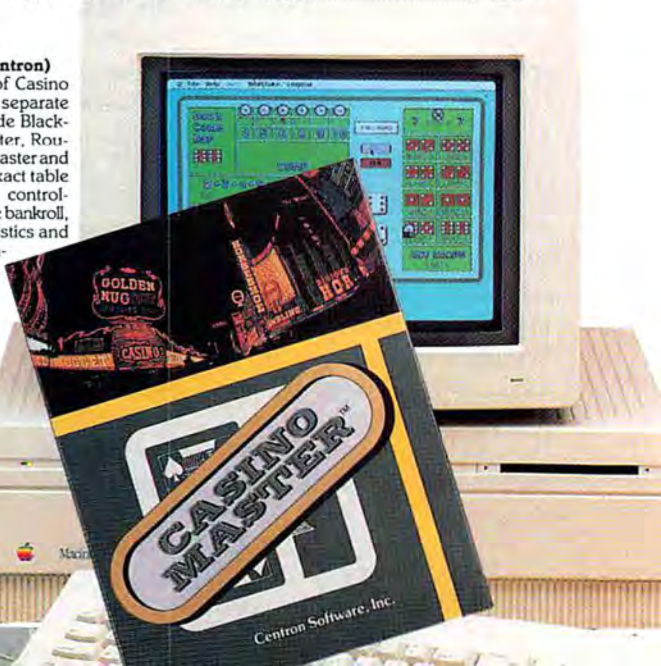

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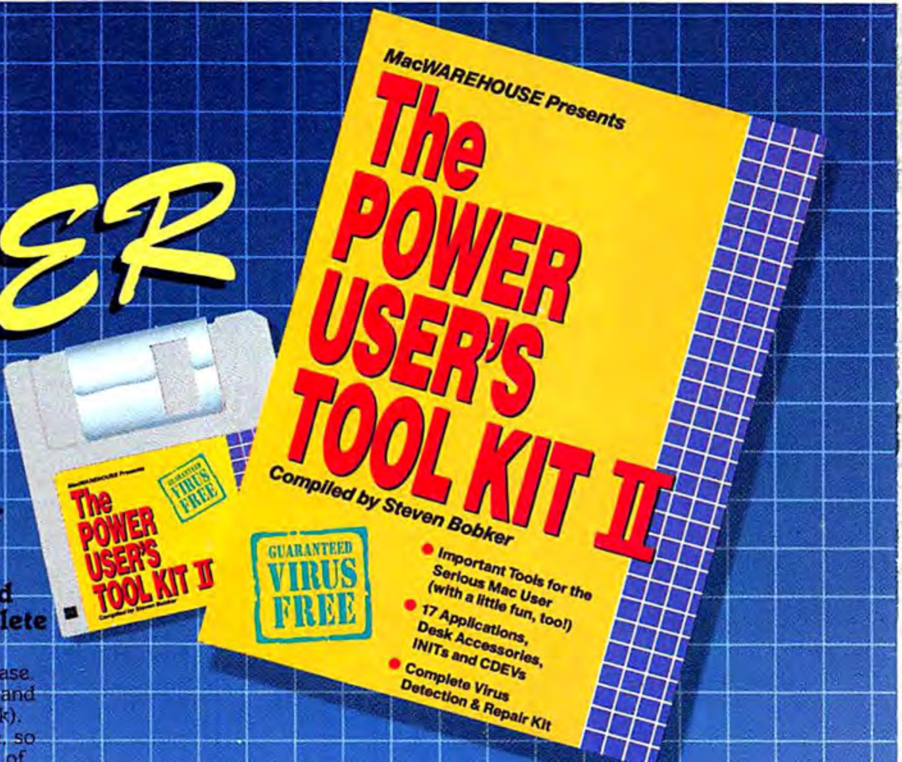
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DTP Advisor	47.
Emerald City Software	
Smart Art I – Text Effects	95.
ICOM Simulations	
MacKern	119.
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Olduvai	
Read-It! 2.0 *(OCR)*	199.
Quark	
Xpress or QuarkStyle	Call.
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Springboard Publisher	109.
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FontSizer	79.

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Fontastic Plus 2.0	52.
KeyMaster	52.
Letraset	
LetraStudio	289.
LetraFonts *(various)*	ea 69.
Olduvai	
ArtFonts Vol.I or 2	55.
Orange Micro	
Alphabits	69.

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ClarisCAD	629.
Generic Software	
Generic CADD Level 1	89.
Graphsoft	
Blueprint	349.
MiniCad Plus	525.
Innovative Data	
MacDraft	145.
Dreams	275.

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Payroll 3.5	99.
Payroll PLUS	159.
TimeMinder	109.
Brown-Wagh Publishing	
MacLedgers	159.
Service Industry Accounting	209.

Trapeze 2.1
(Access Technology)
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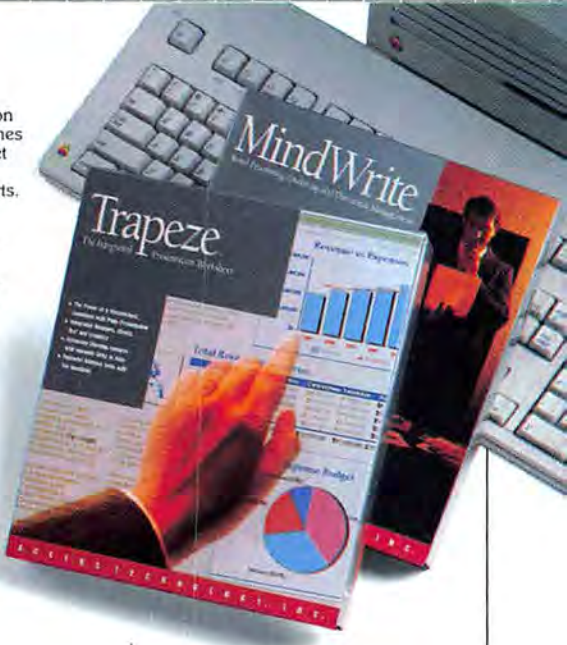
Move freely from outlining to wordprocessing, then polish up your product with the built-in spelling checker and proofreader. Offers a Hide Picture option for faster scrolling. Acta and Pagemaker compatibility. *(word processing)* **$95.**



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(Vertical Solutions)
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Dac-Easy Light	45.
Intuit	
Quicken	33.
MECA	
Managing Your Money	127.
Monogram	
Business Sense	279.
Softview	
MacInTax Federal '88	65.
TaxView Planner	64.
Survivor	
MacMoney 3.02	61.

STATISTICAL ANALYSIS

Abacus Concepts	
StatView II	339.
StatView SE+Graphics	229.
BrainPower	
StatView 512+ *(requires 512k)*	175.
D2 Software	
MacSpin 2.0	189.
Odesta	
Data Desk Professional	289.
Paracomp	
Milo	159.
Select Micro Systems, Inc.	
Exstatix	219.
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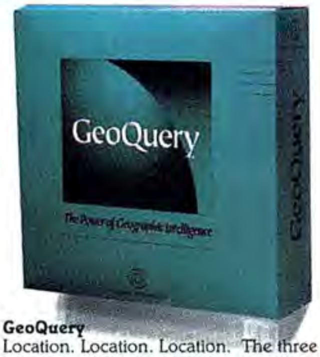

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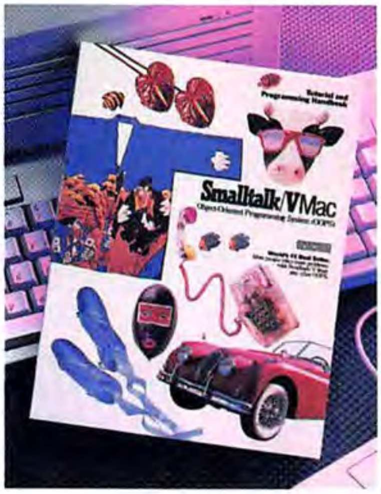

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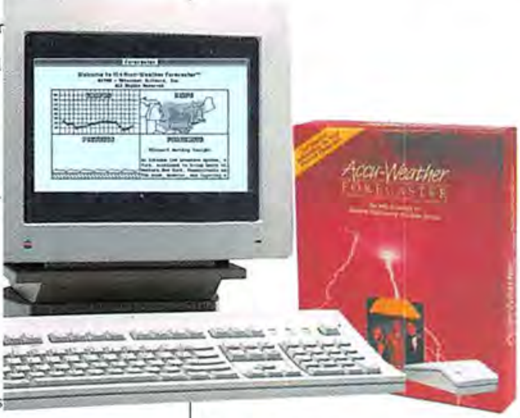

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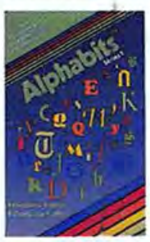

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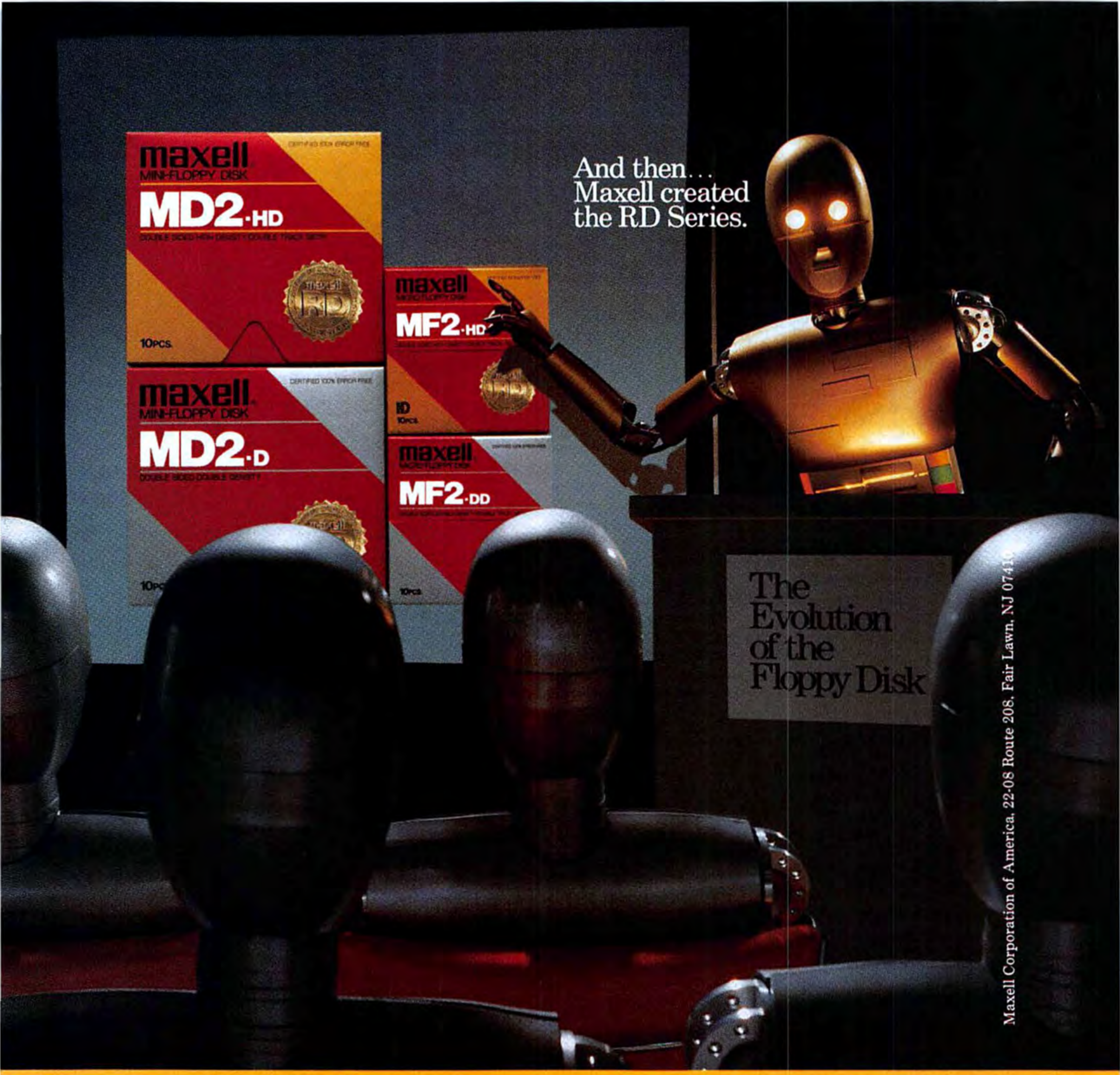

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How ABC Elected HyperCard

The Macintosh was a dark horse before one news producer took charge

by Steven Levy

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

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

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

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

JOYCE RAVID

News producer David Bohrman fell in love with HyperCard and scripted his way to a new job.

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

THE MAGNA CARTEL

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

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

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

(continues)

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

It was one of the more massive uses of HyperCard to date. But what impressed me was not so much its scope or the obvious advantage it gave to ABC over its news-reporting rivals but the meticulous, often delightful attention to detail. There was obviously careful thought given to even the most mundane graphic decisions. At every corner, someone was thinking not only, "How can I speed this information?" but also, "How can I do this in the niftiest possible HyperCard way?" Though the demands of an election year seemed to call for quick-and-dirty stack-writing, it seemed that every one of the 5000-plus cards in the MAGNA system showed a contradictory approach. I sniffed a HyperCard hacker at work, and the fanatic in question was the man sitting across from me.

TALES OF BOHRMAN

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

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

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

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

Getting his employers to accept the idea was not so simple. To the cheerless folks in ABC's MIS division, a personal computer was an IBM PC clone supplementing the mainframe. Even *that* was radical, and people were encouraged to do their writing on mainframes. As a result, ABC News had a computer system

(continues)

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Jonathan Sacks, InfoWorld, April 1988

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Steve Mann, Macintosh Today August 11, 1987

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David Brandt, MacWEEK, January 19, 1988

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Jan L. Harrington, MacUser, November 1987

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Adam Green, Macworld, July 1987

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Andrew Gore, The Macintosh Buyer's Guide, Spring 1988

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

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

SOUND BYTES

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

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

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

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

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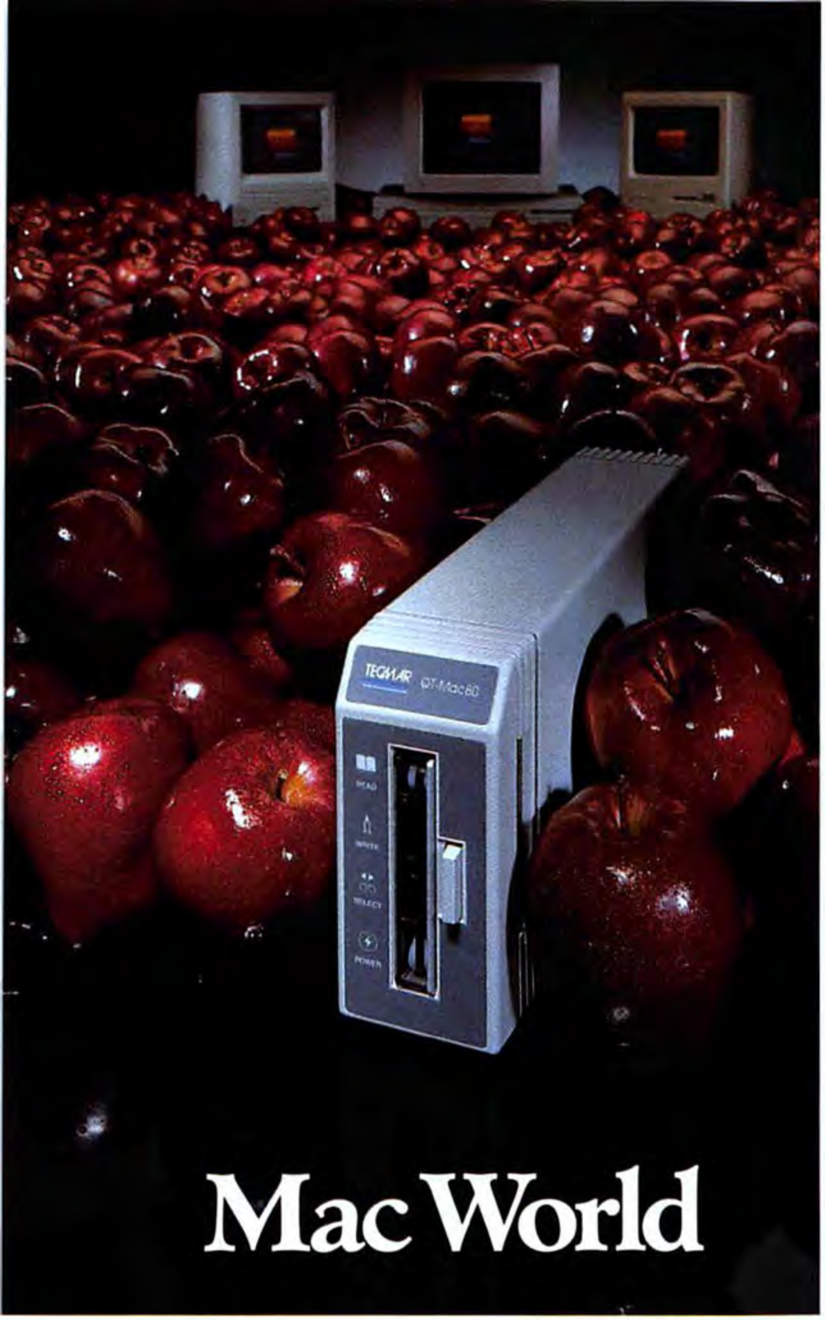

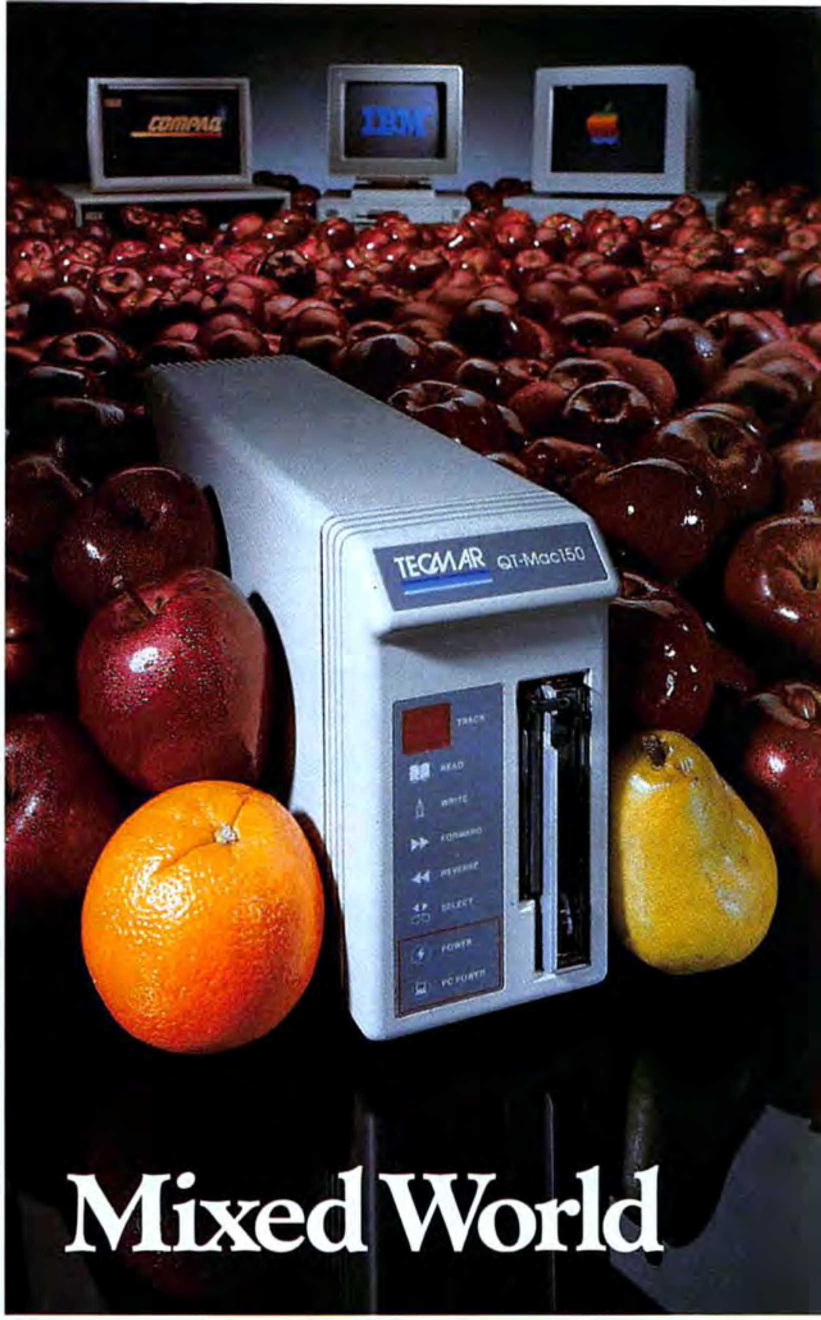

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Circle 321 on reader service card

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

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

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

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

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

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

Sure, Dave. ■

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

"I can't imagine working without it anymore." Steve Bobker, MacUser

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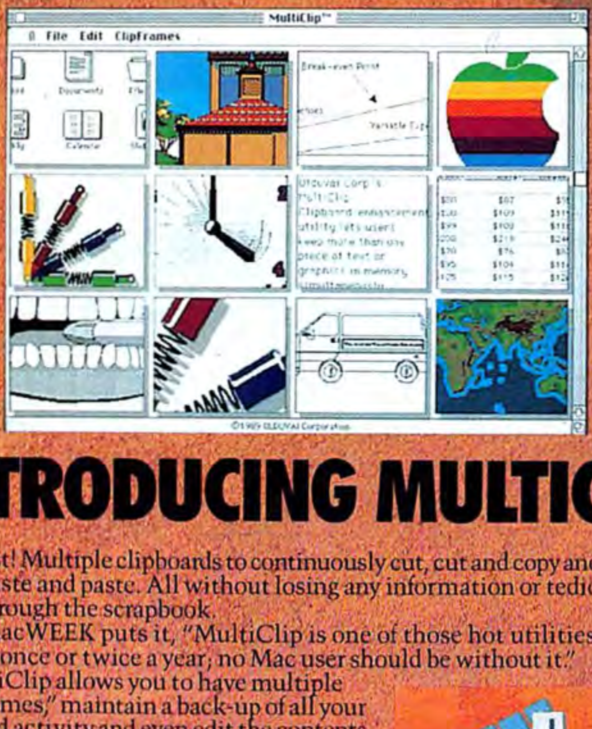

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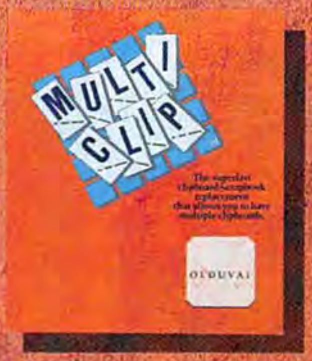

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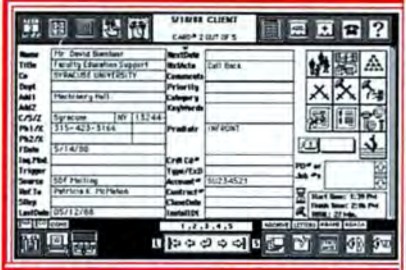

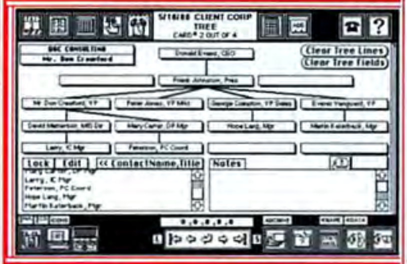

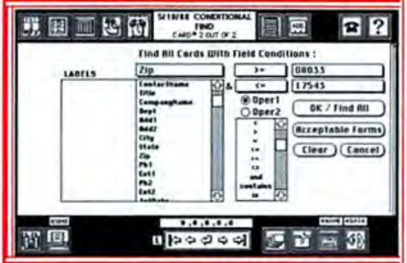

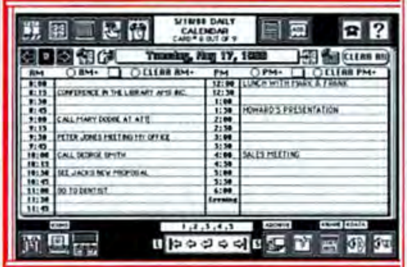

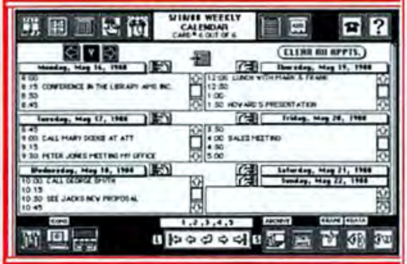

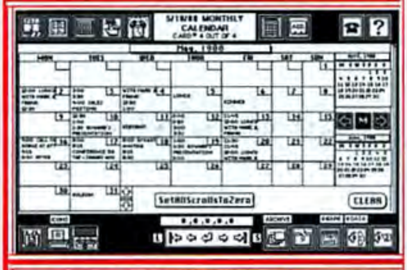

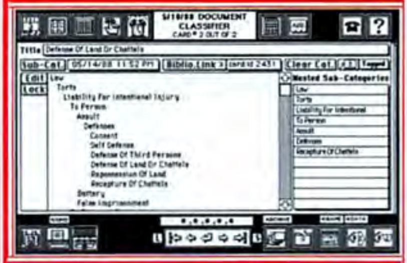

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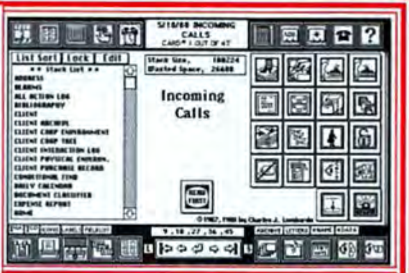

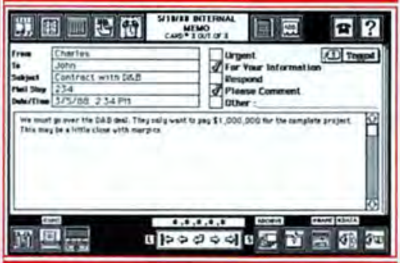

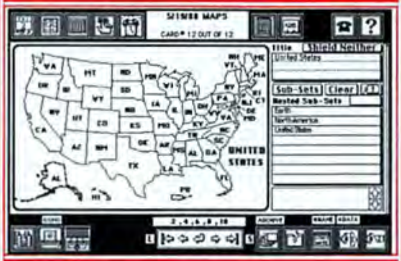

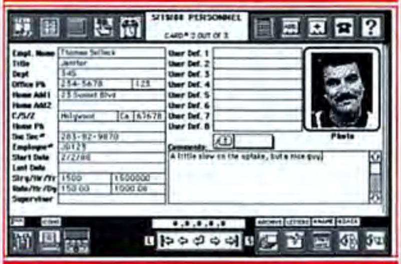

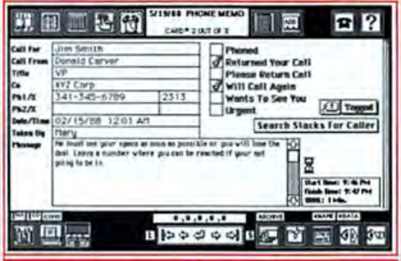

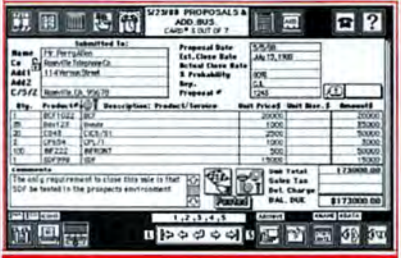

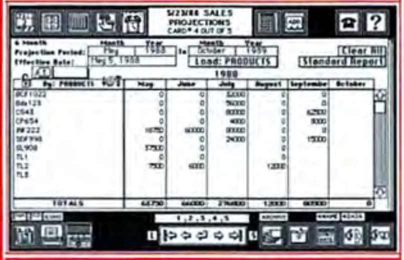

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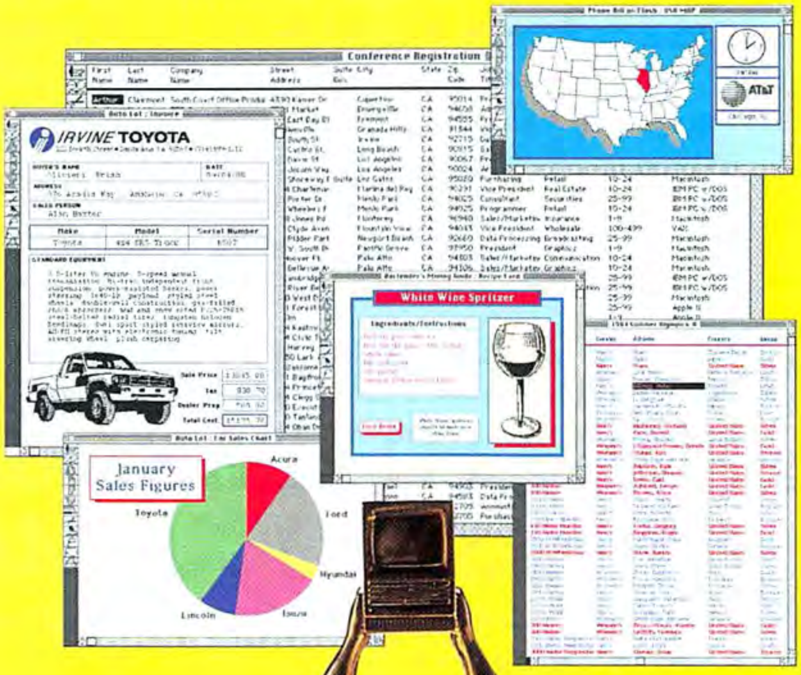

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Desperately Seeking Service

Locating the right dealer takes perseverance

by Deborah Branscum

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

"We had problems with every order they delivered," says Felbab. Several orders arrived incomplete, missing either hardware or software or both. One Mac II refused to boot from its hard disk. "The technician sent by the chain didn't seem to know how to turn on the computer from the extended keyboard and kept looking for an on switch," Felbab says. "He didn't find that, but he did spot the floppy drive. The technician said, 'There's your problem right there.' Then he pulled out a floppy disk with his long-nose pliers and ruined the drive in the process."

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

Advice from technicians, micromanagers, and consultants boils down to research, research, and more research.

DRAKE SOREY

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

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

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

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

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

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

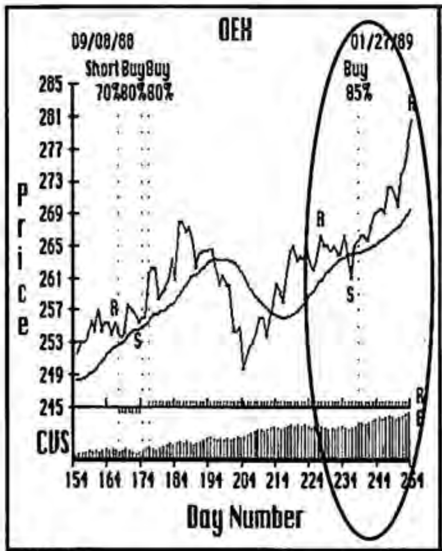
"If you want after-sales support for software and hardware, you need to qualify the salesperson and dealer," says Robert Kinnin, a former service manager for a national chain based in New York who is now a network manager for Arthur Young. Find out, before you buy, if there are people dedicated to providing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

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

(continues)

Results:Winning Trades

$100,399.69 profit in 3 weeks.



Daily Data for:OEX

#	Date	Day	$	Rec	Price	Pr Chg	S-R	Trend
239	01/06/89	Fri	85$	BUY	$266.21	0.67	—	Rising
240	01/09/89	Mon		Hold	$266.45	0.25	—	Rising
241	01/10/89	Tue		Hold	$265.67	-0.79	—	Rising
242	01/11/89	Wed		Hold	$267.44	1.77	—	Rising
243	01/12/89	Thr		Hold	$268.90	1.46	—	Rising
244	01/13/89	Fri		Hold	$269.35	0.45	—	Rising
245	01/16/89	Mon		Hold	$269.61	0.26	—	Rising
246	01/17/89	Tue		Hold	$269.01	-0.60	—	Rising
247	01/18/89	Wed		Hold	$272.24	3.23	—	Rising
248	01/19/89	Thr		Hold	$272.42	0.18	—	Rising
249	01/20/89	Fri		Hold	$271.66	-0.76	—	Rising
250	01/23/89	Mon		Hold	$269.92	-1.74	—	Rising
251	01/24/89	Tue		Hold	$274.16	4.24	—	Rising
252	01/25/89	Wed		Hold	$274.72	0.56	—	Rising
253	01/26/89	Thr		Hold	$277.64	2.92	—	Rising
254	01/27/89	Fri		Hold	$280.70	3.06	Res	Rising

1/27/89

Symbol	Type	Date	Quant	Purch Price	Comm /Buy	Orig Cost	Today's Price	Comm /Sell	Today's Value	P/L
OEX-BM	Calls	1/9/88	100	$7.125	$285.94	$71,535.94	$17.25	$564.38	$171,935,63	$100,399.69

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computer gear in 1989. "So I want to know what kind of stock of machines a dealer has on hand and how quickly he can put one on a desk. Some chains may have a lot of stock, but it may be in a distant warehouse."

Felbab suggests you ask dealers what System version to put on your machine, because some stores don't know about problems with System 6.0. And ask what software they recommend—but remember that you have to educate yourself to recognize bad information.

- *Be realistic.* The perfect dealer is as elusive as the perfect romance. No one store can answer every question, stock every part, or offer the best price on every application.

Make the best deal you can, says Negrino, but it's usually a good idea to pay the few bucks more a good dealership may charge for providing extra service. Felbab agrees, adding that "we frequently lose sight of what it costs us to duplicate the effort that a good dealer can provide."

Decide what's most important to you—support, price, or convenience—and be willing to accept the trade-offs. And do your homework. Crack open the manual before you pick up a phone to call for support.

- *If you get poor service, take your business elsewhere.* As with buying a car, anyone can get burned. "We've sent machines in for repair several times because they wouldn't boot from the hard disk and then gone to the dealer and discovered technicians booting from the floppy and saying there's no problem," says Felbab. "And these are authorized Apple dealers." Felbab didn't rest until he found a retailer that specialized in Macintosh service—and neither should you.

Since customers determine a dealer's reputation, complain to Apple if you encounter serious problems. Apple USA president Allan Loren is not immune to customer letters. Apple will "sit down and see what's wrong" if it gets lots of complaints about the same dealership, he says. (Write to Customer Relations, 20525 Mariani Ave., MS: 37S, Cupertino, CA 95014 to register your complaints—or praise.) And remember, there are excel-

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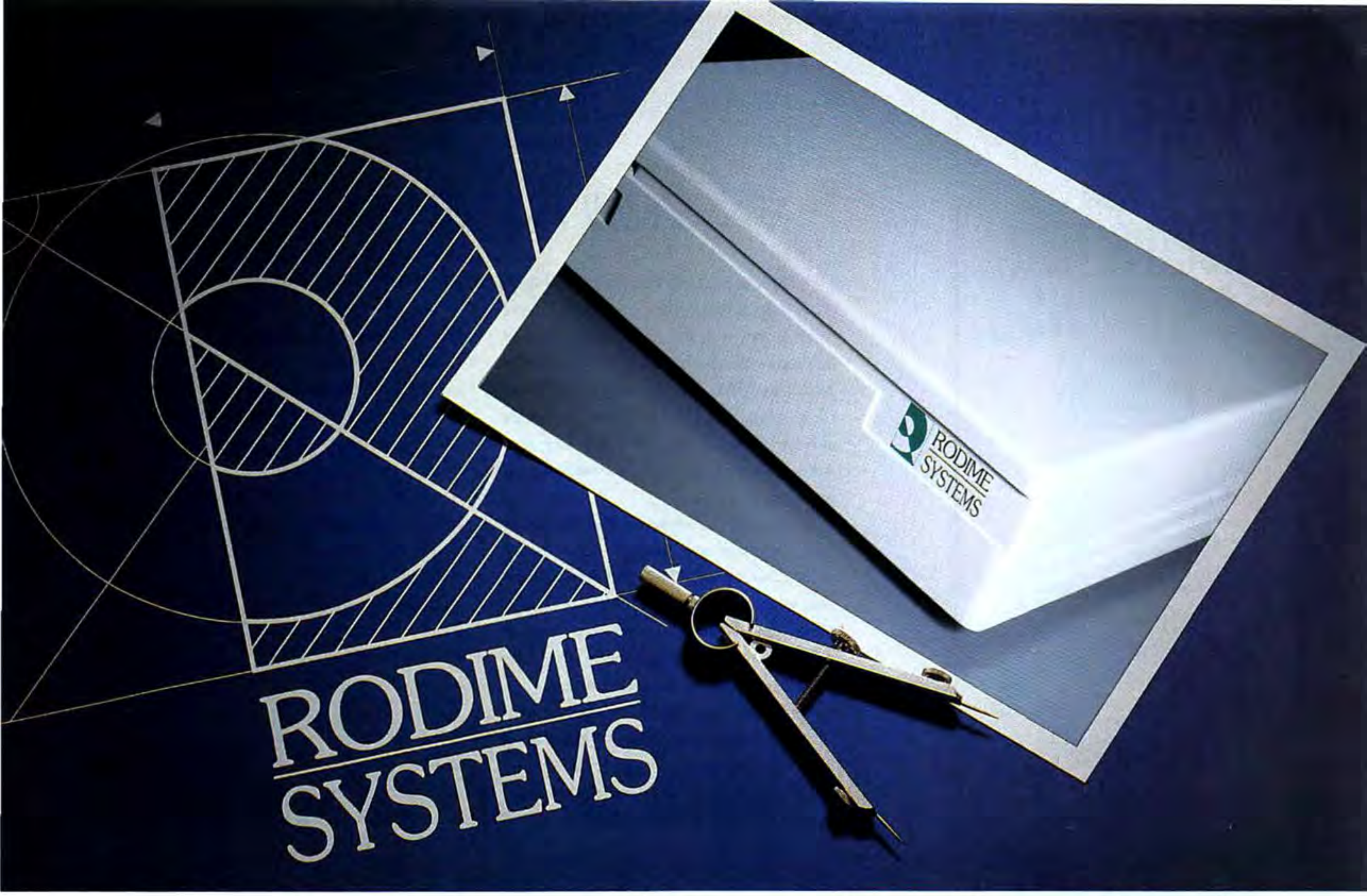

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SERVICE HEROES

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

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

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

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

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

lent dealers out there—you just have to find them.

CORRESPONDENCE WOES

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

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

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

SUPPORT STARS

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

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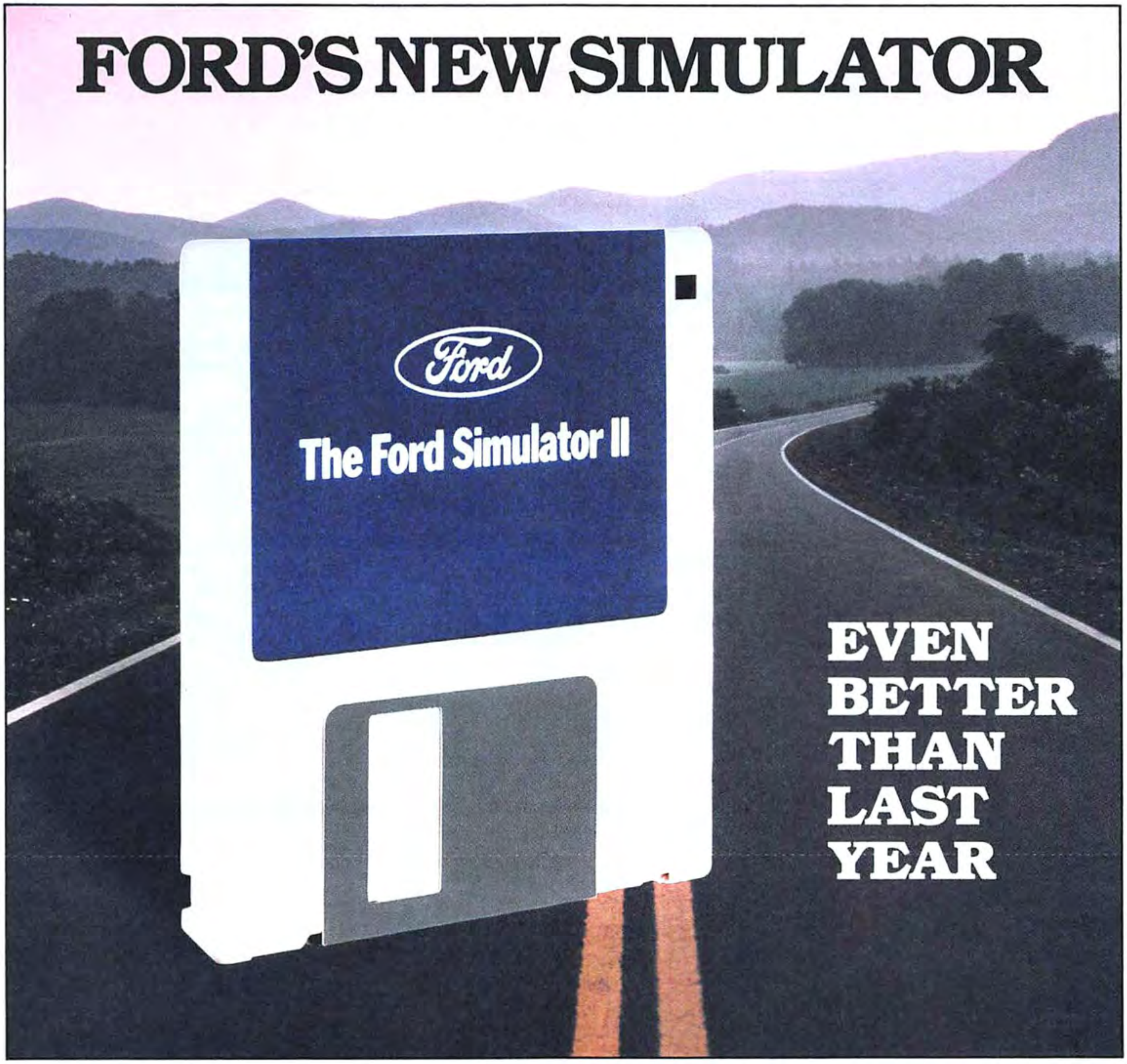
Volume 1, Number 1

AUTOMOTIVE TODAY



FORD'S NEW SIMULATOR

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

For IBM and MacIntosh

Ford's New Simulator

It mixes business with pleasure.

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

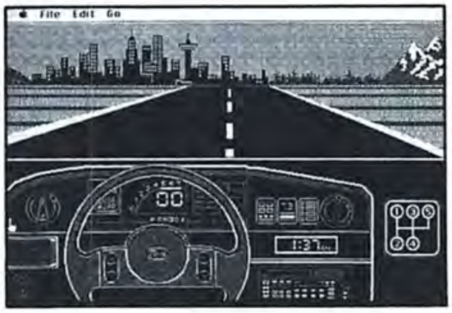
The new graphics are right out of a showroom brochure, and depict the cars in all their glory. And animated screens demonstrate various features of the cars. For example, you'll see heated windshields melt snow, air bags inflate, and supercharged engines propel automobiles down highways.

Exciting games put you in the driver's seat. Don't get us wrong; this software isn't only information. This year, there are three exciting driving simulation games, each with three different scenarios, and each with three levels of driving expertise.

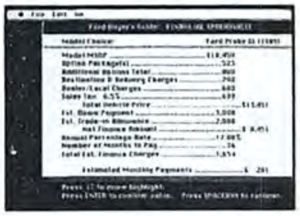
Test Track offers a drag strip, a track inundated with tight turns, and an obstacle course littered with pylons. *City Challenge* lets you wind your way through traffic en route to your choice of the downtown area, a shopping mall or the airport. And *Back Roads* lets you decide whether to take an easy-going byway, a twisting blacktop, or a two-lane road that requires you to maneuver around slow-moving trucks.

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

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



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



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

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

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

Get the new 1989 Ford Simulator: Just $6.95

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MAC

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☐ MacIntosh

My disk drive size is ☐ 5¼" ☐ 3½"

Name

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Please allow 3-4 weeks for delivery.

We would appreciate it if you would provide the following information:

1. Please indicate what vehicle you are currently driving:

Year Make Model

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

☐ Within 3 months ☐ 4-6 months ☐ 7-12 months
☐ 1-2 years ☐ No plans within 2 years

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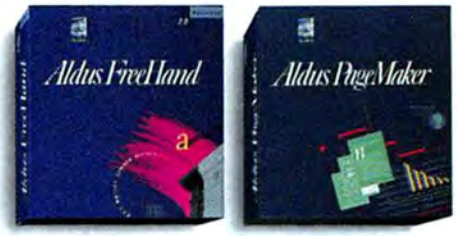

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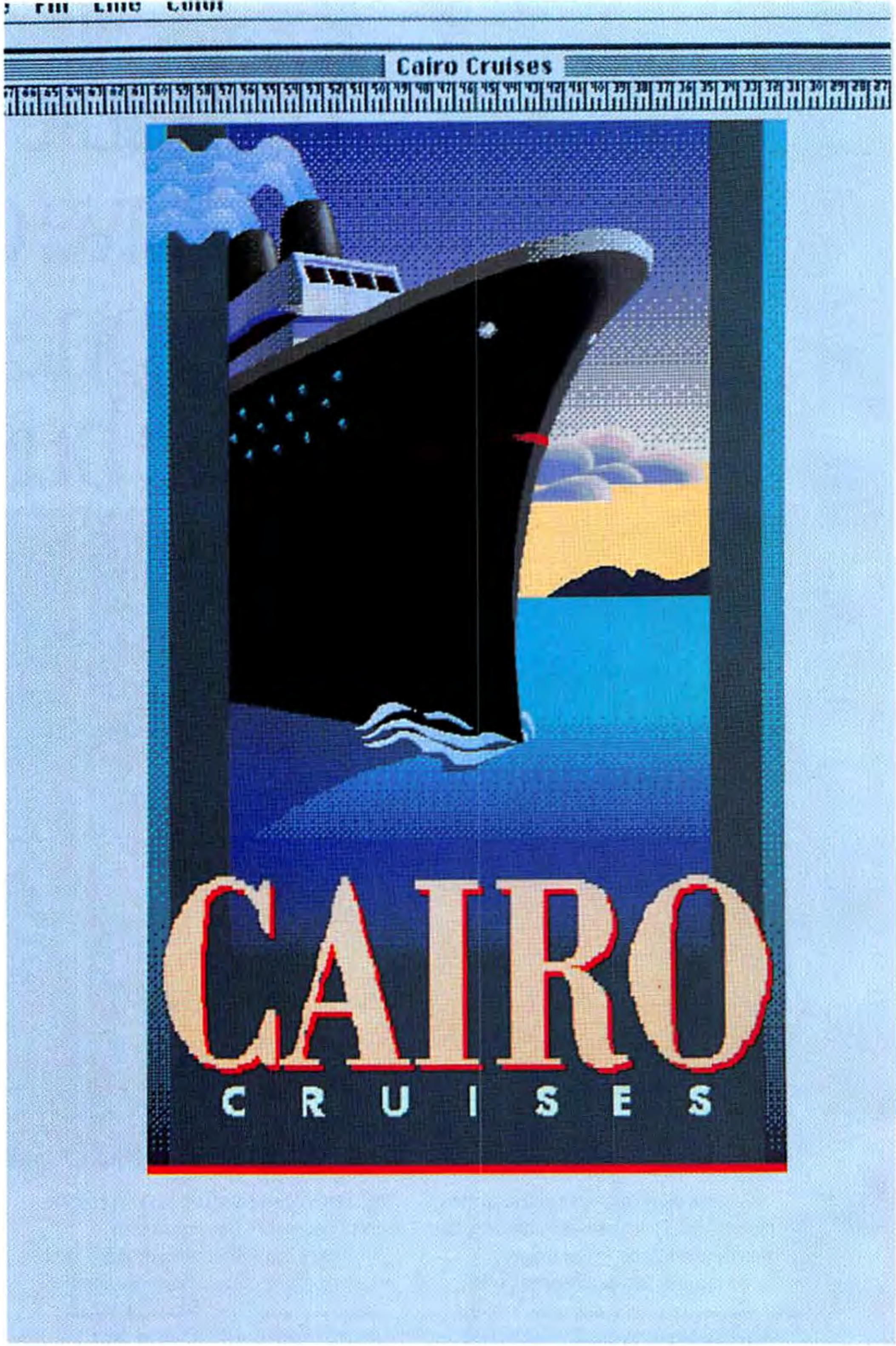

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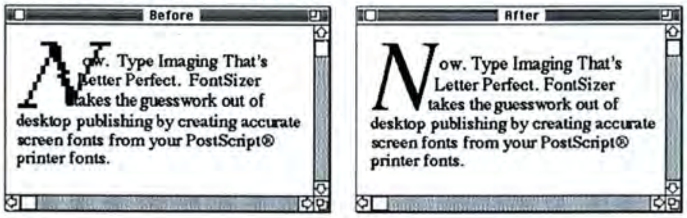

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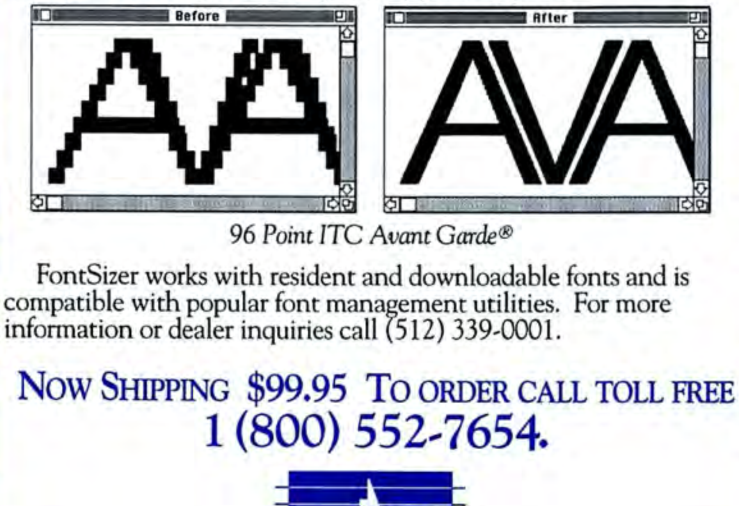

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veyed its members and asked them to identify the developer who provided the best end-user support for products developed or acquired during calendar year 1988. The envelopes, please.

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

WASHINGTON'S READY TO DEAL

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

COMPUTING WITH A CONSCIENCE

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

I love happy endings. Send your nominees for sainthood to Service Heroes, Macworld, 501 Second St., San Francisco, CA 94107 or via AppleLink (Macworld1) or MacNet (Branscum). Conversely, drop me a line if a company is ignoring you. I will help solve your problem, if I can. If your user group is sponsoring an event, please get in touch. Attention Mac-only dealers: I'm compiling a list, so let me know you're out there.

Best Color Display.

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E-Machines T16 Display System
Slide 1
E-MACHINES
Macintosh II

1989 MacUser Editor's Choice Award Winner

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E-Machines T16

Introducing the T16™ Color Display System from E-Machines. T16 features a custom 16″ Sony Trinitron that displays a working area almost twice the size of the Mac II standard 13″ screen. See full-page, high resolution images in 256 brilliant colors with 67Hz flicker free performance. All at a cost lower than any other large color screen.

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

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Epic Epic 2400 Int. SE	315.
Epic 2400 Int. Mac II	***Special*** 315.
Hayes Microcomputing	
Smartmodem 1200	299.
Smartmodem 2400	449.
Practical Peripherals	
Practical Modem Mini 1200SA	77.
Practical Modem 2400SA	179.
MacCommpack *(2400SA w/Microphone & Cable)*	225.
Prometheus	
Promodem 2400M Ext. *(Software & Cable)*	***Special*** 199.
Supra Corporation	
Supra Modem 2400	149.
U.S. Robotics	
Courier 1200 *(Hayes Compatible)*	199.
Courier 2400 *(Hayes Compatible)*	349.
Ven-tel	
Mac2400E *(Int. Mac II w/MS Works)*	369.

Micro Planner 6.0 by Micro Planning

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

NETWORKING SOFTWARE & HARDWARE

CE Software Quick Mail	159.
Farrallon PhoneNET AppleTalk	9.
PhoneNET Din 8 or DB9	35.
Timbuktu	65.
TrafficWatch	139.
LaCie	
Silverserver	89.
Magnus FileMagic	***Special*** 65.
Microsoft	
Microsoft Mail 1-4 users	195.
Olduvai Software Clip Share	109.
Font Sharer	149.
Shiva NetModem V2400	479.
Net Serial X232	289.
Net Bridge or TeleBridge	349.
SuperMac Software Acknowledge	329.
Multi-User SuperLaserSpool	199.
TOPS	
Tops 2.1 Mac, , Tops Dos or Net Print	***Special*** 149.
Tops FlashBox	***Special*** 125.
Tops Repeater	129.
Tops FlashCard	169.
InBox-MacConnection	45.
InBox-Starter Kit	***Special*** 149.
Tops Teleconnector Din8 or DB9	39.

Stepping Out II by Berkeley System

A software alternative to a hardware big screen, ***Stepping Out II*** fools the Mac into thinking it has a big screen. You choose the screen size. Desktop publishing, art/graphics, CAD and spreadsheet programs have new horizons. 25%, 50% & 75% reductions, 2-16X enlargements, fixed menus & palettes give it unparalleled versatility. .... **$52.**

PRINTERS & DIGITIZERS

Digital Vision Computer Eyes-Mac	209.
Koala Technologies Corp.	
MacVision 2.0 *(Digitizer)*	219.
Mac Director	115.
Kurta IS ADB Tablet	255.
Cordless 4 Button Cursor	65.
LogiTech ScanMan	359.
Seikosha SP1000 *(Imagewriter comp.)*	235.
Summagraphics Bit Pad Plus	325.
ThunderWare ThunderScan	189.
LightningScan	***Special*** 409.
Mac II Power Accessory	42.

Expressionist 2.0 by Allan Bonadio Associates

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

EDUCATIONAL/CREATIVE SOFTWARE

Ars Nova Practica Musica 2.1	***Special*** 75.
Barron's Barron's SAT	35.
Bible Research The Word (KJV or NIV)	165.
Bogas Productions Studio Session	49.
String Quartet, Country or Heavy Metal	15.
Super Studio Session	75.
Bright Star Technology Alphabet Blocks	32.
Talking Tiles	69.
Broderbund	
Jam Session or Black & White Movies	30.
Sensei Geometry, Calculus or Physics	59.
Type!	20.
Where in the World is Carmen SanDiego?	27.
Where in the USA is Carmen SanDiego?	32.
Coda Mac Drums	32.
Perceive	52.
Davidson & Associates	
Speed Reader II	36.
Math Blaster or Word Attack!	27.
Electronic Arts Mavis Beacon Typing	35.
Venture's Business Simulator	47.
Deluxe Music Construction Set V2.5	84.
First Byte	
Dinosaur Discovery Kit, Puzzle Storybook or Rhyming NoteBook	27.
Great Wave Software KidsTime	26.
Number Maze	27.
Crystal Paint	27.
Individual Typing Instructor Encore	26.
Learning Company Reader Rabbit	32.
Mindscape Perfect Score SAT w/The Perfect College	46.
Niles & Associates End Note	82.
Nordic	
MacKids Educational Prog. *(ea)*	28.
Simon & Schuster Typing Tutor IV	35.
Springboard Top Honors	59.
Family Matters or Atlas Explorer	28.

FASTAT by SYSTAT

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

BUSINESS SOFTWARE

Abacus Concepts StatView II *(Mac+, SE, II w/68020 & 68881)*	339.
StatView SE+ Graphics	229.
Access Technology Trapeze 2.1	149.
Ashton Tate Full Impact	249.
BrainPower ArchiText	179.
StatView 512 Plus	175.
Math View Professional	139.
DataScan	118.
Bravo Technologies MacCalc	77.
Chang Laboratories C.A.T.	***Special*** 229.
Claris MacProject II	379.
Smartform Designer	309.
Individual 101 Macros For Excel	37.
Mainstay Capture	42.
Mac Flow 2.0 or Mac Schedule	115.
Meta Software MetaDesign	199.
Micro Planning International	
Micro Planner 6.0	***Special*** 325.
Microsoft Microsoft Works 2.0	189.
Microsoft Excel 1.5	255.
Nolo Press WillMaker 3.0	34.
For the Record	29.
Paracomp Milo	159.
Pro Plus WallStreet Investor V3.0	469.
Satori Software	
Bulk Mailer 3.2	***Special*** 78.
Bulk Mailer Plus	195.
Select Micro Systems, Inc. Exstatix	219.
MapMaker	***Special*** 215.
Shana Corporation Fast Forms	89.
SoftView MacInUse	42.
Form Set Business Forms	55.
Synex Mac Envelope 4.0	***Special*** 55.
Mac Invoice	29.
Systat Systat 3.2 *(Specify MacPlus, SE or Mac II)*	459.
Fastat	***Special*** 165.

Overnight $3

SHOWCASE F/X by Aegis

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

SPELLING & GRAMMAR CHECKERS

Aegis Development	
Doug Clapp's Word Tools 2nd Edition	42.
A.L.P. Systems	
MacProof 3.0	115.
Deneba Software	
Big Thesaurus	54.
Spelling Coach 3.0 Professional	105.
Electronic Arts Thunder! II	49.
Lundeen & Associates	
WorksPlus Spell 1.1	46.
Microlytics, Inc.	
Word Finder *(Synonym Finder)*	33.
Electronic Word Finder	79.
Sensible Software	
Sensible Grammar or BookEnds	53.
Working Software Spellswell 2.0	45.

MAC-101 Keyboard by DataDesk

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

DESK ACCESSORY PROGRAMS

Affinity Microsystems	
Tempo II	89.
Affinifile	46.
Borland SideKick V2.0	68.
Casady & Greene, Inc QuickDex 1.4A	32.
CE Software DiskTop 3.0	27.
Deneba Software Comment 2.0	54.
Electronic Arts Disk Tools Plus	31.
Mainstay Think'n Time	61.
Solutions, International	
Super Glue	50.
SmartScrap & The Clipper V2.0	46.
Symmetry HyperDA *(Req. 512K)*	35.
TENpointO OpenIt!	49.

FileGuard by ASD Software

FileGuard is the automatic file protection program that provides a comprehensive solution to all your problems of security and confidentiality. This integrated software will enable the user to easily protect documents against unauthorized access. *FileGuard* can even control the insertion of diskettes to prevent the illegal copying of files or the introduction of a destructive computer virus. .. **$129.**

UTILITY SOFTWARE

ALSoft Disk Express	***Special*** 49.
Font/DA Juggler Plus	42.
Master Juggler	64.
A.S.D. FileGuard	***Special*** 129.
Berkeley System Design	
Stepping Out II	***Special*** 52.
Beyond Inc. Menu Fonts 2	29.
Central Point Software	
Copy II Mac *(Includes MacTools)*	***Special*** 20.
PC Tools Deluxe Mac v5	45.
CE Software	
QuicKeys *(Macro Program)*	53.
MockPackage Plus Utilities	27.
Farallon Computing Screen Recorder	135.
Fifth Generation Systems Suitcase II	45.
FastBack	54.
Power Station	32.
Pyro!	15.
HJC Virex	69.
Icom Simulations On Cue	36.
TMON	95.
Insight Development	
MacPrint	***Special*** 79.
MainStay AntiToxin or ClickPaste	65.
Microlytics, Inc. GOfer	44.
Microseeds INITPicker	29.
Redux	59.
ScreenGems	47.
Olduvai Software Icon-It!	45.
MultiClip	59.
Read-It! O.C.R. Personal	109.
Read-It! O.C.R. 2.0	245.
PCPC HFS Back-Up 3.0	54.
SuperMac Software	
SuperSpool 5.0	***Special*** 54.
SuperLaserSpool 2.0	***Special*** 79.
Diskfit 1.4	54.
Sentinel 2.0	149.
Symantec MacSQZ!	59.
Symantec Utilities for Mac *(S.U.M.)*	69.
Symantec AntiVirus for Mac (S.A.M.)	***Special*** 69.
Williams & Macias	
myDiskLabeler w/Color	31.
myDiskLabeler w/LaserWriter Option	34.
StickyBusiness	99.
Working Software	
Findswell 2.0 *(Document Finder)*	36.
XTree Company XTree	55.

Practica Musica 2.1 by Ars Nova

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

DATABASE MANAGEMENT

Acius 4th Dimension	***Special*** 399.
Activision	
Reports for Hypercard	69.
Focal Point & Business Class Bundle	55.
Apple Computer	
HyperCard	42.
Ashton Tate	
dBASE Mac 1.0	295.
Borland Reflex Plus	189.
Claris	
FileMaker II	229.
Fox Software FoxBase+	205.
FoxBase+ Multi-User	315.
FoxBase+ Runtime	158.
Microsoft Microsoft File 2.0	129.
Odesta Double Helix II	339.
DataDesk Professional	289.
GeoQuery	199.
Preferred Publishers DAtabase	75.
ProVue	
Panorama	207.
Software Discoveries	
RecordHolderPlus	65.
TENpointO FocalPoint II	119.

Cutting Edge 800K Drive by Cutting Edge

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

PROGRAMS PLUS

FAX: 203/381-9043
Inquiries: 203/378-3662
Canada: 1/800/344-7753
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STRATFORD, CT 06497
1/800/832-3201

Programs Plus

Rags to Riches '3-Packs' by Chang Labs

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

ACCOUNTING PACKAGES

Aatrix Software	
Aatrix TimeMinder	109.
Aatrix Payroll Plus	159.
Bedford Software	
Simply Accounting	219.
Chang Labs	
Rags to Riches Gen. 3-Pak 3.1 *(GL/AR/AP)*	***Special*** 289.
Rags to Riches GL, AR, or AP	119.
Check Mark MultiLedger	259.
Payroll	189.
Cash Ledger	129.
Dac Software	
Dac-Easy Light	44.
Intuit Quicken	33.

Layered	
Insight One Write	185.
Insight Expert GL, AR, or AP	455.
MECA	
Managing Your Money	127.
Monogram	
Business Sense	***Special*** 279.
Dollars & Sense 4.0	81.
Peachtree	
Back To Basics Professional *(GL/AR/AP/INV)*	159.
Satori Software	
Components GL	389.
Survivor Software	
MacMoney 3.0 *(En. Ver.)*	61.

Bulk Mailer 3.2 by Satori Software

Bulk Mailer is a powerful program specifically designed for managing mail lists. It does everything you could want in a mail list program, including duplication elimination, zip and alpha sorts, plus much more. .... **$78.**

COMMUNICATION SOFTWARE

Compuserve	
Compuserve Starter Kit	24.
Compuserve Navigator	45.
DataViz	
MacLink Plus with Cable	139.
Freesoft	
Red Ryder V10.3	54.
Hayes	
Smartcom II 3.0	88.

Insigna SoftPC	249.
Software Ventures	
Microphone II *(Includes Glue)*	225.
Solutions, International	
BackFax	127.
Synergy Software VersaTerm	65.
VersaTerm-Pro	189.
Traveling Software	
LAP-LINK	83.

LightningScan by Thunderware

LightningScan is a hand-held, high resolution image scanner for the Macintosh. Its design allows fast scanning of photographs, images from books and magazines, drawings, and logos. Its speed and flexibility make it an ideal tool for all Macintosh graphic applications including desktop publishing and design. After use, the scanning unit is easily stored in any desk drawer. .... **$409.**

GRAPHICS SOFTWARE

3G Graphics	
Images w/Impact Graphics & Symbols	59.
Images w/Impact Business 1	69.
ABA Software	
Draw It Again Sam 2.0	79.
Graphist Paint II	289.
Adobe Systems Adobe Illustrator *88*	309.
Adobe Fonts *(Various volumes)*	Call
Aldus Freehand	349.
Altsys Corp. Fontographer 2.2	229.
FONTastic Plus 2.0 or KeyMaster	52.
Ashton Tate Full Paint	69.
Broderbund	
Print Shop or Clip Charts	35.
Drawing Tables	76.
Casady & Greene	
Vivid Impressions	69.
Quill Pack *(vol. 8 & 20)*	105.
Headline Pack *(vol. 10-12)*	145.
Modern Pack *(vol. 7, 14-18)* or Distinctive Pack *(vol. 8, 19-22)*	195.
Classic Pack *(vol. 3-6, & 13)*	195.
CE Software Calendar Maker 3.1	27.

Informix Wingz	275.
Innovative Data Design	
Residential Construction	139.
Dreams	279.
MacDraft 1.2B	145.
Laserware Laserpaint Color II	359.
Letraset	
ImageStudio 1.5	275.
MacroMind MacroMind Director	449.
Micro CAD/CAM MGMStation	685.
Micro Illusions	
Photon Paint	179.
Micro: Maps	
MacAtlas Paint 2.0 *(MacPaint Format)*	45.
MacAtlas Hyper Atlas	64.
MacAtlas Professional *(PICT/MacDraw Version)*	129.
Microsoft	
Microsoft PowerPoint 2.1	255.
Miles Computing	
Mac the Ripper or Orchestra of Fonts	32.
People, Places-Things or Taking Care of Business	32.

4th Dimension by Acius

4th Dimension is the standard in Macintosh databases. It is easy enough for beginners, yet powerful for high-end users. *4th Dimension* will be up to 100 times faster! The need for programming is almost eliminated! All registered owners of Version 1.0 will get a free upgrade to Version 2.0! Buy now because Version 2.0 will be going up in price. .... **$399.**

Claris MacPaint II	99.
MacDraw II	309.
Claris Cad	629.
Cricket Software Cricket Draw	168.
Cricket Paint	99.
Pictograph	89.
Cricket Graph	115.
Cricket Presents	289.
Deneba Software Canvas 2.0 *(Includes Desk Accessory)*	159.
Dream Maker	
MacGallery *(Hypercard or Paint)*	28.
Cliptures *(vol. 1 or vol. 2)*	95.
Dubl-Click Software	
World Cla[illegible]nts: Various Vol. 1-6 *(ea)*	45.
WetPaint: [illegible]ous Vol. 1-16 *(ea)*	45.
Electronic Arts Studio 8 *(MacII)*	319.
Enabling Technology	
Clip 3D *(ea)*	69.
Pro3D	289.
Foundation Publishing Comic People	24.
Comic Strip Factory	42.
Generic Software Generic CADD	85.
Symbol Libraries:	Call
Graphsoft Mini Cad 4.0	375.
Mini Cad +	519.

NuEquation Nu Paint	99.
Olduvai Software	
Art Clip or ArtFonts 1, 2 or 3	59.
Paracomp Swivel 3D	249.
Silicon Beach Software	
SuperCard	135.
SuperPaint 2.0	129.
Digital Darkroom	169.
Super 3D	179.
Super 3D 2.0	335.
Solutions International	
The Curator *(Catalog Your Art)*	75.
Springboard	
Certificate Maker	24.
Springboard Publisher	109.
SuperMac Software	
Pixel Paint 2.0	199.
Symmetry	
Picture Base & Wet Paint Bundle	89.
Synergy KaleidaGraph	119.
T/Maker Click Art Letters I, Letters II, Personal Graphics, Effects, Business Image, or Holidays *(each)*	28.
Christian Images	35.
Click Art EPS Illustrations	75.
Zedcor DeskPaint 2.0	69.

Casino Master Mac II by Centron Software

Casino Master Deluxe Version includes five casino games in dazzling Mac II color. Play Blackjack, Craps, Roulette, Video Poker and Baccarat. Detailed manuals include rules, strategy. Standard Version runs on all Mac's with 512K. .... **$55.**

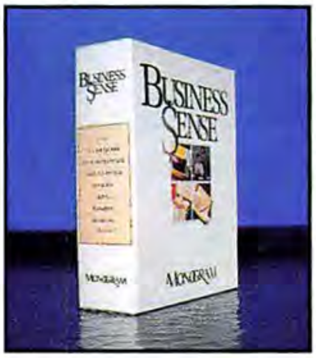
Overnight $3

TOPS 2.1/InBox/FlashBox by TOPS

With ***TOPS ($149)*** you can transform any Mac with at least 512K of memory into a *TOPS* Network station. ***InBox ($149)*** enables users to send and receive messages, memos, and files over a *TOPS* Network. With ***FlashBox ($125)*** you can speed up your AppleTalk network and allow your Mac to communicate at the Flash talk speed of 770K bits per second.

HYPERMEDIA & LANGUAGES

Borland Turbo Pascal	68.	**Smethers & Barnes**	
Bright Star Technology		Prototyper	125.
Hyper Animator	99.	**Softworks** Stack Cleaner	29.
Consulair		HyperTools 1 or 2	59.
Mac 68000 Dev. System	59.	**Symantec** Lightspeed C	135.
Hyper Press Script Screen	42.	Lightspeed Pascal	95.
Script Expert	49.	Just Enough Pascal	49.
Manx		**TENpointO** FocalPoint II	119.
Aztec C	65.	**T.M.L.**	
Aztec C + SDB	99.	TML Pascal II V3.0	115.
Axtec C + MPW	99.	TML Source Code Library II	42.
Microsoft		**Zedcore**	
Quick Basic	69.	ZBasic 5.0	99.



Business Sense by Monogram

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

BLANK MEDIA

Single Sided 3½" Diskettes		Centech 3½" DS/DD Color Disks *(10)*	19.
Bulk *(Sony)* 3½" SS/DD Disks *(10)*	14.	Sony 3½" DS/DD Disks *(box of 10)*	18.
Sony 3½" SS/DD Disks *(box of 10)*	16.	Fuji 3½" DS/DD Disks *(box of 10)*	19.
Double Sided 3½" Diskettes		Maxell 3½" DS/DD Disks *(box of 10)*	19.
BASF 3½" DS/DD *(box of 10)*	17.	Verbatim 3½" DS/DD Disks *(box of 10)*	19.
Bulk *(Sony)* 3½" DS/DD *(10)*	17.	3M 3½" DS/DD Disks *(box of 10)*	20.

Super/SuperLaserSpool by SuperMac Software

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

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Saturday
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(Eastern Time)

Copy II Mac by Central Point Software

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

WORD PROCESSORS & DESKTOP PUBLISHING

Access Technology Mind Write 2.0	95.	Letra Studio	289.
Mind Write Express	139.	LetraFonts *(Various Vol. 1-45 ea.)*	65.
Aegis Showcase F/X	***Special*** 199.	**Microsoft**	
Allan Bonadio Associates		Microsoft Word 4.0	255.
Expressionist 2.0	***Special*** 79.	**Paragon Concepts** Nisus	***Special*** 189.
Aldus Corporation		**Preferred Publishers**	
Aldus Persuasion	389.	Vantage	59.
PageMaker 3.0	399.	**Quark, Inc.**	
Ashton Tate		QuarkXPress V2.0	499.
FullWrite Professional	269.	QuarkStyle	199.
Broderbund		**Symantec** More II	255.
DTP Advisor	47.	**Symmetry** Acta Advantage	65.
Caere Omnipage	559.	**T/Maker Company**	
Claris MacWrite 5.0	99.	WriteNow V2.0	99.
Design Science Math Type 2.0	99.	**U.S. MicroLabs** Font Sizer	79.
Emerald City Smart Art	95.	**Word Perfect Corporation**	
Letraset		Word Perfect	179.
Design Studio 1	459.	**Working Software**	
Ready, Set, Go! 4.5	275.	QuickLetter	75.

S.A.M. by Symantec

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

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FAX: 203/381-9043
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Canada: 1/800/344-7753
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1/800/832-3201

Circle 44 on reader service card

Positively A Plus

DiskExpress by ALSoft

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

ACCESSORIES

Abaton ProPoint *(ADB Mouse for Mac SE & Mac II)*	89.
CH Products Mirage: Quad or ADB *(Turns Joystick Into Mouse)*	39.
Mach IV Plus: Quad or ADB	65.
Cutting Edge	
Cutting Edge MCK-105QK Keyboard w/Quickeys	145.
DataDesk	
MAC-101 Keyboard/Beige *(128k/512k & MacPlus)*	***Special*** 145.
MAC-101 ADB Keyboard/Platinum *(Mac SE & Mac II)*	***Special*** 145.
Ergotron	
Mousecleaner 360°	15.
MacTilt *(Mac, SE or II)*	68.
Farallon	
MacRecorder Sound System *(Mac SE or Mac II)*	135.
Goldstein & Blair	
Macintosh Bible 2nd ed.	20.
Impulse	
Audio Digitizer w/soundware	139.
I/O Design	
Mac Luggage in Navy or Plat.	
Macinware Plus Carrying Case	64.
Macinware SE Carrying Case	75.
Imageware II Carrying Case	49.
HDware *(Hard Disk Case)*	49.
Kalmar Designs	
Teakwood Roll-Top Disk Cases:	
Micro Cabinet *(holds 45 disks)*	14.
Double Micro Cabinet *(holds 90 disks)*	21.
Triple Micro Cabinet *(holds 135 disks)*	31.
Kensington	
Mouseway *(Mousepad)*	8.
ImageWriter or ImageWriter II Cover	9.
Macintosh Plus/SE Dust Cover	9.
Tilt/Swivel	22.
Apple Security Kit	34.
Antiglare Polarizing Filter	33.
Mac II Stand and Cable Kit	65.
Power Tree Surge Suppressors (10, 20, or 50)	Call
Printer Muffler Stand *(80 & 132)*	24.
Printer Muffler 80	43.
System Saver Mac *(Beige or Platinum)*	64.
Super Base	34.
System Saver SE	52.
Masterpiece Mac II	105.
New Turbo Mouse *(Reg. or ADB)*	119.
Universal Copy Stand	22.
Universal Printer Stand	15.
Lynx Computer	
Turbo Trackball *(Mac & Mac+ or Mac SE & Mac II)*	65.
Mobius	
Fanny Mac QT *(Beige or Platinum)*	60.
Mouse Systems	
A+ Mouse *(MacPlus)*	65.
A+ ADB Mouse *(Mac SE/Mac II)*	85.
Moustrak	
MousePad 7"x9" Size	8.
MousePad 9"x11" Size	9.
Orange Micro	
Grappler Spooler	39.
Grappler C/Mac/GS or Alphabits	79.
Grappler L/Q or Grappler L/S	92.
Ribbons	
Available in Black, Blue, Brown, Green, Orange, Purple, Red, Yellow, Silver & Gold	
ImageWriter Ribbon	4.
ImageWriter Black 6-pack	20.
ImageWriter Rainbow Pack *(6 Colors)*	20.
ImageWriter II-Four Color Ribbon	9.
ImageWriter LQ Black	17.
ImageWriter LQ Four Color	20.
Seikosha Ribbon Black	6.
Silicon Comforts	
MacChimney *(Very Effective Cardboard Laminate Convection Cooling Device)*	16.
Targus	
Imagewriter II Carry Case Blk.	49.
Macintosh Plus Carry Case Blk.	59.
Deluxe MacPlus-XKB Blk.	75.

Epic 2400 II Modem by Epic Technology

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

C•A•T by Chang Labs

C•A•T lets you organize and keep track of the Contacts, Activities, and Time that are crucial to the effective operation of your business. *C•A•T* eliminates clerical drudgery with mailmerge, labelling and calendar functions. .... **$229.**

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Cherish This Memory

Three methods for expansion

by Thom Hogan

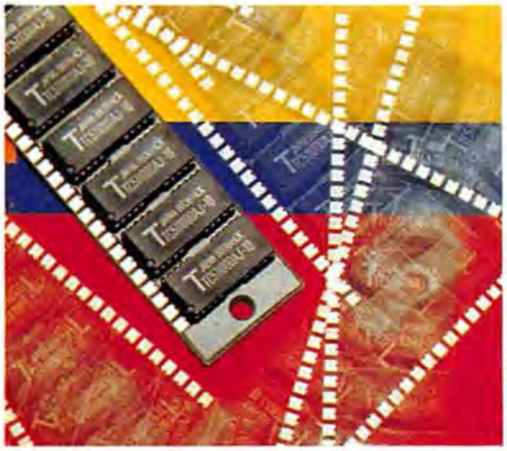
The first computer I built, 13 years ago, had 16K of memory. That was considered a lot. Today I regularly use a computer with 8MB of memory, and it is barely enough. There's an old programmer's maxim that says, "Programs expand to take up all the memory that is made available." Sure seems like that's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

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

THE DATA EXPLOSION

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

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

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

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

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

THE 8MB BOUNDARY

You need one more piece of information before I can tell you about the new memory products. It didn't seem significant back when the 128K Macintosh was introduced in February 1984, but the designers

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

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

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

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

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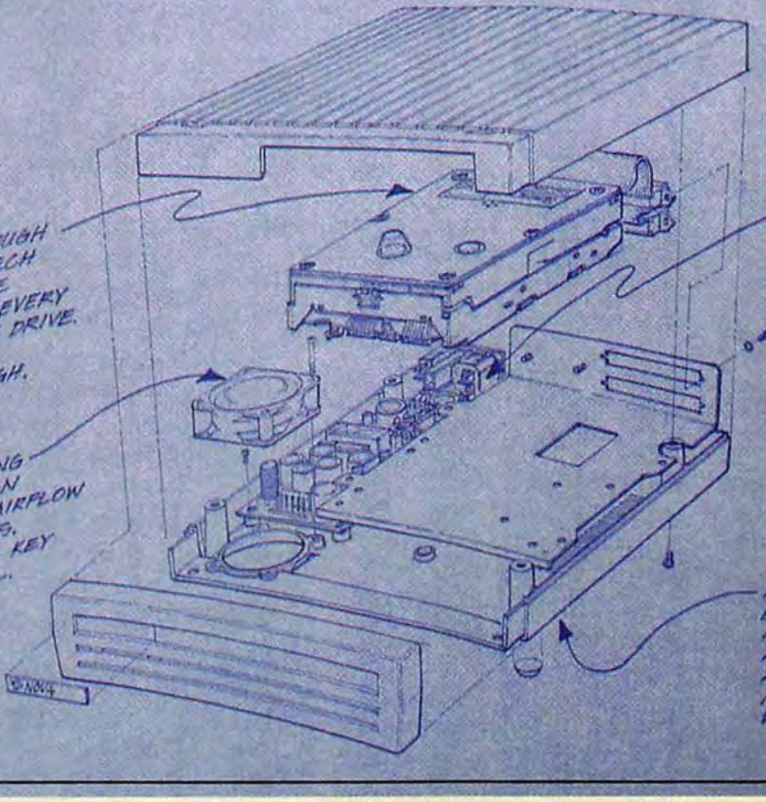

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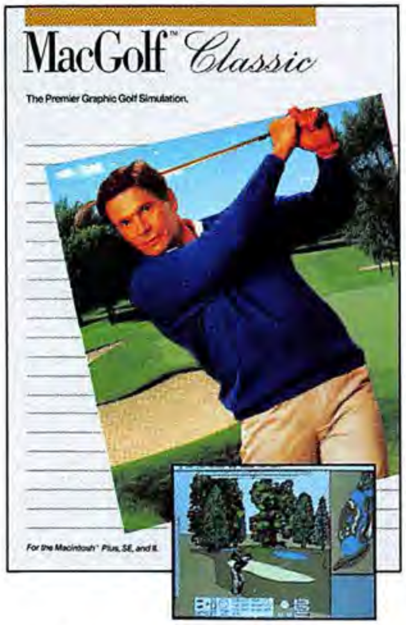
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POTENTIAL MEMORY SIZES

Bank A SIMM Size	Bank B SIMM Size	Total Memory
256K	none	1MB
256K	256K	2MB
1MB	none	4MB
1MB	256K	5MB
1MB	1MB	8MB
4MB	none	16MB
4MB	256K	17MB
4MB	1MB	20MB
4MB	4MB	32MB

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

FATTER SIMMS

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

The first newfangled option is simply SIMMs with higher-density memory chips on them. The current 1MB SIMMs use eight (or nine) 1-megabit dynamic RAM chips. A few Japanese suppliers are now shipping small quantities of 4-megabit chips, and substituting these quadruples the memory on a single SIMM. Thus, option one in the memory-upgrade department is to sell off your 1MB SIMMs and replace them with 4MB SIMMs. You'll still have eight SIMMs in your machine, but you'll have the full 32MB of memory available (again, assuming you've got A/UX or System 7.0). One company already offering such an option is Microtech International, but others will have appeared by the time you read this.

The second option I've seen is to cram more chips onto a single SIMM. Larger SIMMs will fit nicely in the II's case, as long as you don't have to change the disk drive bracket on your II (which is required with some 150MB or bigger internal hard disks). Again, these come in 4MB sizes, so replacing all your 1MB SIMMs with the bigger SIMMs gives you 32MB. Several companys have introduced these fatter SIMMs, including memory-maker Micron Technology. This option has some advantages over using higher-density chips, among them lower cost (currently).

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

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

VIRTUAL MEMORY

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

Perhaps you've heard about the 68851—otherwise known as the Motorola PMMU—before. PMMU stands for Paged Memory Management Unit, which is a fancy way of saying that it's a traffic cop for memory. The PMMU sits there and

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Unretouched screen displays of a television set displaying the output of a Mac II using a NuVista card with a VIDI/O Box, and an Apple RGB monitor displaying the same image.
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directs memory that contains information, but that isn't being used, to go sit on a disk until it's needed. The PMMIC then instructs memory that *is* needed to come back from the disk and sit in memory where the CPU can get to it. This scheme has existed for years on mainframe and larger computers, but because of its complexity took some time to work down to the microcomputer.

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

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

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

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

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

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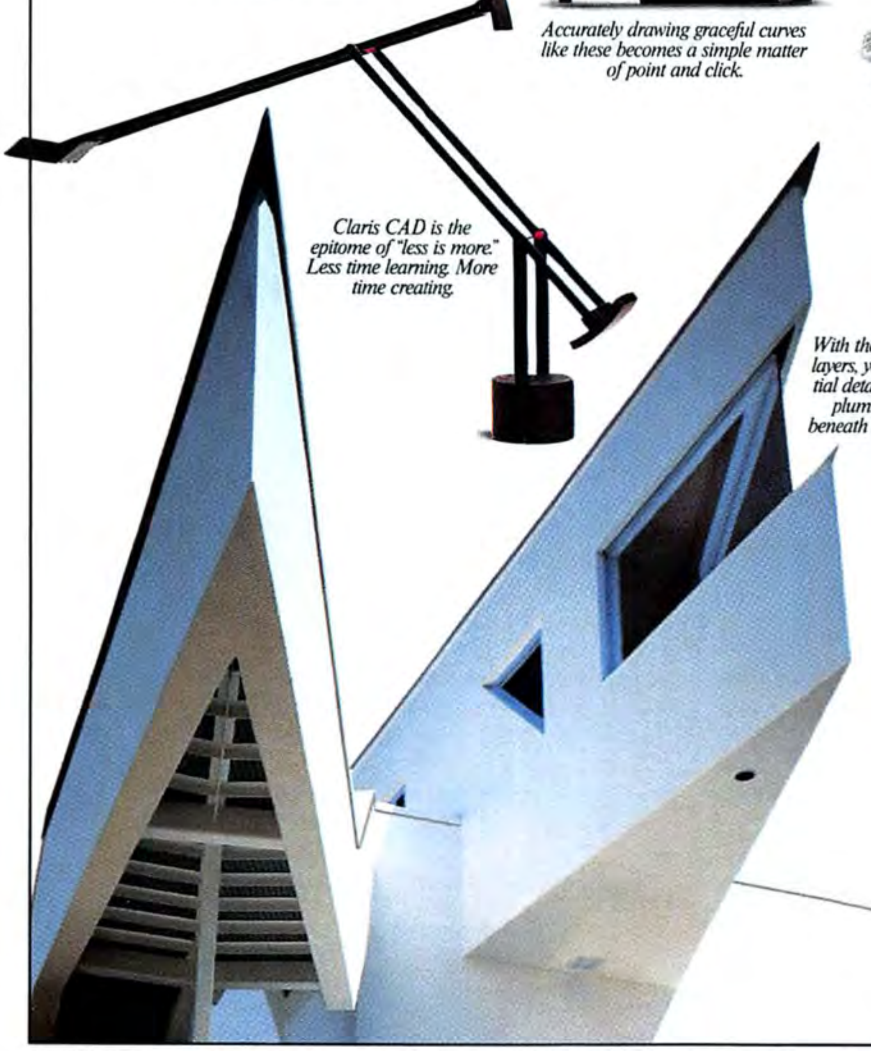

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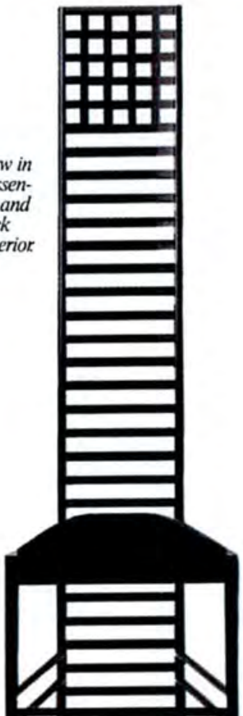

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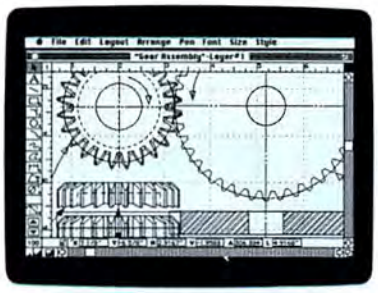

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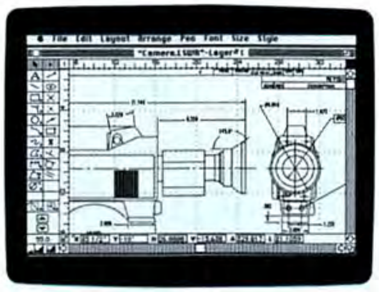

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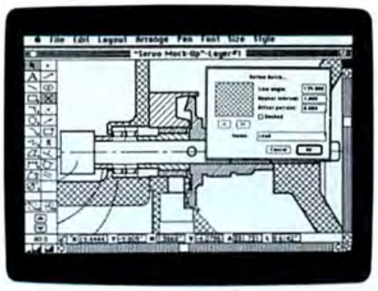

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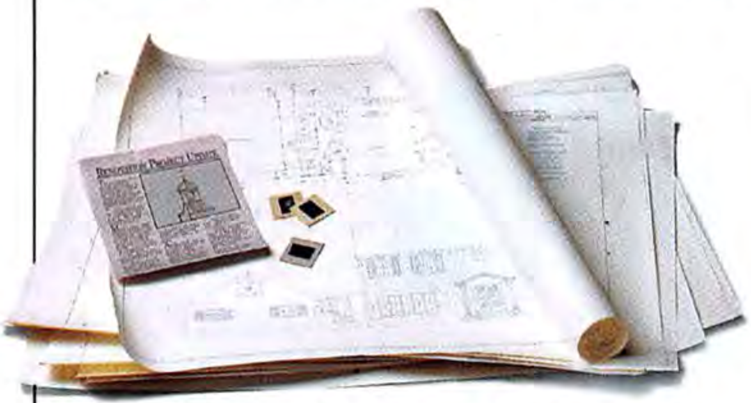

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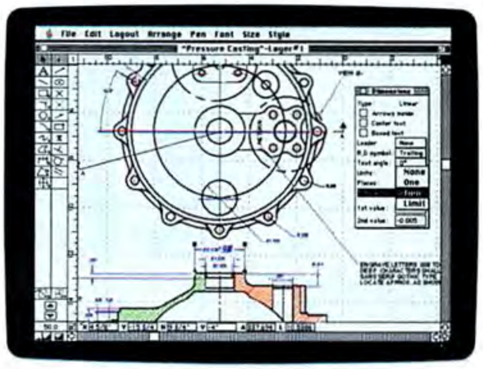
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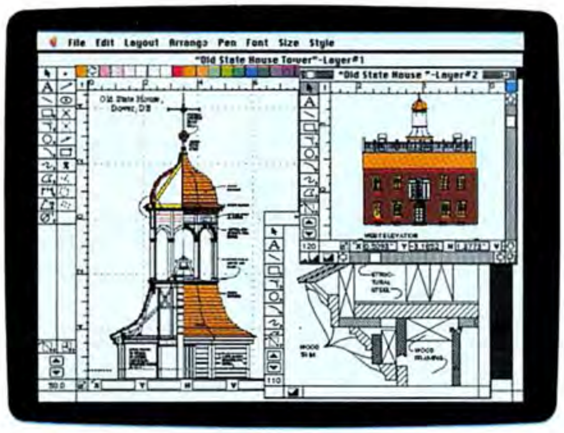
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MACWORLD NEWS

by Tom Moran

Colby's latest Walkmac portable Mac squeezes an SE/30 board, 4MB of RAM, a 40MB hard disk, a 2400-baud modem, an expansion slot, and more into a 12-pound package. And, it's shipping.

PIERRE-YVES GOAVEC

Why Wait for the Apple Laptop?

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

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

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

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

Sharing Supercomputer Power

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

Human Devices' ComputeServer, a dedicated AppleTalk or FlashTalk network server, contains from 1 to 16 INMOS T800 Transputers—floating-point processors—running in parallel. Whereas the RISC-based coprocessor boards from Tektronix (Moto-

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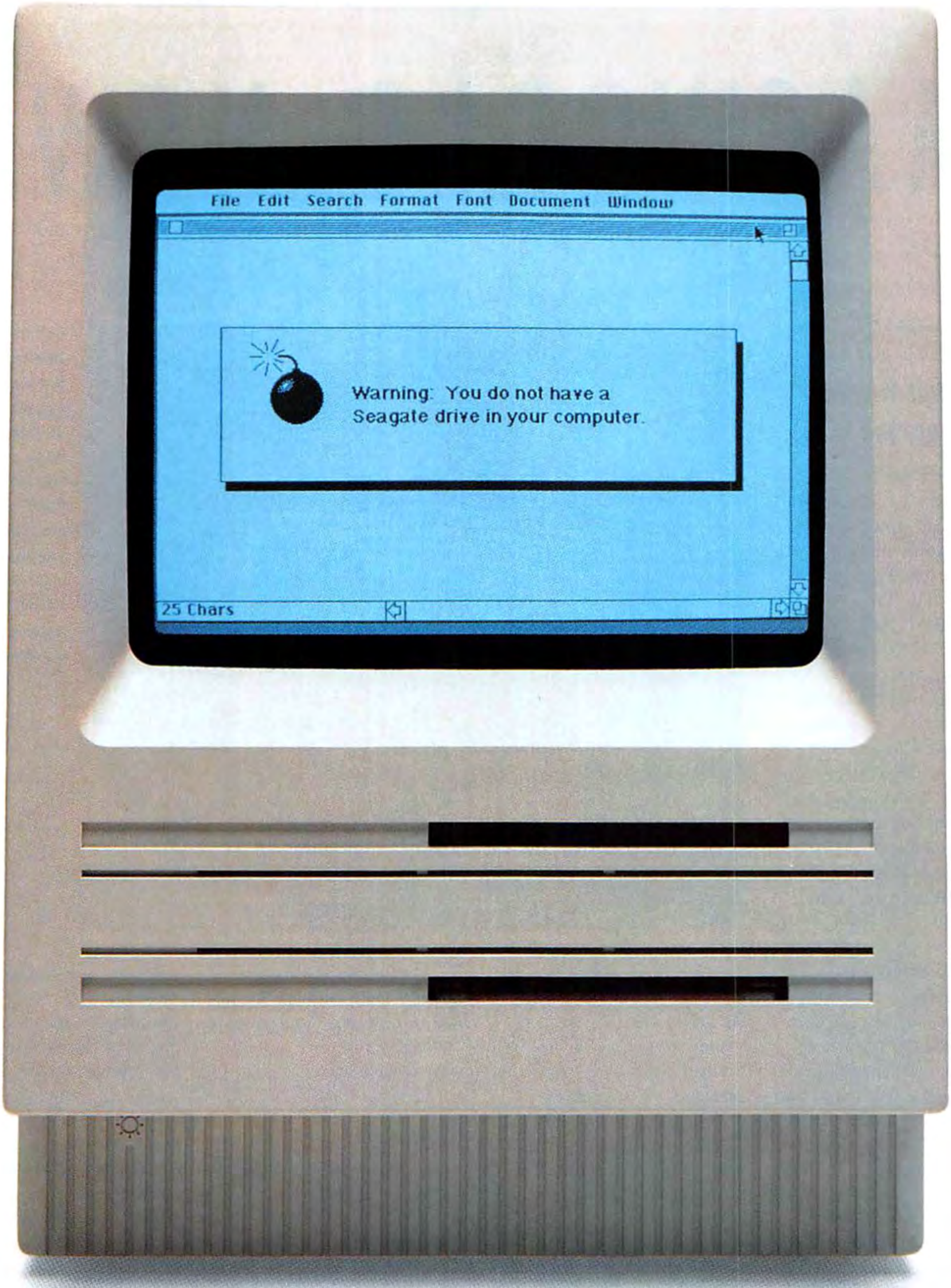

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rola 88000), YARC (AMD Am29000), Levco (INMOS Transputers), and Mercury (Weitek processors) plug into the NuBus and allow only one Mac to utilize this processing power, the ComputeServer allows any number of Macs on an AppleTalk network to share the computing resources of the hardware.

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

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

The entry-level Chorus ComputeServer with a single floating-point processor, AppleTalk and FlashTalk ports, and system software sells for $9700; the Chorus 4 ComputeServer with four floating-point processors costs $25,500. For further information, contact Human Devices in New York, New York, at 212/925-1715.

—David Ushijima

Iain Bason, Jeff Williams, and Sam Bogoch of Human Devices, the Chorus ComputeServer project leaders.

New Light on Data

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

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

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

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

For further information, contact Racet Computes in Brea, California, at 714/579-1725; Personal Computer Peripherals Corporation in Tampa, Florida, at 813/884-3092; Jasmine Technologies in San Francisco, California, at 415/282-1111; Sumo (Storage Plus) in San Jose, California, at 408/286-5744; Pinnacle Micro in Mission Viejo, California, at 714/472-0100; ALOT in Santa Cruz, California, at 408/426-7171; Colby Systems in Fresno, California, at 209/222-4985; Giga Cell Systems in Santa Clara, California, at 408/727-1049; or Storage Technologies in San Jose, California, at 408/879-0300.

—Charles Seiter

Color Printing Takes Off

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

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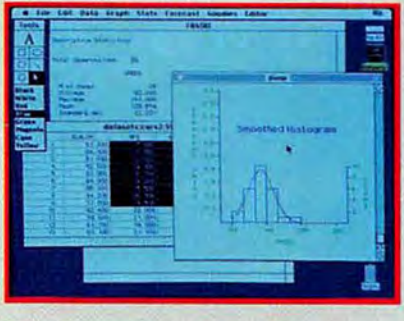

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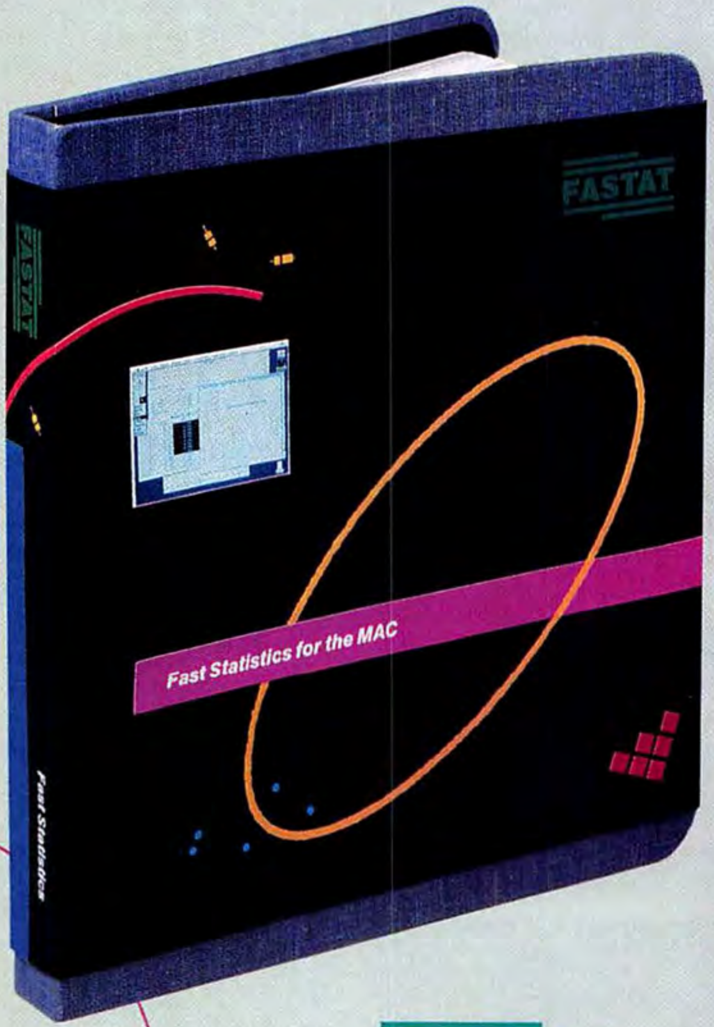

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*MacWeek September 13, 1988
**Suggested Retail Price

Tektronix's $2495 ColorQuick color ink-jet printer comes with 11 LaserWriter fonts and plugs into a SCSI port.

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

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

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

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

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

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

For further information, contact Hewlett-Packard in Cupertino, California, at 800/752-0900; Schlumberger Technologies in Mountain View, California, at 415/964-7900; QMS in Mobile, Alabama, at 205/633-4300; or Howtek in Hudson, New Hampshire, at 603/882-5200.
—Jim Heid

New Network Technology

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

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

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

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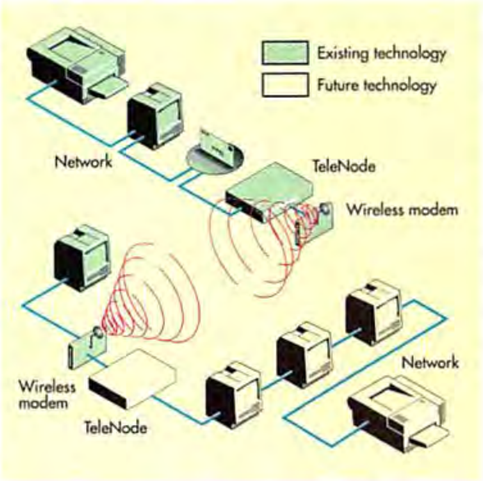

DataSpace's Arlan/TeleNode wireless-network products let a network connect to a solitary Mac. Future technology will allow two networks to connect in the same way.

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Arthur Fuller, *Computing Canada, June 9, 1988:*
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Michael Masterson, *MacWEEK, June 7, 1988:*
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FM networks have always had major drawbacks, and not all of them have been solved with these new products. Nexsys's FM modem cannot operate between glass buildings coated with reflective material, for example, nor underground. DataSpace, which avoids interference by operating at very high frequencies (915MHz), has solved the security problems associated with FM technology by encrypting the packets and shifting the frequency over a range. For further information, contact Nexsys in New York, New York, at 212/995-2224, or DataSpace in Markham, Ontario, Canada, at 416/474-0113.
—Laurie Flynn

32-bit Color Boards

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

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

To use Color QuickDraw, you'll need an add-in video board that supports it. RasterOps has unveiled three such boards and will also continue to sell the 24-bit boards it designed before the Apple standard was established. The company's $5195 ColorBoard 224 supports 16- and 19-inch monitors at three resolutions, including 1024 by 768 pixels. The ColorBoard 232, priced at $3995, works with 13-inch monitors to achieve 640-by-480-pixel resolution, and supports 1-, 2-, 4-, 8-, 24-, and 32-bit modes. The ColorBoard 264 supports multiple modes up to 24 bits and has optional NTSC support.

Radius's upcoming DirectColor/24 board is designed to work with the Radius Color Display to offer 1152-by-882-pixel resolution. Boasting a flicker-free refresh rate of 72Hz, the board is priced at under $5000 and comes with cabling and system software. Radius's 16-bit DirectColor/16 board, priced at less than $4000, can show up to 32,768 colors at one time and can be easily upgraded to the 24-bit model.

Micron Technology's MacroColor board, installed in this Mac II, is one of six new boards that support Apple's 32-bit Color QuickDraw.

SuperMac Technology is offering the Spectrum/24 board, available in 1-, 2-, 4-, 8-, and 24-bit modes. The $4999 board supports resolutions of up to 1024 by 768 on 13- to 19-inch monitors. The Spectrum/24 board's Virtual Desktop technology enables users working in 1-, 2-, or 4-bit mode to have desktops larger than their actual screens. The MacroColor board from Micron Technology supports 640-by-480-pixel resolution and lists for $2395. For further information, contact RasterOps Corporation in Cupertino, California, at 408/446-4090; Radius in San Jose, California, at 408/434-1010; SuperMac Technology in Mountain View, California, at 415/964-8884, or Micron Technology in Boise, Idaho, at 208/386-3900.
—Laurie Flynn

Sharing the Printer Wealth

One of the main difficulties in introducing the Macintosh into PC-dominated offices has been that printers rarely support both types of computers. Luckily there are several new products designed to solve this problem.

The Hurdler-CPI NuBus board for the Mac II, from Creative Solutions, features a Centronics interface—one of the most common interfaces found in PC-compatible printers.

Creative Solutions also customizes the Hurdler-CPI for use in non-Centronics parallel printers. This small modification of the NuBus costs very little and enables printers from manufacturers such as Seiko, Kodak, and Matrix to work with the Mac II. The Hurdler-CPI board retails for $199.

Another new product, the MacPrint utility from Insight Development, lets a Macintosh print directly to the popular Hewlett-Packard family of printers.

MacPrint is also PC network–compatible. Able to run on the Mac Plus, SE, and II, it is simple to install and opens from the Chooser, where you have the option of selecting individual features, depending on the HP printer. Print-tray selection, duplex printing, margin bonding, and envelope support on the LaserJet IID, for example, are a matter of simple mouse clicks.

In the future MacPrint will support HP's color PaintJet, all HP cartridge fonts, soft font downloading, and even

(continues)

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

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

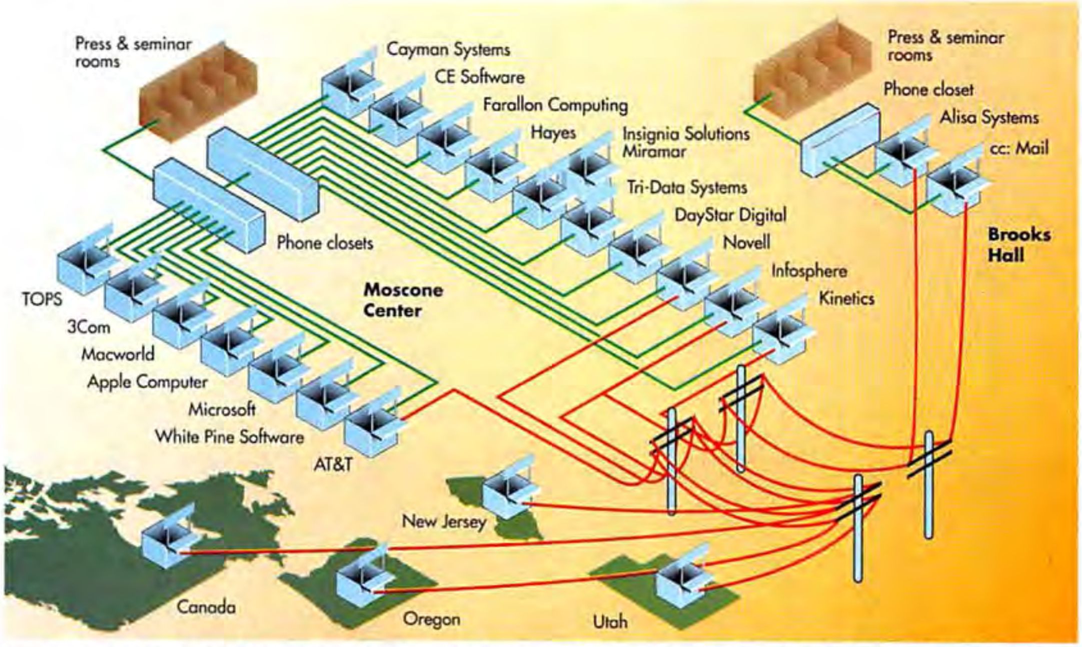
The Network Is the News

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

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

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

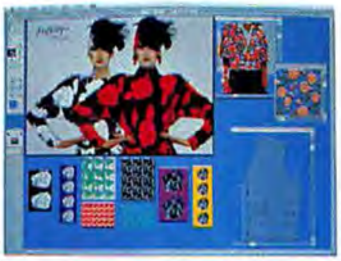
Three companies exhibited software for converting a PC into an AppleShare-compatible file server for a network. If your firm has switched to Macs and you want a use for retired PC/ATs, you might consider turning them into file servers with Dayna Communications' DaynaNet, DayStar Digital's FS100, or Miramar's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



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

Oh-la-la Online

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



High-fashion tool: ModaCAD automates design and manufacture of ready-to-wear clothing.

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

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

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

(continues)

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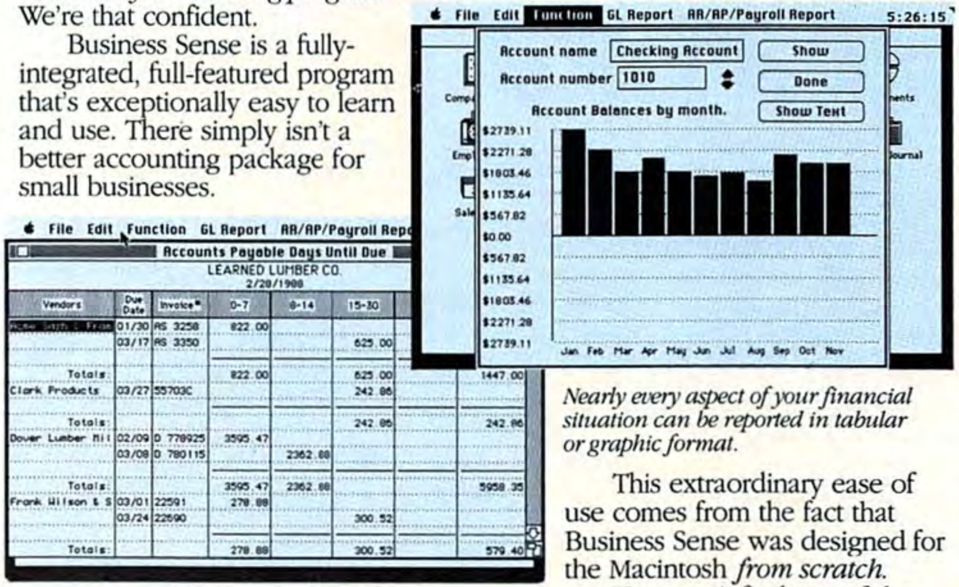

Account name Checking Account

Account number 1010

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Accounts Payable Days Until Due

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Vendors	Due Date	Invoice#	0-7	8-14	15-30		
[illegible]	01/30	AS 3258	822.00				
	03/17	AS 3350			625.00		
Totals:			822.00		625.00		1447.00
Clark Products	03/27	55703C			242.86		
Totals:					242.86		242.86
Dover Lumber Mil	02/09	D 778925	3595.47				
	03/08	D 780115		2362.88			
Totals:			3595.47	2362.88			5958.35
Frank Wilson & S	03/01	22591	278.88				
	03/24	22690			300.52		
Totals:			278.88		300.52		579.40

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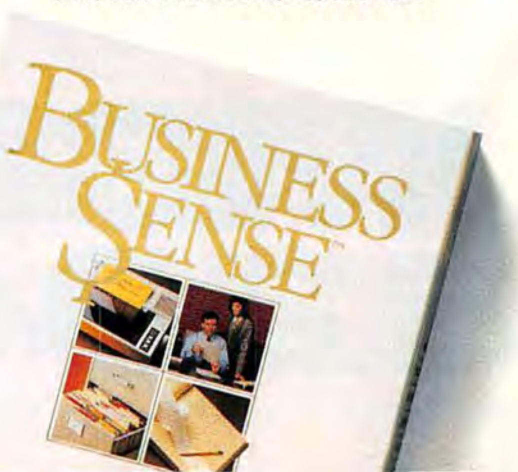

Guarantee: Purchase Business Sense Version 1.2 between January 1, 1989 and June 30, 1989. If for any reason you are dissatisfied with it, return the complete package to us within 60 days of the purchase date and indicate which software program you would like in exchange. You may choose any Macintosh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

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

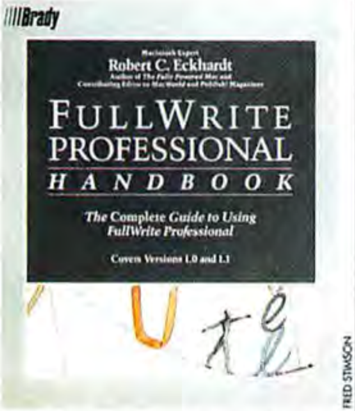
The ModaCAD modules are usually sold in hardware/software packages (including the Mac II) averaging $30,000. Separately, the modules sell for between $5000 and $10,000. For further information, contact ModaCAD in Los Angeles, California, at 213/271-7704.

—Ann Garrison

FullWrite Professional Explained

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

Last year Brady Books published Eckhardt's *The Fully Powered Mac,* a volume of strategies for making the Mac faster and more efficient that did not suggest taking out a second mortgage to upgrade hardware. This year Brady has assembled Eckhardt's Mac know-how into *The FullWrite Professional Handbook,* a detailed account of what happens when a word processor and a page layout program form a 773K hybrid and settle down in the Mac's RAM.


Brady
Robert C. Eckhardt
FULLWRITE PROFESSIONAL
HANDBOOK
The Complete Guide to Using FullWrite Professional
Covers Versions 1.0 and 1.1

FRED STIMSON

Help for FullWrite fans who find fault with the manual.

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

But you can also use Eckhardt's book as a reference work for troubleshooting. With its extensive table of contents and exhaustive index, you can find solutions to just about any problem you might encounter in FullWrite Professional. And it will help you puzzle out FullWrite's manual, too, which is at times frustratingly opaque and inadequate.

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

—William Freais

ROBERT CARDIN

Programmer Greg Baddow converted Lumena, the 32-bit paint and 2-D animation program for the PC, to work on the Mac II.

Graphics Lumenary

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

Requiring 5MB of RAM, Lumena incorporates high-resolution images and addresses high-resolution printers, slide makers, and video recorders. This multimedia system contains 20 interactive modes and 250 discrete painting and image processing tools which can be combined and saved in customized menus. The program addresses the Truevision NuVista 32-bit video graphics board and requires an analog RGB monitor for image display. As an option, an additional monitor can be used for toolbox and menu access.

Lumena's selling price has not been determined as yet; the PC package costs approximately $2500, but can total $5000 when supplemented by scanner software, animation controllers, or film recorder drivers. Time Arts hopes to release Lumena as well as Crystal 3D, a sophisticated solids-modeling and animation program, in September. A 24-bit version of Lumena is slated for release shortly thereafter.

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

—Joost Romeu

(continues)

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

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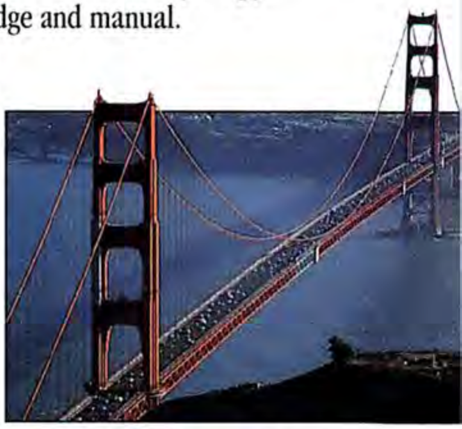

Just as important, when you go with MaxStream, you're getting backup and support from the company that pioneered streaming tape technology back in 1980. Today, there are over one-million Archive tape drives in use throughout the world.

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Museum Macs

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

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

WILLIAM WILSON/AGO

A visitor to the Art Gallery of Ontario pauses at the Mac to learn more about the exhibited works.

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

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

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

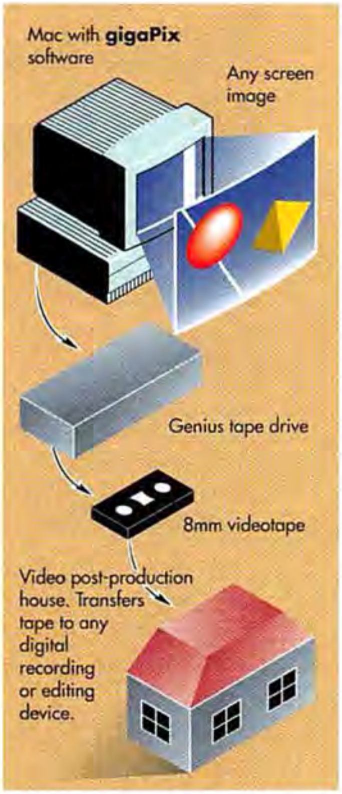
Mac Video

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

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

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

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


Mac with gigaPix software
Any screen image
Genius tape drive
8mm videotape
Video post-production house. Transfers tape to any digital recording or editing device.

Illusion Software's Genius package translates output from any Mac II application into broadcast-quality 8mm videotape.

The Sharp JX 450 color scanner, complemented by ChromaScan software by Imagenesis and Letraset's ColorStudio image processing program, are the new star performers for scanning in photographic quality, 24-bit,

(continues)

Tools of the Trade

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

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

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

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

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

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still-frame color images for video production. The scanner is the most elegant device for incorporating still art, offering far more control than inputting images with a video camera.

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

The ABCs of Mac Fonts

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

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

FRED STIMSON

Strategies for making the most of PostScript fonts for the Mac are revealed in a new book.

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

Fenton devotes a whole chapter to creating and customizing PostScript fonts.

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

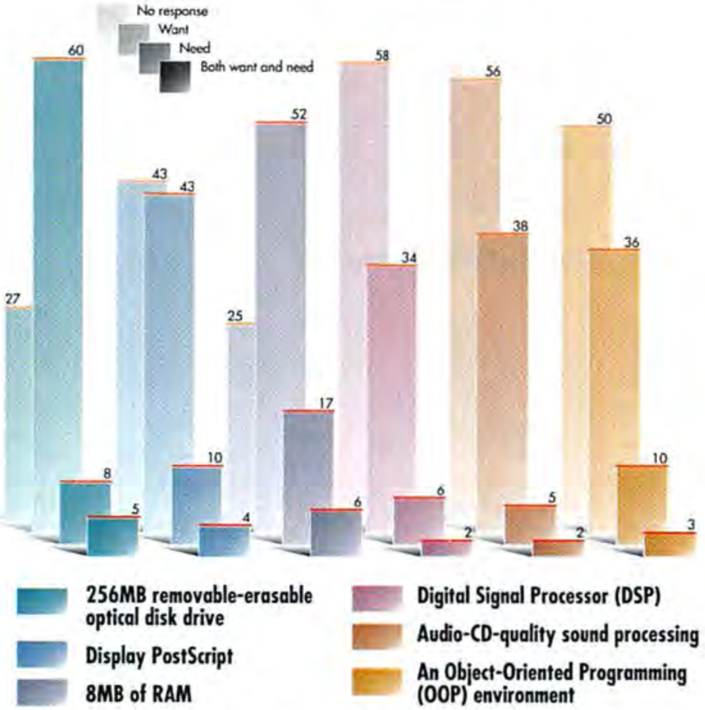
For further information, contact Peachpit Press in Berkeley, California, at 415/527-8555.
—Amacker Bullwinkle

Reader Survey: Next

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

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

Fifty-seven percent thought that Apple should move more PostScript into the Mac in the interest of lower-cost printers, 77 percent believed that Apple should include support for fax, modem, and other DSP-generated functions, and 38 percent thought that Apple should include Ethernet network hardware with its computers. ■



What Macworld readers like about the Next machine: erasable optical disk, Display PostScript, lots of RAM, sound capability, and object-oriented programming.

A midsummer

Hold on to your hats! Hold on to your feet! And hold on to your original packaging and documentation! Because, MacConnection is now offering 30 and 60 day money-back guarantees on products from selected companies. (Look for the companies which are marked with a ★ and listed in red.) If you are dissatisfied with your purchase of these products for any reason, just call for a hassle-free return authorization.

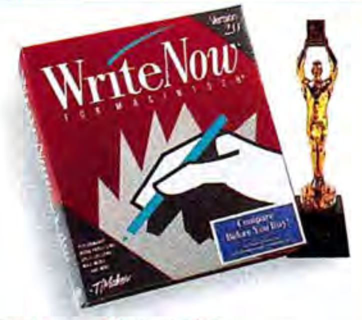
We only carry the latest versions of products. Version numbers in our ads are current at press time. Also, all of the software we sell is not copy-protected, unless indicated otherwise by *(CP)*.

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

Symantec ... 30 day MBG
S.U.M. 1.1–1989 MacUser Editors' Choice Award for *Best New Utilities and Desk Accessories.* "The clear winner in reducing worries about losing data. A well-crafted product." ..... $65.

ACCOUNTING & FINANCE

	★Aatrix Software ... 30 day MBG	
3976	Aatrix Payroll 3.05	99.
4021	Aatrix TimeCard 2.0	109.
4020	Aatrix TimeMinder 2.0	159.
3958	Aatrix Payroll PLUS 3.02	159.
	Bedford Software	
4977	Simply Accounting 1.04	219.
	★Chang Labs ... 60 day MBG	
1613	Rags to Riches Ledger 3.1	119.
1614	Rags to Riches Payables 3.1	119.
1617	Rags to Riches Receivables 3.1	119.
1622	Rags to Riches 3-Pak	289.
1612	Inventory Control 2.6	239.
1615	Professional Billing 2.9	239.
1616	Professional 3-Pak	359.
1618	Retail Business 3-Pak	359.
	Dac Software	
4502	Dac-Easy Light 1.0	42.
	Informix	
4955	Wingz 1.0	269.
	★Intuit ... 30 day MBG	
2425	Quicken 1.01	32.
	★MECA ... 60 day MBG	
2796	Managing Your Money 2.0	125.



T/Maker ... 30 day MBG
WriteNow 2.0–1989 MacUser Editors' Choice Award for *Best New Word Processor.* "Mail merge, a 100,000-word spelling checker, and direct opening and saving of various file formats from within the program." ... $109.

	Monogram	
2779	Business Sense 1.2	279.
	★Nantucket ... 30 day MBG	
2971	McMax	175.
	★Nolo Press ... 60 day MBG	
2981	WillMaker 3.0	32.
	★North Edge Software ... 30 day MBG	
2986	Timeslips III 1.1	117.
	★Satori ... 30 day MBG	
3978	Components GL 1.0	389.
3324	Project Billing 1.56	409.
4987	Project Billing + 1.56	589.
3323	Legal Billing II 2.56	539.
4986	Legal Billing II+ 2.56	589.
	SoftView	
3471	MacInUse	42.
3473	TaxView Planner 2.0	64.
	★Survivor Software ... 30 day MBG	
3289	MacMoney 3.02	61.

NUMBERS & DATABASES

	★Abacus Concepts ... 60 day MBG	
4482	StatView SE + Graphics 1.03	229.
4481	StatView II 1.03	339.
	★Access Technology ... 60 day MBG	
1346	Trapeze 2.1	149.
	★Acius ... 30 day MBG	
1010	4th Dimension 1.0.6	389.
4024	4th Dimension Runtime 1.06	229.
	Ashton-Tate	
4098	Full Impact 1.0	249.
	Blyth Software	
4318	Omnis 3 Plus/Express 3.3	399.
	Borland International	
1508	Reflex Plus 1.01	189.
	★BrainPower ... 60 day MBG	
1532	DataScan 1.0	115.
1535	DesignScope 1.15	128.
1534	MathView Professional 1.1	139.
1537	StatView 512+ 1.2	152.
3960	ArchiText 1.03	179.
4066	The Analyzer Bundle *(includes DataScan, DesignScope, and StatView 512+)*	319.
	★Bravo Technologies ... 30 day MBG	
1539	MacCalc 1.2D	77.
	★Chang Labs ... 60 day MBG	
1611	C.A.T. 2.0	229.
	Claris	
4196	FileMaker II 1.0	$229.
1125	MacProject II 1.0	379.
	★Fox Software ... 30 day MBG	
4580	FoxBASE+/Mac Runtime	158.
4195	FoxBASE+/Mac 1.1	205.
4844	FoxBASE+/Multi-User	315.
	Individual Software	
4720	101 Macros for Excel	37.
	★Microsoft ... 30 day MBG	
2866	File 2.0A	129.
2884	Works 2.0	189.
2865	Excel 1.5	255.
	★Nolo Press ... 60 day MBG	
4228	For the Record 1.02	29.
	★Odesta ... 30 day MBG	
4211	DataDesk Professional 2.0	289.
3014	GeoQuery 1.0	295.
3013	Double Helix II 2.0R51	339.
	★Paracomp ... 30 day MBG	
4664	Milo 1.0	159.
	★Preferred Publishers ... 30 day MBG	
4780	DAtabase 1.01	75.
	★ProVUE ... 60 day MBG	
4582	Panorama 1.1	205.
	★Rubicon Publishing ... 60 day MBG	
3272	Dinner At Eight-Encore Edition *(CP)*	45.
	★Satori ... 30 day MBG	
3320	BulkMailer 3.22	79.
3321	BulkMailer Plus 3.22	195.
	Software Discoveries	
3373	Record Holder Plus 3.0	65.
	★Synergy ... 30 day MBG	
3129	KaleidaGraph 1.10	119.

GRAPHICS & DESIGN

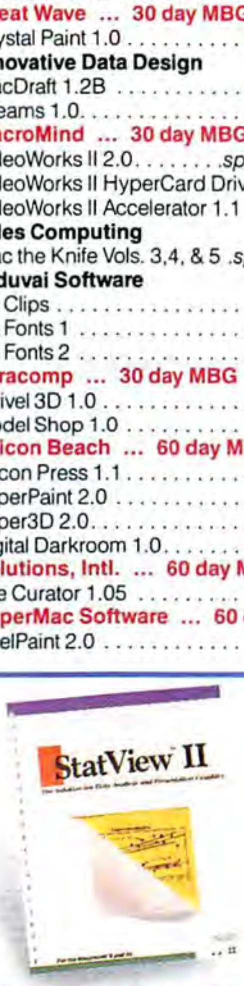
	★Aegis Development ... 60 day MBG	
4956	Showcase F/X 1.0	205.
	★Altsys ... 30 day MBG	
4830	KeyMaster 1.0	52.
1194	FONTastic Plus 2.02	52.
	★Bright Star Tech. ... 30 day MBG	
3962	HyperAnimator 1.5	99.
	Broderbund Software	
4065	PosterMaker Plus 2.5B	35.
1427	Print Shop 1.3	35.
4501	Drawing Table 1.0	76.

Farallon Computing ... 30 day MBG
MacRecorder 1.1–Honorable mention–1989 MacUser Editors' Choice for *Music and Sound.* A microphone for your Macintosh. "Allows sounds to be sampled and captured." Includes SoundEdit .... $135.

night's dream.

Fox Software ... 30 day MBG
FoxBASE+/Mac 1.1–1989 MacUser Editors' Choice Award for *Best New Relational Database.* "It's blindingly fast and has much of the Mac look and feel grafted onto its DOS roots.". **$205.**

	★Casady & Greene ... 60 day MBG	
1575	Fluent Fonts 2.0	27.
4835	Fluent Fonts/SC ITC Garamond	39.
	★Challenger ... 30 day MBG	
1610	Mac3D 2.1	119.
	Claris	
1123	MacPaint II 2.0	99.
1117	MacDraw II 1.0	309.
4815	Smart Form Designer	309.
4814	Claris CAD	629.
	Cricket Software	
4346	Cricket Paint 1.0	99.
1667	Cricket Draw 1.1.1	168.
5086	Cricket ColorPaint 1.0	179.
	★Deneba Software ... 30 day MBG	
1769	Canvas 2.0	159.
	★DreamMaker ... 60 day MBG	
4088	MacGallery *(MacPaint format)*	27.
	Dubl-Click Software	
	LaserType Vol. 1-6 each	45.
3972	World-Class Fonts! Originals (1-2)	45.
3973	World-Class Fonts! The Stylish (3-4)	45.
3974	World-Class Fonts! The Giants (5-6)	45.
3964	WetPaint Classic Clip-Art (1-2)	45.
3965	WetPaint For Publishing (3-4)	45.
3966	WetPaint Animal Kingdom (5-6)	45.
3967	WetPaint Special Occasions (7-8)	45.
3968	WetPaint Printer's Helper (9-10)	45.
3969	WetPaint Industrial Revolution (11-12)	45.
3970	WetPaint Old Earth Almanac (13-14)	45.
3971	WetPaint Island Life (15-16)	45.
4940	WetPaint All the People (17-18)	45.
	Electronic Arts	
4315	Studio/8 1.0	309.
	★Enabling Technologies ... 30 day MBG	
1871	Pro3D	285.
5020	Clip 3D Fonts	57.
5019	Clip 3D Accents	57.
5022	Clip 3D Geography	57.
5023	Clip 3D Messages	57.
5024	Clip 3D People	$57.
5025	Clip 3D Recreation	57.
5027	Clip 3D Lifestyle	57.
5026	Clip 3D Business	57.
	Enzan-Hoshigumi USA	
1879	MacCalligraphy 2.0	99.
	★Foundation Publishing ... 60 day MBG	
2384	Comic Strip Factory 1.6	42.
2385	Comic People	24.
	★Generic Software ... 60 day MBG	
4319	Generic CADD Level 1 1.1	89.
	★Graphsoft ... 30 day MBG	
4993	MiniCad+	519.
	★Great Wave ... 30 day MBG	
2272	Crystal Paint 1.0	27.
	Innovative Data Design	
2417	MacDraft 1.2B	145.
4707	Dreams 1.0	275.
	★MacroMind ... 30 day MBG	
4953	VideoWorks II 2.0 *special*	150.
4952	VideoWorks II HyperCard Driver 1.2	60.
4954	VideoWorks II Accelerator 1.1	115.
	Miles Computing	
4847	Mac the Knife Vols. 3,4, & 5 *special*	69.
	Olduvai Software	
4667	Art Clips	51.
4850	Art Fonts 1	55.
4851	Art Fonts 2	55.
	★Paracomp ... 30 day MBG	
4597	Swivel 3D 1.0	249.
5028	Model Shop 1.0	379.
	★Silicon Beach ... 60 day MBG	
3504	Silicon Press 1.1	52.
3506	SuperPaint 2.0	129.
3507	Super3D 2.0	325.
3980	Digital Darkroom 1.0	195.
	★Solutions, Intl. ... 60 day MBG	
3446	The Curator 1.05	75.
	★SuperMac Software ... 60 day MBG	
3380	PixelPaint 2.0	199.



Abacus Concepts ... 60 day MBG
StatView II 1.03–Honorable mention–1989 MacUser Editors' Choice Award for *Science/Engineering.* "Offers powerful statistical analysis tools." Now with presentation quality color graphics **$339.**

	★Symmetry ... 30 day MBG	
4160	PictureBase 1.23-WetPaint Bundle	$89.
	★T/Maker ... 30 day MBG	
3633	Christian Images	35.
	★3G Graphics ... 30 day MBG	
3942	Images with Impact: Graphics 1	59.
4583	Images with Impact: Business 1	69.
	★Zedcor ... 60 day MBG	
3986	DeskPaint & DeskDraw 2.01	69.

CE Software ... 60 day MBG
QuickMail 2.0–Honorable mention–1989 MacUser Editors' Choice Award for *Networking.* The Ultimate E-Mail & more. Plus... FREE... *Vaccine*–1989 *Most Significant Product* Eddy Award winner. Both in one great package **$205.**

PUBLISHING & PRESENTATIONS

	Adobe Systems	
1138	The Collector's Edition	79.
4816	The Collector's Edition II	139.
5001	StreamLine	239.
1142	Newsletters/Publishing Pack 1	249.
4565	Forms and Schedules Pack 2	299.
4566	Presentations Pack 3	299.
1137	Adobe Illustrator '88 1.6	299.
	MacConnection carries the entire Adobe Type Library (volumes 1-82). Listed below are Adobe's newest typefaces at press time.	
4577	67 ITC Clearface	245.
4578	68 Americana	125.
4579	69 ITC Serif Gothic	182.
4817	70 Century Expanded	95.
4818	71 Serifa	182.
4819	72 Caslon Open Face	63.
4820	73 Frutiger	245.
4821	74 Centennial	245.
4822	75 Stemple Garamond	125.
4823	76 Weiss	125.
4824	77 Garamond 3	125.
4825	78 Universal News Com/Greek	95.
4826	79 Avenir 1	182.
4827	80 Avenir 2	182.

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Quicken 1.01–1989 MacUser Editors' Choice Award for *Best New Personal Financial Package*. "Hands-down winner in this category. Surprises you by delivering an entire personal or small business accounting system." .... $32.

4828	81 Bauhaus	125.
4829	82 Antique Olive	125.
	Aldus	
1330	Freehand 2.0	349.
4751	Persuasion 1.0	385.
1331	PageMaker 3.01	389.
	★Altsys ... 30 day MBG	
1195	Fontographer 2.4.1 *(CP)*	229.
	Broderbund	
4465	DTP Advisor 1.0	47.
	★Casady & Greene ... 60 day MBG	
	MacConnection carries the entire collection of Fluent Laser Fonts ea.	46.
4839	Vivid Impressions	69.
4838	Quill Pack *(Vol. 8 & 20)*	105.
4836	Headline Pack *(Vol. 10-12)*	145.
4837	Modern Pack *(Vol. 7, 14-18)*	195.
4834	Distinctive Pack *(Vol. 8, 19-22)*	195.
4833	Classic Pack *(Vol. 3-6, & 13)*	195.
	Cricket Software	
1668	Cricket Graph 1.3	115.
1670	Cricket Presents 2.0	289.
	★DreamMaker ... 60 day MBG	
4840	Cliptures: Business 1	95.
4841	Cliptures: Business 2	95.
	★Farallon Computing ... 30 day MBG	
4684	ScreenRecorder 1.0	135.
2199	MacRecorder 1.1	135.
	Letraset	
5047	StandOut 1.0	175.
2621	Ready,Set,Go! 4 4.5	275.
2619	Image Studio 1.5	275.
4709	LetraStudio 1.0	289.
	★Microsoft ... 30 day MBG	
2878	PowerPoint 2.01	255.
	Postcraft International	
3157	Laser FX 1.6	99.
	Quark	
4621	QuarkStyle 1.0	189.
3230	Quark XPress 2.0	499.
	★Softstream Int'l., Inc. ... 60 day MBG	
4996	UltraSpec 1.0	95.
	Springboard	
3530	Certificate Maker 2.0	24.
4497	Top Honors	59.
4500	Springboard Publisher 1.0	109.
	★T/Maker ... 30 day MBG	
3635	EPS Illustrations	75.

PROGRAMMING & HYPERMEDIA

	★Beacon Technology ... 30 day MBG	
4967	HyperBible *(King James)*	$159.
4968	HyperBible *(New International)*	195.
	Borland International	
1511	Turbo Pascal 1.1	68.
	★DreamMaker ... 60 day MBG	
4115	MacGallery *(HyperCard format)*	27.
	★Hyperpress Publish. ... 30 day MBG	
4233	Icon Factory 1.0	29.
5089	Script Library 1.0	29.
5090	Silver Screen 1.0	42.
4265	Script Expert 1.0	46.
	Ideaform	
2418	HyperBook Maker 1.0	31.
	Individual Software	
4719	101 Scripts & Buttons for Hypercard	37.
	★Manx Software ... 60 day MBG	
4068	Aztec C 3.6B	65.
4317	Aztec SDB	65.
4316	Aztec C UniTools	65.
4069	Aztec MPW C 3.6B	99.
4075	Aztec C + SDB 3.6B	99.

Electronic Arts

Studio/8 1.0–1989 MacUser Editors' Choice Award for the *Best New Paint Program*. "Offers every imaginable tool and the ability to work with all the colors a Mac II can display." $309.

	★Microsoft ... 30 day MBG	
4471	QuickBasic 1.0	65.
	★OWL International ... 30 day MBG	
3082	Guide 2.0	99.
	★SmethersBarnes ... 30 day MBG	
1478	Prototyper 2.0	149.
	Softworks, Inc.	
4601	Stack Cleaner	29.
4599	HyperTools #1 1.02	59.
4600	HyperTools #2 1.03	59.
	★Symantec ... 30 day MBG	
4644	Just Enough Pascal 1.0	49.
3421	Lightspeed Pascal 2.0	85.
3420	Lightspeed C 3.01	149.
	TENpoint0	
1338	Reports! 1.2	69.
4638	Focal Point II 1.0	119.
	★TML Systems ... 30 day MBG	
3548	TML Source Code Library II 1.1	42.
4989	TML Pascal II 3.0 *(w/o MPW 3.0)*	59.
3549	TML Pascal II 3.0 *(w/MPW 3.0)*	115.
	True BASIC, Inc.	
3587	True BASIC 2.01	59.
	★Zedcor ... 60 day MBG	
3985	ZBASIC 5.0	$99.

UTILITIES

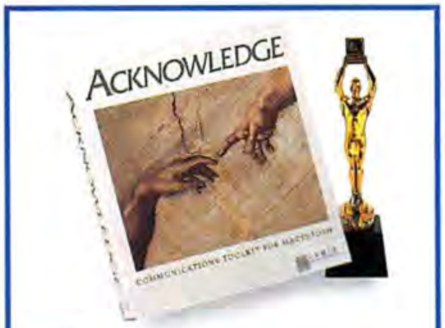
	★Affinity Microsystems ... 60 day MBG	
1014	Affinifile 1.1	46.
1016	Tempo II 1.0	89.
	★Berkeley System ... 30 day MBG	
1541	Stepping Out II 2.01	52.
	Beyond, Inc.	
4203	MenuFonts 2.02	29.
	★Casady & Greene ... 60 day MBG	
2269	QuickDEX 1.4A	32.
	★CE Software ... 60 day MBG	
1727	CalendarMaker 3.0	27.
1728	DiskTop 3.0.4	27.
4689	MockPackage Plus Utilities 4.4	27.
1729	QuicKeys 1.1	52.
	Central Point	
5040	Copy II Mac 7.2	20.
5041	PC Tools Deluxe Mac 1.1	42.
	Dubl-Click Software	
1824	Calculator Construction Set 1.04	35.
	Electronic Arts	
1843	Disk Tools Plus 1.01	31.
	★Fifth Generation ... 60 day MBG	
4287	PYRO! 3.3 *(screen saver)*	15.
3954	PowerStation 2.5	32.
3955	Suitcase II 1.2.2	45.
3953	FastBack Mac 1.3	54.
	★FWB Software ... 30 day MBG	
2232	Hard Disk Partition 2.0	41.
4683	Hard Disk DeadBolt 1.0	53.
	★HJC Software ... 30 day MBG	
4803	Virex 1.3	69.
	ICOM Simulations	
4084	On Cue 1.3	36.
	Ideaform	
2419	DiskQuick 2.10	27.
2420	MacLabeler Plus 3.0	42.
	★Kent Marsh Ltd. ... 30 day MBG	
2591	The NightWatch 1.02	87.
2592	MacSafe 1.08C	87.
	★Lundeen & Assoc. ... 60 day MBG	
2683	WorksPlus Command 2.0	57.
	MEDIAGENIC	
4591	Open It! 1.0	49.

Softworks, Inc.

Each package includes 16 development tools. *HyperTools #1 1.02*–For stack design, icon editing, and alignment (incl. HyperCard) $59. *HyperTools #2 1.03*–For enhancing stacks, data entry, and formatting (incl. HyperCard) .. 59.

you've ever seen.

	★Microlytics ... 60 day MBG	
2732	GOfer 1.0	$43.
	★Microseeds Pub. ... 60 day MBG	
4848	INITPicker	29.
4210	Screen Gems 1.0	47.
2913	Redux 1.5	59.
	Olduvai Software	
4503	MultiClip 1.0	36.
3031	Icon-It! 1.1	39.
5030	ClipShare 1.0	99.
3030	FontShare 1.1	149.
	★PCPC ... 30 day MBG	
3175	HFS Backup 3.0	54.
	★Solutions, Intl. ... 60 day MBG	
3448	SmartScrap & The Clipper 2.0	46.
3449	SuperGlue 1.05	50.
	★SuperMac Software ... 60 day MBG	
3383	SuperSpool 5.0	53.
3382	SuperLaserSpool 2.0	79.
3378	Multi-User SuperLaserSpool 2.0	199.
3377	Diskfit 1.5	53.
3379	Network Diskfit 1.5	199.
3381	Sentinel 2.0	89.
	★Symantec ... 30 day MBG	
4728	MacSQZ! 1.51	52.
4729	S.U.M. 1.1	65.
	★Symmetry ... 30 day MBG	
3318	HyperDA 1.1	35.



Lamir ... 30 day MBG
Acknowledge 1.0–1989 MacUser Editors' Choice Award for *Best New Telecommunications Product*. "We salute it for offering us a glimpse of what telecommunications might be like in the near future." . . . . $329.

	★Williams & Macias ... 30 day MBG	
3783	myDiskLabeler w/Color 2.9.1I	31.
3784	myDiskLabeler w/LaserWriter 2.9.1LI	34.
4976	Sticky Business 1.0.4	99.
	Working Software	
3788	Findswell 2.0	36.

WORD PROCESSING

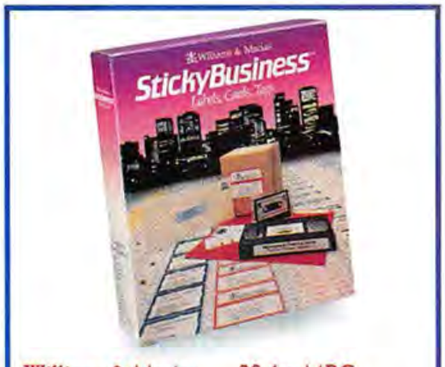
	★Access Technology ... 60 day MBG	
3959	MindWrite 2.1	95.
4109	MindWrite*Express* 2.1	139.

Insignia Solutions
SoftPC 1.3–Honorable mention–1989 Editors' Choice Award for *Connectivity*. (Mac to Non-Mac). "Emulates a PC on a Mac II." Requires less memory, & works with FDHD drives. . . $249.

	★Aegis Development ... 60 day MBG	
1133	Word Tools 1.2	42.
	Ashton-Tate	
1324	FullWrite 1.0	269.
	★Deneba Software ... 30 day MBG	
4700	BigThesaurus *(1.4 million words)*	54.
1767	Comment 2.0	54.
1768	Coach Professional 3.0A	105.
	Electronic Arts	
1543	Thunder II 2.0	52.
	★Lundeen & Assoc. ... 60 day MBG	
2684	WorksPlus Spell 2.0	46.
	★Microlytics ... 60 day MBG	
2733	Word Finder 2.0	33.
4870	Electronic WordFinder 220	79.
	★Microsoft ... 30 day MBG	
2885	Write 1.0	79.
2882	Word 4.0	255.
	★Niles & Associates ... 30 day MBG	
5048	EndLink 1.0	59.
4602	EndNote 1.1.1	82.
	★Preferred Publishers ... 30 day MBG	
4781	Vantage 1.0	59.
	★Sensible Software ... 30 day MBG	
4692	BookEnds 1.0	53.
3375	Sensible Grammar 1.1D	53.
	Software Discoveries	
3374	Merge Write 1.0	34.
	★Symantec ... 30 day MBG	
3422	More II 2.0	255.
	★Symmetry ... 30 day MBG	
4504	Acta Advantage 1.0	65.
	★T/Maker ... 30 day MBG	
3639	WriteNow 2.0	109.
	WordPerfect	
3800	WordPerfect Mac 1.0.1	185.
	Working Software	
3792	Spellswell 2.0G	45.
4693	Quick Letter 1.0	75.

MUSIC & EDUCATION

	★Ars Nova ... 60 day MBG	
1215	Practica Musica 2.1	$75.
	★Bogas Productions ... 60 day MBG	
4255	Super Studio Session 2.0	75.
1461	Studio Session 2.0	49.
	★Bright Star Tech. ... 30 day MBG	
1402	Alphabet Blocks 3.01	32.
3961	Talking Tiles 1.0	69.
	Broderbund Software	
4314	Type! 1.0	20.
1423	Jam Session 1.1 *(CP)*	30.
1422	Geometry 1.0 *(CP)*	59.
4067	Calculus 1.0 *(CP)*	59.
	Coda Music Systems	
4367	MacDrums 1.01 *(CP)*	32.
4483	Perceive 1.0	52.
	Davidson & Associates	
1734	Math Blaster! 1.0 *(CP)*	27.
4978	Speed Reader II 1.0 *(CP)*	36.
	Electronic Arts	
3941	SmoothTalker 2.0	33.
3935	Speller Bee	33.
4619	Mavis Beacon Typing 1.2B	35.
1846	Deluxe Music Construction Set 2.5	85.
	★Great Wave ... 30 day MBG	
2277	TimeMasters 1.0	22.
2276	KidsTime 1.2	26.
2270	American Discovery 2.1	27.
4334	NumberMaze 1.0	27.
2273	ConcertWare+ 4.0	39.
2271	ConcertWare+ MIDI 4.0	79.
	Individual Software	
4209	Typing Instructor Encore	26.
	Learning Company	
2670	Reader Rabbit 2.0 *(CP)*	32.
	Mindscape	
2748	The Perfect Score: SAT 1.0	46.



Williams & Macias ... 30 day MBG
Sticky Business 1.0.4–Solves your business labeling problems. Design and print distinctive preformatted labels, cards and tags using your Mac. Be creative with text and graphics . $99.

950C
MMC
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MacConnection™ 1-800/622-5472

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/622-5472 603/446-7711 FAX 603/446-7791

This is for real:

	★Personal Training Sys. ... 60 day MBG	
	MacConnection carries the entire PTS collection. A partial listing follows.	
4946	Excellerate *(beginner level)*	$29.
4852	PageTutor *(beginner level)*	39.
4947	LearnWord *(beginner level)*	39.
	Primera Software	
5003	Different Drummer	59.
	★Simon & Schuster ... 60 day MBG	
3305	Typing Tutor IV 1.2	35.
	★Spinnaker ... 30 day MBG	
2329	SAT Score Improvement 1.0 *(CP)*	57.
	Springboard	
4493	Atlas Explorer *(CP)*	28.
	★Think Educational ... 60 day MBG	
3615	MacEdge II 1.0 *(CP)*	27.
	★Unicorn ... 30 day MBG	
3751	Animal Kingdom *(CP)*	27.
3756	Math Wizard *(CP)*	27.

ENTERTAINMENT

	Access Software	
4655	World Class Leader Board Golf	28.
	★Accolade ... 30 day MBG	
1184	Hardball *(CP)*	23.
4484	Mean 18 *(CP)*	23.
4485	4th and Inches *(CP)*	23.
	Activision	
4475	Quarterstaff *(CP)*	30.
4486	Manhole	30.
4592	Zork Zero *(CP)*	36.
	Broderbund Software	
4099	Shufflepuck Cafe *(CP, air hockey)*	24.
4111	Moebius *(CP, adventure & arcade)*	24.
4229	Where is Carmen Sandiego? *(CP)*	27.
4965	Auto Duel *(CP)*	27.
4966	SimCity *(CP)*	27.
1421	Ancient Art of War *(CP)*	27.
4540	Ancient Art of War at Sea *(CP)*	27.
	Bullseye	
1544	Ferrari Grand Prix *(CP)*	32.
4074	P51 Mustang Flight Simulator *(CP)*	32.
	★Casady & Greene ... 60 day MBG	
2268	Crystal Quest 2.2C	26.
4119	Crystal Quest w/Critter Editor 2.2C	42.
	★Discovery Software ... 30 day MBG	
4408	Arkanoid	27.

HJC Software ... 30 day MBG

Virex 1.3–The first comprehensive solution to the threat of Mac computer viruses. Virex both detects their presence & repairs infected programs on files, disks & servers. Combats all known viruses . . . . $69.

	Electronic Arts	
1842	Chessmaster 2000 *(CP)*	$28.
4064	Chuck Yeager Flight Simulator *(CP)*	32.
4588	Life & Death *(CP, surgery simulation)*	32.
4945	The Hunt for Red October *(CP)*	32.
4981	Starfleet 1: The War Begins	36.
	Epyx	
2037	Sub Battle Simulator	29.
4660	Sub Battle Simulator for Mac II	29.
	MicroProse	
4697	Pirates! *(CP)*	32.
	★Microsoft ... 30 day MBG	
2868	Flight Simulator *(CP)*	33.
	Miles Computing	
2767	Harrier Strike Mission II *(CP)*.*special*	27.
2765	Fool's Errand *(CP)* .*special*	27.
	Mindscape	
4083	Balance of Power 1990 *(CP)*	30.
3987	Colony *(CP)*	30.
4596	Deja Vu II *(CP)*	30.
	PBI Software	
3110	Strategic Conquest Plus 2.0	35.
4985	NetTrek—The Real Version	35.
	PCAI	
3144	MacGolf 2.0 *(CP)*	35.

Casady & Greene ... 60 day MBG

Crystal Quest w/ Critter Editor 2.2C–1989 MacUser Editors' Choice Award for *Best New Recreation Program*. "Clear winner: import digitized sounds as well as edit game play itself." . . . . $42.

Crystal Quest 2.2C . . . . 26.

4320	MacGolf Classic *(CP)*	54.
4321	Lunar Rescue *(CP)*	34.
4517	Road Racer *(CP)*	39.
	Sierra On-Line	
3397	Leisure Suit Larry *(CP)*	23.
3396	King's Quest III *(CP)*	29.
	★Silicon Beach ... 60 day MBG	
3501	Apache Strike	27.
3503	Dark Castle	27.
3502	Beyond Dark Castle	27.
3508	World Builder	41.
	★Simon & Schuster ... 60 day MBG	
3303	Star Trek Kobayashi Alternative *(CP)*	24.
	Sir-Tech	
3347	Mac Wizardry *(CP)*	35.
	★Softstream Int'l., Inc. ... 60 day MBG	
4071	Mac•Man *(w/adapter)*	24.
4072	The Solitaire DA	24.
4073	Colour Billiards	35.
4995	Cribbage Tutor	27.
	★Spectrum Holobyte ... 30 day MBG	
4175	Solitaire Royale *(for Mac SE)*	20.
3464	Tetris	20.

Silicon Beach ... 60 day MBG

Digital Darkroom 1.0–1989 MacUser Editors' Choice Award for *Best New Image-Processing Software (B & W)*. "By offering the tools of digital photo retouching it should become a part of every scanner user's arsenal." . $195.

4472	Tetris *(color version)*	24.
3462	PT-109	26.
3459	Falcon 2.0	32.
	★Spinnaker ... 30 day MBG	
2328	Sargon IV *(CP)*	29.
	Springboard	
4988	Hidden Agenda	36.
	★SubLogic ... 60 day MBG	
4698	Jet *(CP)*	32.

NETWORKS & COMMUNICATIONS

	★Abaton ... 30 day MBG	
4589	InterFAX Modem	325.
	★CE Software ... 60 day MBG	
3963	QuickMail 2.0	205.
	★CompuServe ... 60 day MBG	
1676	CompuServe Information Service	24.
1673	CompuServe Navigator 2.02	45.
1674	Standard Service/Navigator Bundle	59.
	★DataViz ... 60 day MBG	
1823	MacLink Plus 3.0	139.
4842	MacLink Plus/Translators	119.
	★Dove Computer ... 60 day MBG	
4939	FastNet III	450.
4938	FastNet SE	450.
4937	FastNet SCSI	925.
	★Dow Jones ... 30 day MBG	
1785	Desktop Express 1.03	95.
1786	Market Manager Plus 2.0	189.
	★Farallon Computing ... 30 day MBG	
4208	Timbuktu 2.0.1	65.
4866	Timbuktu Remote 1.0.1	195.
4867	Timbuktu 30-Pack	1395.
2201	TrafficWatch 1.08	139.
2202	PhoneNET-AppleTalk 120 adapter	9.
2203	PhoneNET PLUS *(DIN-8)*	35.
2204	PhoneNET PLUS *(DB-9)*	35.
2205	PhoneNET Punch Down Block	69.
4869	PhoneNET Connector 10-Pack	225.
4868	PhoneNET Repeater	325.
2206	PhoneNET StarController	1199.
	★Freesoft ... 60 day MBG	
2219	Red Ryder 10.3	54.
	Hayes	
2300	Smartcom II 3.0B	88.
2307	Smartmodem 2400	429.

"Was I dreaming or what?"

Dear MacConnection,

I had to get a quote for a surgical laser to a surgeon before noon tomorrow. I had already missed FedEx and I hadn't even done the proposal yet. Then it hit me. What if I called MacConnection, ordered a fax board, and faxed the quote before the meeting? Was I dreaming or what?

I made the call at 7:58 PM. I prepared my quotation. The fax board arrived the next morning at 9:00 AM. By 10:30 AM I sent the quote, and even discussed it with the good doctor before the meeting. It's a good thing I was too late to call FedEx—the quote might not have made it in time.

I love it! What a company!

Mark Trigsted
Advanced Laser Systems, Inc.
Allentown, PA

1-800/622-5472

MacConnection™

MacConnection, 14 Mill Street, Marlow, NH 03456 1-800/622-5472 603/446-7711 FAX 603/446-7791

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

money back deal.

★PCPC ... 30 day MBG

3177	HD-WSI *(Apple HD-20 to SCSI)*	$269.
3189	MacBottom HD 45 SCSI	859.
4658	MacBottom HD 84 SCSI	1249.

DISKS

3297	**Sony** 3½" DS/DD Disks	16.
3772	**Verbatim** 3½" DS/DD Disks	17.
2214	**Fuji** 3½" DS/DD Disks	17.
2792	**MAXELL** 3½" DS/DD Disks	17.
3298	**Sony** 3½" HD Disks *(1.44 Meg)*	39.
3773	**Verbatim** 3½" HD Disks *(1.44 Meg)*	39.
2215	**Fuji** 3½" HD Disks *(1.44 Meg)*	39.
2793	**MAXELL** 3½" HD Disks *(1.44 Meg)*	39.

ACCESSORIES

★Avery ... 60 day MBG

4864	3½" Disk Labels *(Qty. 250)*	13.
4865	3½" x 15/16" Address Labels *(Qty. 3750)*	15.
4811	8½" x 11" Transparencies *(Qty. 50)*	22.

Bantam Publishing

1403	Complete HyperCard Handbook	23.

★Computer Coverup ... 60 day MBG

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

★Ergotron ... 60 day MBG

2004	Mouse Cleaner 360°	15.
3992	The Muzzle *(covers power outlet)*	62.
2000	MacTilt SE	68.

★Goldstein & Blair ... 30 day MBG

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

★I/O Design ... 30 day MBG

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

Kalmar Designs

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

★Kensington ... 30 day MBG

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

2577	Mouseway *(mouse pad)*	8.

Ergotron ... 60 day MBG

MacTilt SE–Eliminate eye, neck & back strain. This sturdy unit allows full range of tilting & swiveling .... $68.

Mouse Cleaner 360°–Quick & easy cleaning kit to keep your mouse rolling smoothly..... 15.

2589	Universal Printer Stand	$15.
4126	LaserWriter II Cover	17.
5021	Space Saving Printer Stand	17.
2545	Universal Copy Stand	22.
4970	Modem/FAX Protector 10	15.
4971	Modem/FAX Protector 20	25.
4972	Power Tree 10 *(good)*	19.
4973	Power Tree 20 *(better)*	29.
4974	Power Tree 50 *(best)*	59.
2559	Apple Security Kit	34.
2556	Maccessories Anti-Glare Filter	33.
2568	Maccessories SuperBase	34.
2585	Printer Muffler 80	43.
2586	Printer Muffler 80 Stand	24.
2583	Printer Muffler 132	58.
2584	Printer Muffler 132 Stand	24.
4070	System Saver SE	52.
2566	System Saver Mac *(platinum)*	64.
2546	Maccessories A-B Box	64.
5064	Apple Color Monitor Polarizing Filter	65.
5065	Full Page Display Polarizing Filter	65.
5066	Two Page Display Polarizing Filter	135.
4941	Mac II Monitor Stand	65.

Odesta ... 30 day MBG

Double Helix II 2.0R51–Honorable mention–1989 MacUser Editors' Choice Award for *Relational Database*. Build powerful self-running databases with its intuitive tile-based interface... $339.

4643	Mac II Stand and Cable Kit	65.
2561	MasterPiece Mac II	105.

★MacConnection ... 60 day MBG

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

★Mobius Technologies ... 60 day MBG

4470	Fanny Mac QT	60.

★Moustrak ... 60 day MBG

2694	Moustrak Pad *(standard 7"x9")*	8.
2692	Moustrak Pad *(large 9"x11")*	9.
2693	Moustrak Pad L/F *(9"x11")*	10.
	Moustrak Designer Series .....ea.	12.

Ribbons

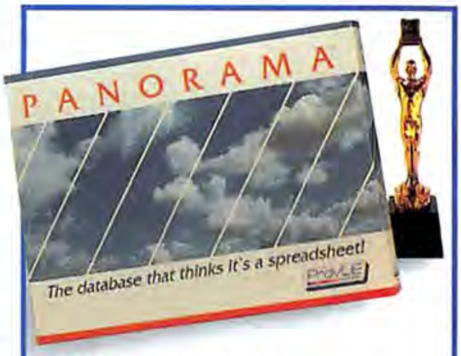
3255	ImageWriter II Ribbon	4.
3261	ImageWriter II 4-color Ribbon	9.
3270	ImageWriter II Rainbow Six Pack	20.
3260	ImageWriter LQ Black Ribbon	17.

★Simon & Schuster ... 60 day MBG

4230	*The Fully Powered Mac* book	24.

★Sopris Softworks ... 60 day MBG

4016	MacPlus Cover *(navy)*	15.
4171	Mac SE Std. Keyboard Cover *(navy)*	15.
4019	Mac SE & Ext. Keyboard Cover *(navy)*	15.
4017	ImageWriter II Cover *(navy)*	11.
4168	ImageWriter LQ Cover *(navy)*	13.



ProVUE ... 60 day MBG

Panorama 1.1–1989 MacUser Editors' Choice Award for *Best New Flat-File Manager*. "With the look of a spreadsheet, this RAM-based flat-file manager is extremely quick and agile.". . $205.

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

★Targus ... 60 day MBG

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

OUR POLICY

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

SHIPPING

Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all credit card orders phoned into MacConnection by 8 PM EST will ship Airborne the same night for next day delivery, except for those within UPS Ground Zone 1 (which is also an overnight service). The total freight charge on any order placed with MacConnection is now $3. Backorders will also ship Airborne overnight at no additional charge. Some areas require an additional day delivery.

Hawaii, Alaska and Outside Continental US: Call 603/446-7711 for information.

A no-questions-asked

	Insignia Solutions	
4089	SoftPC 1.3	$249.
	★LaCie, Ltd. ... 30 day MBG	
4975	LaCie Utilities 1.0 *(Includes SilverLining, SilverPlatter, and SilverServer)*	89.
	★Lamir ... 30 day MBG	
4984	Acknowledge 1.0	329.
	★Microsoft ... 30 day MBG	
2875	Microsoft Mail 1.36 (1-4 users)	195.
2872	Microsoft Mail 1.36 (5-10 users)	325.
	★Nuvotech ... 60 day MBG	
3000	TurboNet ST *(DIN-8)*	30.
3001	TurboNet ST *(DB-9)*	30.
	★Practical Peripherals ... 30 day MBG	
3100	1200 Baud External Modem	77.
3102	2400 Baud External Modem	179.
3089	Mac Communications Pack	225.
	★Shiva ... 30 day MBG	
3444	NetSerial X232	289.
4347	NetBridge	349.
4942	TeleBridge	349.
3443	NetModem V2400	479.
	★Software Ventures ... 30 day MBG	
3454	Microphone 1.5	119.
3455	Microphone II 2.0	225.
	★Solutions, Intl. ... 60 day MBG	
4308	BackFAX *(reqs. Apple FAX modem)*	127.
	★Synergy ... 30 day MBG	
3130	VersaTerm 3.20	65.
3131	VersaTerm-PRO 3.0	189.
	★TOPS ... 30 day MBG	
3723	TOPS Mac 2.1	149.
3726	TOPS for DOS 2.1	119.
3724	NetPrint 2.0	119.
4715	InBox Connection Mac 2.2	75.
4714	InBox Starter Kit 2.2	199.
4188	TOPS Teleconnector *(DIN-8)*	39.
4189	TOPS Teleconnector *(DB-9)*	39.
4598	TOPS FlashBox	125.
3725	TOPS Repeater	129.
3720	TOPS Flashcard	169.
	★Traveling Software ... 60 day MBG	
3729	LAP-LINK Mac 2.0	83.

INPUT/OUTPUT

	★Abaton ... 30 day MBG	
1188	ProPoint ADB	89.

Paracomp ... 30 day MBG

Swivel 3D 1.0–Honorable mention–1989 MacUser Editors' Choice Award for *Science & Engineering*. Features full color shading & innovative linking for realistical movement. Earned a 5 mice rating from MacUser. . . . . $249.

	Caere	
4476	OmniPage 1.0	$559.
	★Cutting Edge ... 30 day MBG	
3988	CE 105ADB Keyboard w/QuicKeys	145.
	★Datadesk ... 30 day MBG	
1819	MAC-101 Keyboard *(beige)*	145.
1820	MAC-101 Keyboard *(platinum)*	145.
1821	MAC-101 Keyboard *(ADB)*	145.
	★Ex Machina ... 30 day MBG	
4843	WristMac	149.
5018	WristMac Executive	199.
	★Kensington ... 30 day MBG	
2576	Turbo Mouse for Mac Plus	109.
2547	Turbo Mouse ADB	109.
	Koala	
2593	MacVision 2.0	219.
	★Kraft Systems ... 60 day MBG	
2600	3-Button QuickStick	39.
4082	3-Button QuickStick ADB	51.
	Kurta	
2604	IS ADB Tablet	255.
2605	Cordless 4 Button Cursor	65.

Fifth Generation ... 60 day MBG

Suitcase II 1.2.2–Honorable mention–1989 MacUser Editors' Choice Award for *Utilities and Desk Accessories*. Unlimited number of fonts & DA's without having to install them in your system . . . . $45.

	★LYNX Computer ... 30 day MBG	
1211	LYNX Trackball	65.
1212	LYNX Trackball ADB	65.
	★Mobius Technologies ... 60 day MBG	
4846	MultiScreen	349.
	★Mouse Systems ... 30 day MBG	
2808	A+ Mouse	65.
2809	A+ Mouse ADB	85.
	★Nutmeg Systems ... 30 day MBG	
2992	15" Monitor for Mac PLUS	999.
2994	15" Monitor for Mac SE	999.
2993	15" Monitor for Mac II	999.
4002	19" Monitor for Mac PLUS	1349.
4096	19" Monitor for Mac SE	1349.
4097	19" Monitor for Mac II	1449.
4849	LCD Interface *(Kodak DataShow)*	399.
	Olduvai Software	
3035	Read-It! OCR Personal	99.
3034	Read-It! OCR 2.0	249.
	★Orange Micro ... 30 day MBG	
4488	Grappler Spooler	39.
3036	Grappler C/Mac/GS	79.
4076	Grappler LQ	103.
4487	Grappler LS	103.

North Edge Software ... 30 day MBG

Timeslips III 1.1–1989 MacUser Editors' Choice Award for *Best New Professional Financial Package*. "By far the best program we've seen for tracking time spent on client's accounts." . . . . $117.

	★PCPC ... 30 day MBG	
5005	SHADOWGRAPH Monitor *(gray scale, incl. CGC/2 Card)*	2895.
5004	CGC/2 Graphics Card	1495.
	★PTI/DataShield ... 30 day MBG	
4845	MacDirector	115.
	SoftStyle	
3282	Printworks (Dot Matrix) 3.5	43.
3283	Printworks (HP laser) 3.6	85.
	Summagraphics	
4298	BitPad Plus ADB	325.
	★Thunderware ... 30 day MBG	
3648	ThunderScan 5.0 with PowerPort	189.
4994	LightningScan	409.

MEMORY & DRIVES

1107	**1 Meg SIMMs**	call
	AST Research	
4666	Mac 86	429.
1229	Mac 286	1079.
	★Cutting Edge ... 30 day MBG	
3989	800k External Disk Drive	175.
3990	The Wedge XL 30+ SCSI	559.
3991	The Wedge XL 45+ SCSI	689.
	★Dove Computer ... 60 day MBG	
1801	SCSI Interface/Port	109.
1807	MacSnap 524E	289.
1809	MacSnap 524S	379.
1811	MacSnap 548	499.
1812	MacSnap 548S	589.
1800	MacSnap 2SE	439.
1797	MacSnap Plus 2	439.
1804	MacSnap 2S	call
1805	MacSnap 4S	call
1793	MaraThon 020 MSE1	585.
1794	MaraThon 020 MSE2 *(1 Meg)*	979.
1795	MaraThon 020 MSE3 *(math chip)*	779.
1796	MaraThon 020 MSE4 *(1 Meg/chip)*	1159.
4231	MaraThon 020 MSE4x4	2095.
4663	MaraThon 030 Accelerator 32 Mhz	999.
	★LaCie, Ltd. ... 30 day MBG	
4983	Maxcie Internal Drive Kit	59.
	(with Epson 40 Meg, 25ms)	509.
	(with Epson 70 Meg, 25ms)	659.
4982	Maxcie External Drive Kit	189.
	(with Epson 40 Meg, 25ms)	625.
	(with Epson 70 Meg, 25ms)	775.

MOVE

by STUART CUDLITZ

Animation is an illusion. Take a series of static images, display them in rapid succession, and you create the impression of continuous motion. The slowest display possible before movements appear jerky is about 16 images per second. The Mac II with an Apple color card can display 66 noninterlaced frames per second—that's plenty for making Mac-created animations look believable.

Animators today are taking advantage of that potential to do everything from building better video games to creating moving storyboards for motion pictures, walk-throughs of architectural models, and even complete short pieces. But if you want to create animations on the Mac, there are decisions you must make.

One of the first decisions will be what type of software you will use to create and view your graphics. Three-dimensional software provides you with a wide range of choices for designing realistic models and creating simulations with real-world properties. Two-dimensional programs, which display sequences of paint object graphics screens, enable you to simulate traditional frame-by-frame animation. Some 2-D products, such as those from MacroMind, also provide editing tools and facilities for *compositing,* or layering,

IT!

SCOTT BALDWIN

Whether you do traditional cell animation or real-time 3-D simulations, there's a Mac animation program for your purpose

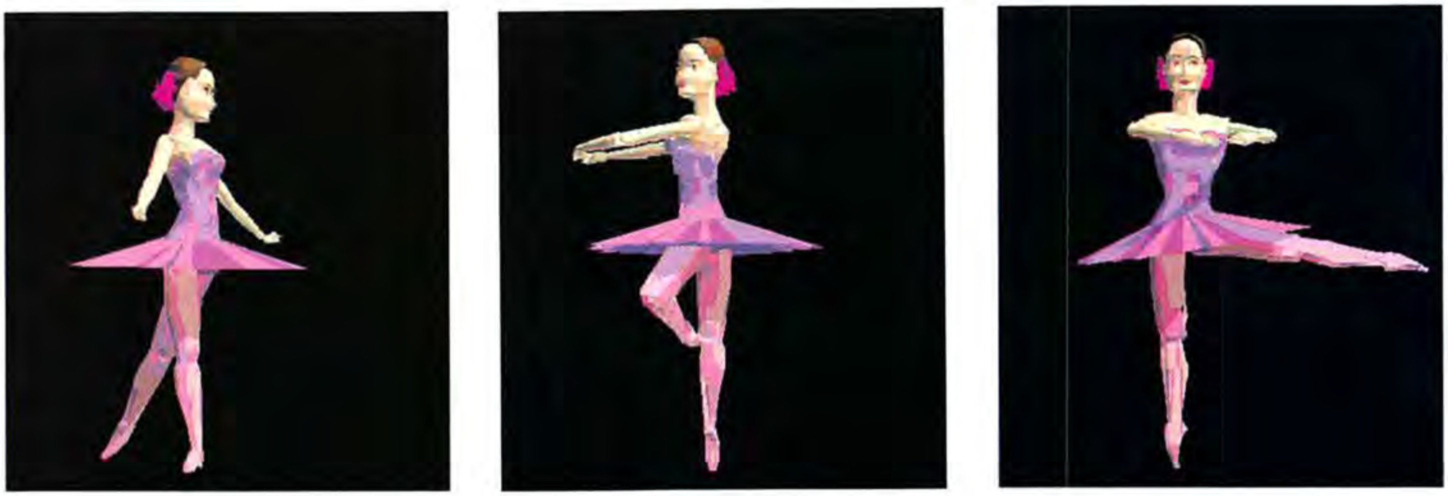
multiple animating images. Then there are HyperCard-based applications, which provide an interactive mechanism for displaying animations. The important thing is to select software with animation features that will economically give you the look you're after.

3-D: ADDING TIME TO SPACE

Depending on the complexity of your 3-D design and the sort of motion you want, you have a fair number of software offerings to choose from on the Mac. Three-dimensional programs are typically object oriented; you draw or construct a 3-D object and then animate it by manipulating its position relative to the camera point of view. Some 3-D programs can play back sequences of frames; others force you to export frames to another program for display.

Three-dimensional products from Abvent, Dynaware, Paracomp, Visual Information Development, Inc. (VIDI), and Silicon Beach can automatically interpolate a sequence of frames to show the motion of an object between a selected start frame and end frame (the *keyframes*). This ability is called *in-betweening* or *tweening*. Three-dimensional programs also offer features for animating objects by rotating part of an object or the whole object, moving the camera relative to the object, or moving the 3-D world of camera and object (see "3-D in Perspective," *Macworld*, December 1988, for an introduction to basic 3-D terms and features).

- *Swivel 3/D*, from Paracomp, is a creative tool for generating objects quickly. You drag anchor points on a default object—a cube—or sketch freehand using polygon-creation tools. You can establish linked parent/child relationships between objects, so that when one moves the other moves in any of a number of specified ways. The relationship can be locked, as in a ball joint, or free as in a model of the



Tiny Dancer

Ileana Garcia-Montes, of Los Angeles, put together 45 separate body parts in Swivel 3D to create her Tiny Dancer. She used Swivel's tweening feature to create a repertoire of ballet moves, and then exported the frames to VideoWorks Accelerator to bring her creation to life.

earth and moon. These features make Swivel ideal for creating objects with multiple animating elements (see "Attitude Check").

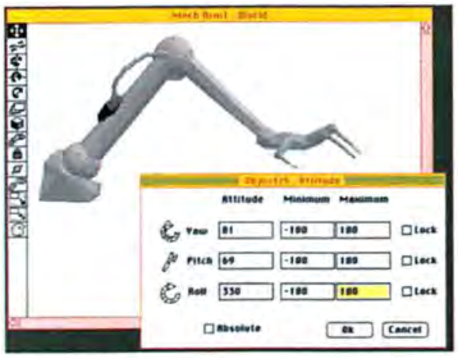
Swivel's Tween function enables you to create a specified number of images by placing objects at their beginning and end positions. You can animate linked or separate objects. The sequential tweens can be saved to the Scrapbook or as PICT files, in either Paint or Draw format. You can preview animations in real time as wire-frame objects, but to run the rendered animations you must export them to an animation program like VideoWorks II.

Swivel provides a wide range of graphic looks. It has a rendered look, with hidden lines to give shaded solid images. If you find the vector lines appealing, you can colorize a wire frame and view it without hidden lines. There is also a texture-mapping option, which allows you to map a digitized graphic or text to an object; the texture then moves with the 3-D object.

A new version of Swivel, 1.1, includes some significant improvements and should be out by the time you read this. I'll mention only a few of the upgraded animation features. You can now position models along multiple keyframes to create complex motions, and you can smooth the motion path with a bezier function, for more fluid flight paths. An ease-in, ease-out control is available for giving apparent inertia to objects. Swivel's tweening now works with special effects such as antialiasing, and you can export animations to a greater number of formats, including Illustrator 88.

• *Super 3D,* from Silicon Beach, was designed by CAD/CAM people and offers powerful modeling and animation features. Its use and appearance are closer to those of a more traditional 3-D design program than Swivel. You can precisely draw a 2-D shape, via numeric input, and then extrude or revolve that shape into a 3-D object. The look of objects can vary from wire-frame to shaded gray-scale or colored surfaces with up to four light sources. Super 3D enables you to precisely place the camera relative to an object in its 3-D space and easily move the point of view.

The animation capabilities are quite good. You have the choice of creating each frame separately by manually recording a particular position or by using a translation command to automatically in-between. These animations are saved as Movies that play at up to 60 frames per second.



	Attitude	Minimum	Maximum	
Yaw	81	-180	180	☐ Lock
Pitch	69	-180	180	☐ Lock
Roll	330	-180	180	☐ Lock

☐ Absolute

Attitude Check

Swivel 3D's Attitude dialog enables you to precisely define the movement attributes of links in a 3-D model.

Super 3D is great for constructing accurate objects, but the creative individual might prefer the Swivel look. It's a question of artistic preference.

• *SpaceEdit,* from Abvent, is a complex 2-D and 3-D CAD program that's probably best suited for technical illustration and industrial design. Working in up to four windows, you start with a 2-D drawing and assign height and depth to create an object in plan view. This process will seem most natural to people like architects and industrial designers, but it has some interesting applications for animation, particularly for designing detailed 3-D logos for use in motion graphics.

What SpaceEdit does well is allow you to move around a complex object. You can create a series of points in 3-D space and, in effect, walk the camera through them. This process is great for designing very accurate fly-throughs, but awkward for animation, because the program doesn't automatically interpolate from key frames. You really build the moves yourself. To run these moves as animations you need to export the image files to another program, such as VideoWorks or Abvent's Action.

For motion graphic design, SpaceEdit's advantage is accuracy. By LaserPrinting a series of plan views from SpaceEdit, you can end up with a series of pictures accurate enough to serve as CAD/CAM models for input and rendering in high-end raster systems.

• *DynaPerspective,* from Dynaware, offers interesting possibilities for constructing architecturally accurate models and then moving around and through them. You can extrude or revolve rough 3-D drawings into objects or quickly build complex forms out of wire-frame geometric *primitives.*

Camera controls enable you to change the perceived focal length, as if you were changing a camera lens from wide angle to telephoto; and you can zoom, rotate, and pan relative to a model. DynaPerspective offers key-frame selection and tweening and can display up to 20 frames per second. Rendered drawings and objects can also be exported as PICT files to VideoWorks for animation, display and layering with other animation elements.

• *Dimensions Presenter,* from VIDI, is noteworthy because it enables you to bridge the gaps between high- and low-end 3-D packages, and even between 2-D and 3-D. The program's name tells its story: instead of being a 3-D–creation package, Presenter is designed to put graphics created in other programs in their best light. It currently imports Super 3D files and any file in DXF format (primarily used by CAD programs at present); VIDI plans to add more file formats.

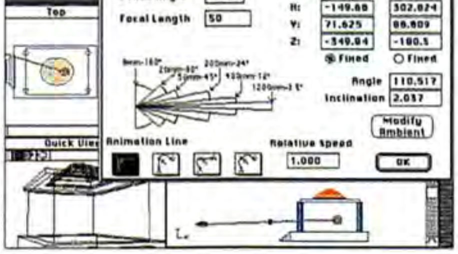
Once you've got a graphic into the program, Presenter enables you to give it flat, colored shading using any combination of up to 1024 light sources. If you have Dimensions RayTrace, you can add surfaces and transparency. Presenter also does animation based on key frames, allowing you to move objects along straight or curved paths. You can do flybys, walk-throughs, and independent-object animations (in which groups of objects move in relation to each other).

Presenter's ability to give depth to 2-D PICT graphics is unique. VIDI has developed a simple command language called 3DPICT. You simply go into MacDraw, SuperPaint, or any other program that produces object PICT files and use 3DPICT to describe the dimensions of the 2-D art you want to flesh out. Presenter reads these dimensions and produces a 3-D object.

2-D: PAINT ON PARADE

Two-dimensional animating programs are paint oriented (with some object or draw features). Such programs usually display animations by screen replacement; MacMovies, for example, shows full-screen MacPaint images sequentially at up to 30 frames per second. Creating artwork screen by screen using graphics software is a time-consuming process. The advantage is that because the frames are bitmaps, any part of any image can be easily edited.

• *Studio/1,* from Electronic Arts, is an innovation in paint-based animation. The black-and-white program offers two animating techniques. The first, dubbed AnimPainting, works in two ways. You can define any selection—a painting of a crescent moon, say—as a brush and then simply draw the path you want your selection to follow. The program automatically generates the frames required to move that moon across a starry sky. A more interesting variation allows you to define a short sequence of animation as a brush. If you had, for example, a runner that took ten frames to take two strides, you could define that sequence as a brush and then simply drag it along its course.



Points of View

VIDI's Presenter gives you a high degree of control over the appearance of objects. This screenshot shows the program's ability to simulate focal lengths running from an 8mm fish-eye lens to an extreme telephoto.

Mixing it Up

Vitsie Video Sitter, by Steve Lomas, combines live-action video with Macintosh animations. The artwork was created in Modern Artist, among other programs, and animated in VideoWorks II. Computer Friends' TV Producer board was used to encode NTSC output, and the animation and video layers were composited at Master Digital's broadcast production facility.

COURTESY OF LOMAS VIDEO LTD. AND MASTER DIGITAL

The second type of animation is called Animoving, and represents a hybrid 2-D/3-D approach. You select a portion of a painting or a piece of text, call up the Animove dialog box, and specify numerically the path you want the selection to follow. The program maps the 2-D drawing into a 3-D database. Thus you can specify that a logo appear on the horizon and spin its way into the foreground. One of the good things about Studio/1 is that it saves animations very efficiently by saving only the differences between frames.

Despite these innovations, the model approach to 2-D animation has been and remains VideoWorks, from MacroMind. VideoWorks II handles 2-D animations as composited paint-and-draw images, enabling you to place multiple *sprites* in layers. (A sprite is a simple animating image within a larger static or moving background.) This ability to layer multiple animating elements enables VideoWorks to provide the closest thing to traditional cell animation available.

MACROMIND

MacroMind's VideoWorks line has always dominated Mac animation, and the company continues to set the pace with its new MacroMind Director, originally announced as VideoWorks Professional. Like the earlier MacroMind products, Director is based on traditional animation techniques. You create artwork in the supplied paint program, or import it as a graphic from other Macintosh 2-D or 3-D applications. VideoWorks now accepts the PICS format, which enables you to import entire animated sequences from programs that export PICS, instead of having to import the frames one at a time.

The program lets you work with 24 animation channels at one time. Each of these, known as a Cast Member, represents a different event or element in an animation—an animating object or character, a background, or music, for example. There are also 4 channels for effects, such as wipes and dissolves. You correlate these events in time by arranging them in the Score window. The score reads from left to right, like a piece of music (see "How VideoWorks Works").

In the past, one of the common practices of conventional animation that the Mac couldn't duplicate was flipping. Flipping drawings and seeing through layers is fundamental to traditional animation,

Scans What Animate

Stuart Sharpe, designer at MacroMind, created this animation sequence by scanning photos into a Mac II using a HowTek scanner. Using the system palette for gray scale, he combined the elements into layers using VideoWorks II and VideoWorks Accelerator. The shadows were created by animating QuickDraw primitives.

RENDERMAN FOR THE MACINTOSH

Creating computer-generated images that look more like photographs than lessons in solid geometry has been the goal of many a computer artist. But producing realistic images has up until now required that designers work on high-powered graphics workstations. Now a Macintosh II or IIx equipped with Levco's parallel processing board and RenderMan software licensed from Pixar can produce images that rival those created on dedicated graphics machines costing three to four times as much.

In September San Diego–based Levco plans to deliver the first Macintosh implementation of Pixar's RenderMan Interface version 3.0 and the RenderMan Shading Language. RenderMan for the Mac allows a three-dimensional modeling or animation program to describe a complex scene with a series of commands called the RenderMan Interface Protocol, or RIP.

What makes RenderMan scenes so striking is the degree of detail in the shading of surfaces. In RenderMan objects are specified by their geometry and by procedures called shaders which describe the attributes of light sources, the surface properties of objects, and the characteristics of local conditions, such as fog. Designers can map the properties of standard materials like metal, plastic, or wood onto any surface; wrap scanned images around objects; warp or distort surfaces; or design their own custom materials and light sources using the RenderMan Shading Language.

Companies reported to be working on incorporating RIP into their programs include Silicon Beach, MacroMind, and VIDI. The modeling program can store ASCII or binary RIP commands in a file or send the commands directly to another software module called a renderer. Levco's renderer divides up a scene into pieces and distributes the pieces to the various Transputer processors for rendering.

The beauty of the Levco solution is the speed with which the Transputers transform a scene from its description into the final highly detailed image. Scenes that would normally take hours to complete finish in only minutes. Furthermore, the Transputers run independently from the Mac's CPU, so an artist can be working on a new design, while the Transputers render a scene in the background.

—David Ushijima

and for good reason. By flipping through drawings an animator can immediately see his or her work moving at speed and make adjustments. Director offers a feature similar to flipping, enabling you to align all the panels and easels and use a button to flip through them.

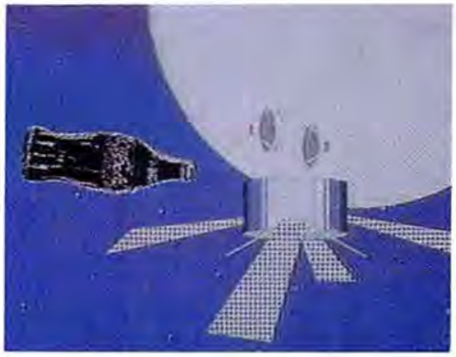
Director includes some other great new features, including an autotransform capability similar to the Blend tool in Adobe Illustrator. You specify a start shape and end shape for an object and the number of frames it takes to get from one to the other; the program interpolates the transformation between the two. There are also new limited-animation features for autoanimating charts and text with zoom, title crawl, and various other effects. All of this adds to the power of MacroMind's products to create and composite graphics, text, and sound. But it's these capabilities in conjunction with 3DWorks that make the Director package a unique animation tool.

I recently saw a beta version of Director and its companion programs, 3DWorks and RenderWorks. MacroMind's Director with 3DWorks offers an exciting way to do complex 3-D animation. It also allows you to exchange files between any 3-D programs, so that you can import Swivel 3-D or Super 3D shapes, for example, and then create detailed motion and rendering.

3DWorks has some unique animation features. As opposed to being limited to moving objects in a straight path between key frames, the program enables you to use *splining* in a variety of ways. A spline allows you to graph the axis of motion between two or more points to get the dynamics of complex motion. You can also control the velocity at which an object moves and have it accelerate and decelerate between locations. There is also a 3-D autotransform tool that generates a specified number of frames to show the transformation of one 3-D object into another.

With the RenderWorks part of the Director package, you can give objects sophisticated transparency and surface treatments, working with wire frames or shaded objects. RenderWorks also offers the combination of object shading (using Phong or Gouraud models), texture and reflection maps, and multiple-light-source controls.

Collectively, the features of MacroMind Director, 3DWorks, and RenderWorks make the Mac a complete graphic animation platform. They provide the closest thing there is to a stand-alone Mac solution for the battery of techniques and applications required for versatile and professional animation.



COPYRIGHT © 1989 LES PRODUCTIONS ZAP

Fast Takes

Les Productions Zap, of Montreal, finds the Mac a good way to produce "fast, affordable animation," according to director Hubert Neault. Using PixelPaint graphics and VideoWorks, the company produced 150 fifteen-second pieces for television in eight months.

COPYRIGHT © 1989 MARK WEISSMAN

RUN

Mark Weissman used GraphistPaint's Spherize command to simulate 3-D animation in his "James Bonk in* The Courier.*"

HYPERANIMATION

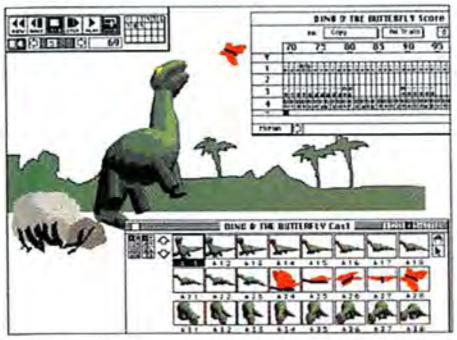
HyperCard is one option for creating and/or displaying Mac animations. Designed for interactive, visually oriented applications, HyperCard's basic metaphor is a stack of cards that can share common backgrounds. Each card can contain paint and text elements. The pictures can be created with HyperCard's paint tools or imported from any MacPaint-compatible program. You link cards by creating buttons or through scripting in HyperTalk. Every card, background, field, and button is considered an object, with a script that determines its behavior.

Animated transitions between cards (such as dissolve, wipe, or zoom open or close) can easily be scripted in HyperTalk. But for animation of individual elements, HyperCard is limited; it's primarily a screen-replacement program. Still, HyperCard has served as a point of departure for some very effective Mac animation innovations.

One innovation that takes advantage of HyperCard is VideoWorks II Accelerator. With Accelerator, animations that could run only at 5 frames per second (fps) in VideoWorks II can run at 30 fps. To accomplish this Accelerator keeps track only of the differences between frames. Accelerator comes with a HyperCard driver so that you can play accelerated files as part of a HyperCard stack. Studio/1 also has a HyperCard driver, so that you can easily import complete Studio/1 animations into HyperCard, instead of doing it a frame at a time.

Silicon Beach has created a second-generation HyperCard program called SuperCard. To HyperCard's abilities, SuperCard adds color and several commands that facilitate stack animation. For example, you can now move graphics along drawn paths or have the program cycle colors. SuperCard can also compile animations to increase speed. SuperCard imports and supports TIFF, PICT, MacPaint, and HyperCard graphic formats, and it imports and exports PICS format animations. These format options mean you can work with scanned images; draw files; paint files; HyperCard transitions; and prebuilt animation sequences from Super 3D, Swivel 3D, and 3DWorks. Something of a hybrid of VideoWorks and HyperCard, SuperCard offers a powerful platform for editing animations and combining them in an interactive format.

One final program is in a class by itself: HyperAnimator, from Bright Star Technology. HyperAnimator gives you access to a random-access software engine, called RAVE, to create and edit lip-synchronized synthetic actors. You can use HyperAnimator to create cartoon talking heads whose mouth positions synchronize with speech sounds (either in Macintalk or digitized speech). These actors are controlled through HyperTalk scripting.



How VideoWorks Works
VideoWorks's (or Director's, in this case) Cast window acts as a catalog of the components—from animating elements and backgrounds to sound events—that will be combined to make an animation. The Score window shows a frame-by-frame breakdown of the active elements in an animation. This piece,* Dino and the Butterfly, *was created by Pat Perrin, of Los Angeles.

Tape to Mac, and Back
Peter Mitchell of Big Animated Digital Productions, Melbourne, Australia, used a MacVision video digitizer to grab video frames and put them into the Mac for this music video. He edited the video bitmaps using VideoWorks's paint tools and also used VideoWorks to composite the image. To assemble the piece, he filmed individual frames displayed on the screen of a Mac II and then had a service transfer the film to video.

HyperAnimator comes with two programs that demonstrate its use. Talking Tiles and Alphabet Blocks are language-instruction programs in which talking tutors teach phonics. These products use the random-access capabilities of the RAVE driver to link HyperCard stacks and sounds and take advantage of HyperCard's sorting and display speed. They exemplify an animation-based product that suggests innovative means not only for interacting with displays, but for creating animations.

ON WITH THE SHOW

Of course choosing software to create and display an animation is only half the battle. Hardware also comes into play. Memory restrictions, for example, may prohibit you from making a radical change in every frame of an animation. To get animations to run smoothly you may have to design them so that in each frame only one little element changes.

Mac animators also face difficulties when it comes to getting their stuff out to videotape. There are functional differences between the Mac's noninterlaced scan (refreshing the screen one line at a time at 66 frames per second) and the NTSC standard, which is made up of two interlaced scans (odd and even sets of scan lines that sequentially refresh the screen at 30 frames per second). The difference in scan methods is the main source of problems associated with going directly from the Mac to broadcast-quality video. A concurrent problem is that of translating the Mac's red-green-blue (RGB) color information into the NTSC composite color signal displayed in standard video. The development of new hardware to resolve these problems and to get animations out of the Mac and into other systems is fueling the growing enthusiasm for video publishing and presentations. For the time being, if you want to put complex Mac animations on videotape look for hardware that records single frames and for software that enables you to output animations in single frames.

Master Digital has developed software that facilitates the transfer of animation to videotape. TapeOp displays and transfers PICT2 and PICS documents without any

ANIMATION SOFTWARE

	3-DIMENSIONAL					2-DIMENSIONAL			
	Dimensions 1.19 Visual Information $2500	DynaPerspective 1.0* Dynaware $1495	SpaceEdit 2.2 Abvent $625	Super 3D 2.0 Silicon Beach $495	Swivel 3D 1.0 Paracomp $395	MacMovies 1.0 Beck-Tech $99	MacroMind Director** MacroMind $695	SuperCard** Silicon Beach $199	VideoWorks II 2.0 MacroMind $295
Category									
CAD related	•	•	•	•	•				
Full animation							•		•
Limited animation						•		•	
Runs On									
Mac 512K			•	•		•			•
Mac Plus and SE	•		•	•	•	•	•	•	•
Mac II	•	•	•	•	•	•	•	•	•
Animation Types									
Create, store multiple frames	•		•	•	•	•	•	•	•
Play back stored frames	•	•	•			•	•	•	•
Tweening	•		•	•	•		•		
Text animation scripts				•			•	•	
3-D Manipulations									
Rotate/move objects	•	•	•	•	•				
Rotate/move object elements			•	•	•				
Rotate/move world	•			•	•				
Rotate/move camera	•		•	•	•				
Move camera	•	•		•	•				
Zoom	•		•	•	•				
Dolly	•			•					
Export/Import									
Scrapbook	E/I	E/I	E/I	E/I	E/I		E/I	E/I	E/I
PICT	E/I	E/I	I	E/I	E/I		E/I	E/I	E/I
PICS				E	E		E/I	I	
MacPaint	I		I	I	E/I	I	E/I	I	E/I
PostScript							E		
ASCII text files	E			E					
Export other formats	E			E			E		

*Includes Presenter, RayTrace, and Solid Modeler.

**Prerelease version.

Mac windows, title bars, or scroll bars so that full-screen Mac animation can be recorded, one frame at a time, to videotape. The package includes modules that control the transfer of Mac animations to various 1-inch, digital (D-2), BetaCam, and U-Matic machines and video switchers, as well as to Sony, Ampex, JVC, and Panasonic recorders. Another module supports the Truevision NuVista card for frame grabbing. And if you can't afford the system, Master Digital also runs a service bureau.

In conclusion, keep in mind that many companies have animation tools and don't know it (video digitizers, for example); it's up to you to innovate. Animation is a creative process in which there are no stand-alone solutions. The cooperation of artists, animators, and developers will be essential in creating an umbrella approach that will integrate the graphic techniques and traditions of animation—with the platform the Mac offers. M

See *Where to Buy* for contact information.

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Stuart Cudlitz *is an artist and filmmaker who has designed computer graphics and special visual effects for feature films, broadcast television, and interdisciplinary fine arts.*

DAN ESCOBAR

Special-effects firm extraordinaire Industrial Light and Magic is creating a comprehensive Mac network for everything from budgeting to motion control and image processing. Above, Ray Gilberti mans a motion-controlled Vista Cruiser camera. Below, Scott Squires in the line-up room.

DAN ESCOBAR

by Stuart Cudlitz

Star Quality

In film and video production, the Mac has begun its climb from supporting cast member to featured performer

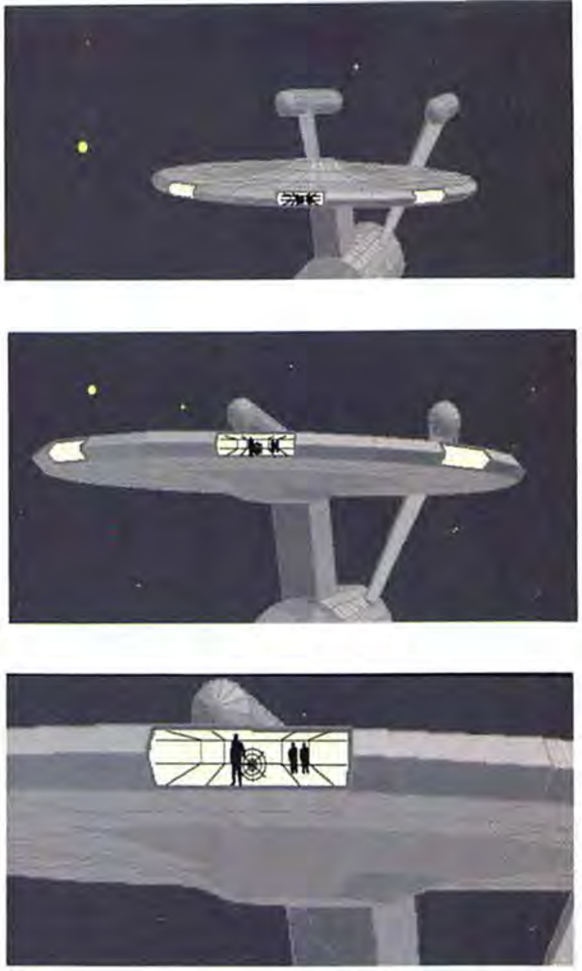
It's a popular myth that the big-name studios in the film industry constantly keep armies of artists and technicians on their payrolls. Actually, the film giants are primarily in the business of financing and distribution. The work of making motion pictures is primarily done by contract personnel and independent production companies.

DAN ESCOBAR

Jon Alexander in front of an optical printer.

Manufacturing a movie may involve hundreds of people working in several locations over a period of a few years. While the large studios use IBM or DEC mainframes to keep their schedules and budgets, independents must bring their skills and tools with them as they move from project to project.

The Mac, with its graphic user interface, is particularly well suited to the requirements of independent film professionals. In fact, the Mac II is becoming a preferred platform for applications in every phase of filmmaking, from scripting through laying down the final score. Particularly in the graphics-oriented applications of storyboarding, special-effects production, animation, and editing, Macintosh technology is making a significant impact on the way films are made.



Zoom

Lynda Weinman created this animatic to help the Star Trek V *film crew determine whether they wanted to produce an expensive special-effects shot (which requires matching zooms on a rear-projection plate and the Enterprise model). She made the Enterprise in Swivel 3D and animated the piece in VideoWorks II. Along the way she made use of Illustrator, MacDraw, and Capture.*

STORYBOARDS

Storyboards are a tool for pictorially working out the visual details of a script. They can be anything from a few rough drawings showing the continuity of action, to elaborate renderings of entire sequences. Producers, directors, cinematographers, and production designers use storyboards to anticipate problems as well as to gain approval of ideas. For independents, whose budgets leave little room for reshooting, being able to previsualize a production in detail is essential. The Mac provides these filmmakers with the ability to create more-finished—and even animated—boards at less cost and with smaller staffs.

No single tool exists for creating custom storyboards that can carry all the information required. As always in Mac graphics, finding a workable solution requires a certain amount of resourcefulness.

EFFECTS ANIMATICS

When Degraf Wahrman of Los Angeles was engaged to consult on the *Star Trek V* production, the firm hired free-lance effects animator Lynda Weinman to produce specialized storyboards on a Mac II. Weinman used VideoWorks II with the VideoWorks Accelerator to assemble and run animatic* boards for the effects sequences. (Terms marked with an asterisk are defined in "Film and Video Glossary.")

She created graphic elements in a battery of programs that include Super 3D, Swivel 3D, Pro3D, PixelPaint, MacDraw, and Illustrator 88. She used Capture (from Mainstay) to import this art into VideoWorks. For backgrounds and essential details, Weinman scanned artist Nilos Roodis's original boards using a MacVision system (see "Zoom").

This sort of creative solution is necessary even with best available Mac tools. Using film effects terminology, Weinman comments, "There are no programs that provide registered animation templates (rotoscoping*), work in a real-time environment, or stretch and shrink the duration of a sequence." Still, she uses the Mac for all aspects of her film-design work and bookkeeping, and finds it "amazing that the same machine can do all this."

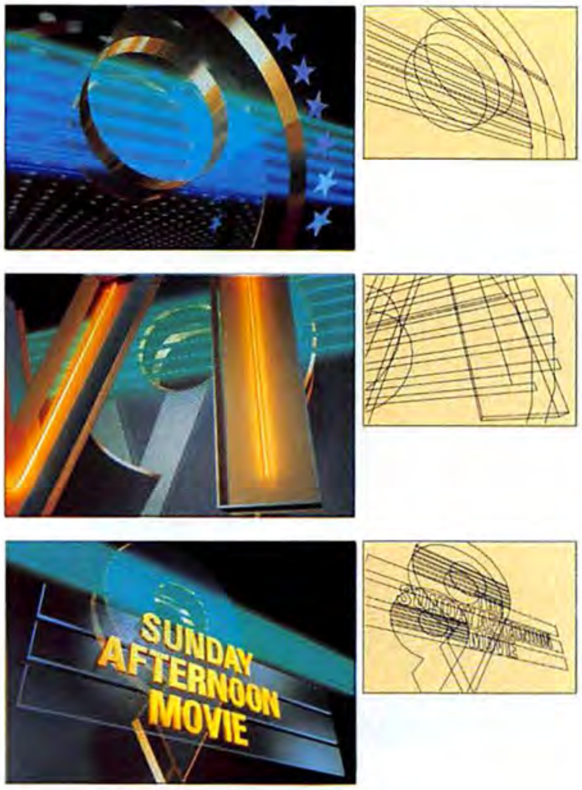
Dale Herigstad also uses the Mac to storyboard 3-D computer graphics animation. As a designer/director for Marks Communications in Los Angeles, Herigstad uses the Mac as a "concept station" for designing 3-D storyboards with Abvent's SpaceEdit and Swivel 3D, previewing on an 8-bit monitor, printing color boards, and faxing images to clients (see "Adventures in 3-D Space").

Herigstad comments: "The Industry is accustomed to going from page to page with boards. But as designs get more complex, clients may have a hard time understanding motion. Using the Mac on the animatic level, you can bridge the gap. This necessitates using programs like Swivel 3D, which does *in-betweening*, to smooth the animation." In computer-created animation, in-betweening is a function in which a program automatically draws the motion of objects between two selected positions.

HYPERBOARDS

Hal Barwood, currently in production on a romantic comedy for Lucasfilm, has done all the jobs at the top end of feature-film production. As writer and director on this project he used a Macintosh SE to write the screenplay and produce storyboards.

When Barwood wanted to use Macintosh graphics to replace the usual thumbnail sketches, he found the paint and draw tools on the market "wildly expensive or overcomplicated." So he took HyperCard and designed a storyboard program. Called StoryCard, it's available as shareware. StoryCard enables Barwood to visualize sequences, write comments describing the action in a picture, and tie the graphics and notes to their place in the film's script through HyperCard stacks.



Adventures in 3-D Space *Dale Herigstad finds SpaceEdit useful for planning motion graphics such as this one. His Mac designs are later rendered on a high-resolution raster system for national television broadcast.*

FEATURE ANIMATICS

Independent filmmakers Thomas Brown and Meg Switzgable are currently in production on *Passing thru Linden* for Foresight Films in New York. Directing is Switzgable, nominated for an Academy Award and an Emmy for her previous film *In Our Water*. Producer Brown was part of the original team that assembled filmmaking electronics and hardware for George Lucas and Francis Coppola. Working now as an independent filmmaker, Brown has economized on technology, using the Macintosh as a key production tool. For script writing, budgeting, and scheduling he uses Screenplay Systems' Scriptor, and Movie Magic Budgeting and Movie Magic Scheduling/Breakdown programs.

For storyboards Brown uses the Mac and an updated version of the electronic storyboarding techniques he first developed for Coppola. Using SuperPaint, his production team places text and notes in the draw level and storyboard pictures in the paint level (see "Scene 45: Int. Sadie's Car"). They draw pictures on a Summagraphics tablet, but also digitize from tape and scan in images with a Dest scanner. By videotaping the storyboards (with the text suppressed) and taping a "radio play" of dialog and sound effects, Brown and company produce an animatic version of the entire film.

These Mac storyboarding techniques are heading

FILM AND VIDEO GLOSSARY

Animatic A limited animation consisting of artwork shot on film or videotape and edited to serve as an on-screen storyboard.

Compositing The combining of two or more film, video, or electronic images into a single frame or display.

Conforming Performing final editing on film or video using an off-line edited master as a guide.

Matte In film, an opaque piece of art or a model that leaves a selected area unexposed to be filled on a subsequent pass or in composite.

Motion-Control Photography A system for using computers to precisely control camera movements so that the different elements of a shot—models and backgrounds, for example—can later be composited with a natural and believable unity.

Off-Line Edit Preliminary or test edit usually done on a low-cost editing system using videocassette work tapes. Allows editor to make decisions and gain necessary approvals prior to the final edit.

On-Line Edit Final edit, using the original master tapes to produce a finished program.

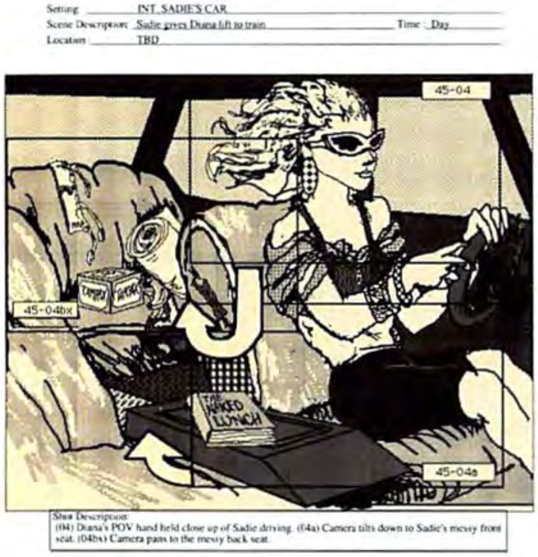
Opticals (optical printer) Visual effects produced optically by means of a device (an optical printer) that contains one camera head and perhaps several projectors. The projectors are precisely aligned, so as to produce multiple exposures in exact registration on the film in the camera head.

Rotoscope A camera setup that projects live-action film one frame at a time onto a surface so that an animator can trace complicated movements. When it is filmed, the completed animation exactly matches the motion of the original action.

SMPTE Society of Motion Picture and Television Engineers. A professional association.

SMPTE Time Code A frame-numbering system developed by SMPTE that assigns a number to each frame of video. The numbers track elapsed hours, minutes, seconds, and frames from any point you choose; they look like this: 01-42-13-26.

Ultimatte The trade name of a very high quality special-effects system used for background replacement and image composites.



Setting: INT. SADIE'S CAR
Scene Description: Sadie gives Diana lift to train Time: Day
Location: TBD

Shot Description:
(04) Diana's POV hand held close up of Sadie driving. (04a) Camera tilts down to Sadie's messy front seat. (04bx) Camera pans to the messy back seat.

Scene 45: Int. Sadie's Car *The Passing thru Linden production team created this storyboard in SuperPaint. The three rectangles and arrows show framing and camera moves that correspond to the shot descriptions at the bottom. The image can be printed with or without these notations, which are in SuperPaint's draw layer.*

in the direction of full computer simulation of key sequences or even scenes before production begins. Macintosh consultant Michael Backes recently put together such an application for *Aliens* director James Cameron's new film, *The Abyss,* using the Mac in all aspects of preproduction, including 3-D simulation of sets. In order to plan special-effects sequences as tightly as possible, Ron Cobb (using Super 3D) and David Smith (programming) actually created 3-D simulations of props and sets. The director used these models in California to test camera angles and movements, such as flybys. When the crew arrived on location in South Carolina, the real-time Mac animations they'd produced helped save time and money on the shoot.

PRODUCTION

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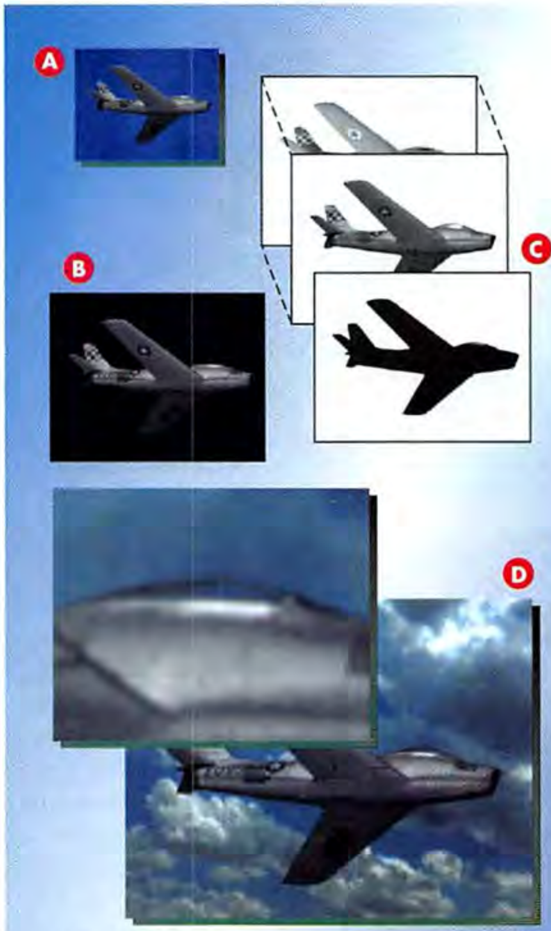
While these storyboard applications streamline the start-up phase of filmmaking, other filmmakers are using the Macintosh II as a platform for innovative film-and-video production techniques. Some of the unique hardware setups these companies have developed are changing traditional approaches to motion-control photography*, animation, and the production of composite* images.

INDUSTRIAL LIGHT AND MAGIC

In movies from *Star Wars* to *Who Framed Roger Rabbit?,* Lucasfilm and its subsidiary Industrial Light and Magic (ILM) have established themselves as preeminent manufacturers of special effects. At ILM, Scott Squires, Chris Brown, John Knoll, and their associates are developing a comprehensive Macintosh-based network that uses Mac II workstations for budgeting and scheduling, controlling photographic hardware, and image processing.

Scott Squires says ILM picked the Mac for a variety of reasons, but primarily for the visual interface, which appeals to the visually oriented personnel at ILM and makes it easy for the large numbers of freelancers the company uses to get up and running quickly. Brown, who has been building custom motion-control systems since 1978, attests to the growing popularity of the Mac in the film business: "In my work as a contractor, I used to have clients using a variety of computers. Now I have five or six clients, and they're all using Mac IIs or SEs." The devices he is currently creating for ILM employ hardware devel-



Synthetic Blue Yonder
PhotoShop, developed by John and Thomas Knoll, includes tools that enable it to simulate blue-screen replacement with great accuracy. (A) The model is photographed against a pure blue background. (B) To subtract the pure blue from the transparent portion of the canopy, an operation is used that compares the levels of green in the image's blues (normal blues contain some green). (C) A very accurate outline matte is created by combining negative red and positive blue separations. (D) This matte is used to cut the pure blue-subtracted plane from its background; it can then simply be combined with the new background. Notice that the sky shows through the canopy.

oped by Copymotor of Petaluma, California.

ILM has a full computer-graphics department, so its goal is to tie in the motion-control systems through Macs so that filmmakers can pass motion control and graphics data back and forth. "We should be able to look at a movement and duplicate that move whether it's on the stage, on the animation stand, or in the optical printer*," says Brown.

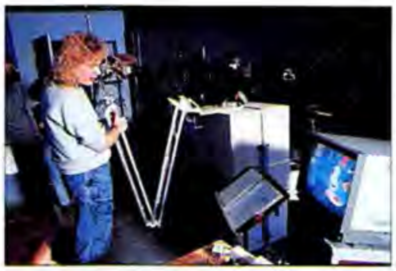
One of the areas that special-effects filmmakers have been looking at is the process of digital-composite printing. ILM has achieved good results scanning film footage into a Mac; manipulating, matting*, and compositing elements in a digital form; and then using the results either for previsualization or production (see "Synthetic Blue Yonder").

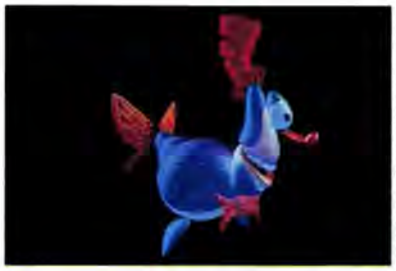
The color image processing program ILM uses is a custom program called PhotoShop. John Knoll describes the program as a superset of the functions of ImageStudio and Digital Darkroom, "which makes it really good for storyboard manipulation. You can use a video frame grabber to get one element and an input camera to grab storyboard art, then make any alterations you want." To check the work before committing to expensive, high-resolution computer imaging, an effects supervisor or an art or optical person can print the Mac image to a LaserWriter or, for color images, to a Tektronix color printer.

PhotoShop works with 24-bit files, whether it's on a machine that displays 24 bits or only 8. Since the program exports 24-bit files in a variety of formats, it can send Mac graphics over a network to a Pixar Image Computer, which can drive a proprietary, high-resolution film printing device. If it's desirable, images can be passed in the other direction as well, from the Pixar to the Mac.

Currently ILM is also switching over to Macintosh for production management. The firm has a mainframe to take care of all production data for every shot of every in-house production, and plans to use Macs as dedicated input devices from every department.

ILM has a history of setting the pace for technological research and development in the film industry. The company's uses for Macintosh applications are indicative of the direction the industry will be taking in years to come. As ILM implements its proprietary applications in prominent feature-film special effects, live-action sequences, and commercial productions, the attention of other designers in this highly competitive field will focus increasingly on Macintosh solutions.





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***MacMuppet* An innovative hardware-and-software setup enables Jim Henson Productions to produce "live" animation. Here, Steve Whitmire works the Waldo armature, which collects motion data used to animate its namesake, Waldo C. Graphic. Whitmire monitors his performance by watching real-time medium-resolution animation. Later, selected performance data will be used to generate high-resolution renderings (right).**

THE DIGITAL MUPPET

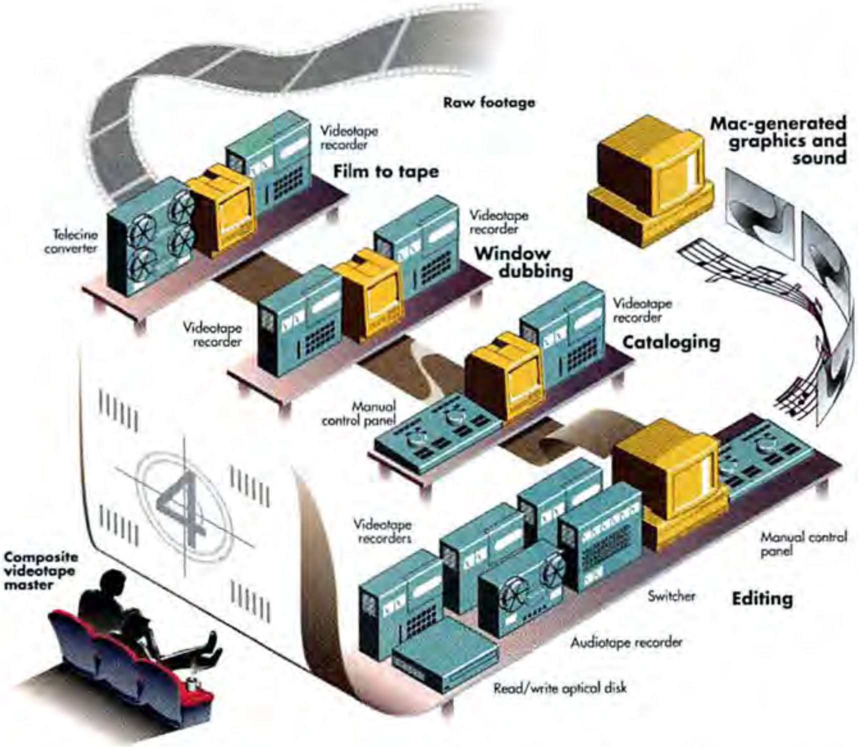
Muppet creator Jim Henson and his associates are renowned for mixing live puppet performances with film and video. For his latest project, Henson wanted to create a character that could have the transformational magic of animation yet maintain the interactivity and spontaneity of the muppet performances. To realize Henson's vision, Pacific Data Images (PDI) of Sunnyvale, California, put together a sophisticated computer graphics system with the Mac as an integral part of the production process.

The most difficult part of computer animation is collecting sufficient motion data so that the characters will move in a lifelike manner. PDI's Graham Walters, Thad Beier, and their associates solved this problem by linking a customized version of Visual Programming Language Research's (VPL's) Mac-based Body-Electric program to PDI's high-end 3-D systems. VPL is best known to the Macintosh community as the creator of the DataGlove and Body Suit input devices, which are used in a variety of 3-D simulation applications.

Henson wanted a character with the magic of animation yet the spontaneity of the muppet performances

For PDI and Henson, the DataGlove technology was adapted to an armature equipped with sensors to capture motion data as a real-time performance (see "MacMuppet"). As the Muppet puppeteer moves the armature (known as the Waldo, after Henson's new character, Waldo C. Graphic), the changes in angle of each joint create changes in voltage, which the Mac translates into movements of the Waldo character.

As the armature moves, the Mac displays a simple wire-frame version of the character. Since the Mac cannot produce graphics as fast as is required to get real-time animation, VPL customized the BodyElectric package to enable it to interface with a Silicon Graphics computer. The SG interrogates the Mac to find out where the armature is and applies a software model of Waldo's movement to the armature data to create a preliminary rendering of the character.



The Worx

A basic Mac-based editing network using Edit Worx. At the first station, film is transferred to tape for a video edit. At the window-dubbing station, SMPTE Time Code numbers are added to each frame. Cataloging is the process of assigning labels corresponding to shots and scenes to the film sequences. At the final editing station, Edit Worx is used to control source machines and to build a final cut.

This real-time rendering is what the puppeteers see as they perform; the puppeteer who works the armature and those who work the characters with whom Waldo interacts monitor their performances on video screens where they see a composite picture of the preliminary Waldo rendering and the other muppets.

When the selected takes are approved, the Waldo data is brought back to PDI in Sunnyvale where the character, along with the required mattes, is fully rendered. The fully rendered images and mattes are then sent back to the production facility in Toronto, where an Ultimatte* system is used to combine these images with the Waldo-less video layer.

The net result is that two minutes of performance data yields two minutes of animation. These two minutes of animation take two more weeks to render fully, but this is still a time savings of four to eight weeks over the traditional animation process.

The dynamics built into the automatic-rendering routines that produce Waldo make use of the latest computer graphics techniques. To produce Waldo's distinctive motion, different parts of the character's body were assigned varying degrees of *goopiness*—a springlike attribute. According to project supervisor Walters, "It's a tremendous amount of fun for us to see this kind of character come out with just the data from the automatic software setup. It was a big challenge to make it this automatic and get this much character out of it at the same time."

Macintosh-based innovations in image processing, photography, compositing control, and animation technique define a specialized industrial-market niche. By linking these applications to the larger production process, Mac filmmakers are creating models for the kind of comprehensive approach that studio feature films and broadcast productions demand. The same can be said for some of the recent applications of Mac hardware and software in film and video editing.

EDITING

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The editing process starts with logging the first film shot and ends with the marriage of the final mixed master sound track and the final cut picture. The job of tracking every scene, shot, and take in a picture (and, of course, the corresponding sound tracks) is a labor-intensive and mistake-prone one. To help keep everything straight, film is manufactured with film-edge numbers printed at 1-foot intervals alongside the picture area. When film is transferred to video—as it often is for editing, since videotape is simpler to work with—there is the additional problem of keeping track of where each film image appears on the videotape.

Whether a filmmaker is conforming* a film's final cut to a video edit or using the new high-definition television technology to create a film version directly from video, the accuracy of the film-to-tape relationship is critical. Devices that handle the transfer of film to tape are constantly being improved, and recently the Macintosh has been added to this technology.

EDGEWRITER

EdgeWriter is a film-transfer and edit-management system that evolved from the designs and engineering Clark Higgins started working on ten years ago for Francis Coppola. "Francis wanted to create 'the studio of the future,'" Higgins recalls, "so we began designing the Silver Fish for him." The Silver Fish is an Airstream mobile home that Coppola uses as a portable office, conference room, and on-location film-and-video-editing suite. Originally the intention was to design a facility that would allow Coppola to preview edits and effects on tape.

Higgins and his partner Roger Davis have since developed the technology into a hardware-and-software system that uses Macintosh-run devices to control the transfer of film to video. The EdgeWriter is compatible with high-end film-to-tape transfer machines (such as the Rank-Cintel system) and random-access video-editing systems (in particular, the Montage Picture Processor, which uses EdgeWriter software).

In addition to being able to control the hardware for the film-to-tape transfer, EdgeWriter makes the laborious process of logging in all the scenes, takes, and shots in a film more convenient. Once the film transfer is complete, you simply play through the videotape, making notations in an Excel template of the SMPTE Time Code number and film-edge number for each shot, scene, and take. An Excel log is created for each reel of film. Since preliminary film for a feature may run to hundreds of reels, EdgeWriter uses a HyperCard database to manage the individual logs.

The final result of this process is that the data from the film-to-tape transfer becomes available for entry into a computer-controlled video-editing system. In fact, the EdgeWriter system in the Silver Fish is part of a complete Mac-based video workstation combining Eli Hollander's VideoMaker (as a video-edit controller), Screenplay Systems software, and Seehorn's Edit Worx for integrated project-management.

ULTIMATE EDITING

In designing the Edit Worx film-and-video workstation, Larry Seehorn, of Sunnyvale, realized that when film editors speak fondly of the feel of cutting film, what they're describing is "the immediacy of the thing—make the edit, put it back in the sprockets, and view it." Seehorn's system is designed to provide this flexibility on a video-editing system, offering a single station that controls a video special-effects system (video switcher); audio tape recorders (ATRs); videotape recorders (VTRs); and videodisks, with the input from a high-end frame grabber and EdgeWriter (see "The Worx").

The system is configured with a Macintosh II as the main platform. "The Mac is the primary management software," Seehorn explains. "The second level of software is the edit engine, which is administrative. It looks to see what resources it has (VTRs, ATRs, and disks) and what the Mac is sending down to it, and fulfills the requests. If the right reel isn't up, it asks for it. At the bottom level are the interfaces to the individual machines."

Tim Felon has been writing the software for the Seehorn system using 4th Dimension. Each video sequence listed in the database is referenced by one or more screen icons made from shots in that sequence. A frame grabber from Data Translation captures the approximately 32K icons and stores them in the 4th Dimension fields.

Julian Systems, which markets Edit Worx, is currently working with Seehorn to upgrade the system's direct-video-output capabilities, to enable the Mac CPU to handle such things as video overlay and titling. Seehorn has come to view editing as only one part of a computer-controlled multimedia workstation. "The workstation is a group of tools that ties the script, editing, and catalog together. So, when shooting, one can see what shots are related to what part of the script, and in editing, what shots or script sections are related. I'm really not aiming it as an editor, though it does have these off-line• and online• capabilities. I want to see it going toward optical disk." Seehorn envisions a video workstation where film makers can randomly access playback sound and image source machines to immediately view digital variations of works in progress.

FADE TO BRIGHT

"There's no doubt in my mind," said Francis Coppola in his keynote speech at last year's Apple Media Conference, "that the Macintosh can be a beautiful creative processor where text, sound, and picture can be totally linked. . . . Basically there isn't a task in the whole filmmaking process that can't be handled through the Macintosh computer. It is the machine of note today in the audiovisual future."

At present, the Mac commands only 10 percent of the film-production market, but there is considerable competition among Mac hardware and software developers to crack the major studios through more diverse and more specialized tools. Economic pressures and the creative demands of filmmakers for more comprehensive tools are the forces that motivate research, development, and change in the film industry. With the imminent arrival of desktop video and interactive disk technology, it remains to be seen how Macintosh technology will shape filmmaking and be shaped by it.

It remains to be seen

how Macintosh

technology will shape filmmaking,

and be shaped by it

See *Where to Buy* for contact information.

Stuart Cudlitz *is an artist and filmmaker who has designed computer graphics and special visual effects for feature films, broadcast television, and interdisciplinary fine arts.*

TWO NEW PRODUCTS EXPAND THE HYPERMEDIA UNIVERSE

On beyond HyperCard

BY SUZANNE STEFANAC

FRED STIMSON/RUTH KEDAR

HyperCard is nearly two years old. And although it has many fans, it has been plagued by a rumble of discontent from the beginning. Some complaints imply a basic misunderstanding of the program; HyperCard was never intended as a full-fledged relational database or programming language. Other complaints, however, are more legitimate. Items on many stack authors' wish lists include cards that can be larger or smaller than HyperCard 1.2's limit of 512 by 342 pixels, the size of a Mac Plus's screen; the ability to open more than one card/window at a time; object-oriented drawing tools and the ability to print high-resolution, full-page output; customizable menus and dialog boxes; the ability to write scripts for any object, even an irregularly shaped text field or bitmapped graphic, in order to define the object as a button; and color stacks.

Many of these requests are already addressed through add-on external commands (XCMDs) and external functions (XFCNs), which are written in Pascal or C code, compiled and installed into stacks using ResEdit or ResCopy (see "Extending HyperCard" for details on a few of these). Also, HyperCard 2.0 will probably incorporate many of these enhancements, although Apple's commitment to keeping the program's size down and speed up may preclude adding color.

Now, two products—SuperCard, from Silicon Beach, and Format Software's Plus, from West Germany—promise to address many of HyperCard's major deficiencies as well as expand the program in new ways. It is difficult to compete with a free product, particularly one bundled with all new Macintoshes. To succeed, a competitor must be able to open all existing HyperCard stacks, read HyperTalk scripts, offer features unavailable in HyperCard, and, finally, accept the risk of being superseded by Apple upgrades. For a year and a half, no one accepted this challenge. And even now, at press time, neither SuperCard nor Plus is shipping. But a brief catalog of features already implemented in the beta versions of these programs offers us a window onto the future of hypermedia.

SUPERCARD

In keeping with Silicon Beach's strong graphics reputation, SuperCard adds a number of paint and draw enhancements to the usual HyperCard features. Object-oriented draw tools allow SuperCard authors to create high-resolution images for their stacks. This ability is augmented by the AutoTrace feature, which transforms bitmapped graphics into object-oriented ones. Because SuperCard can import MacPaint, PICT, PICT2, TIFF, and PICS animation formats, users can pull in images created in a variety of other programs. And SuperCard's 8-bit color support includes the ability to import or create a separate palette for each card.

Additional graphics capabilities include color cycling—an animation effect in which a series of colors are displayed in rapid succession—and a variety of "inks" that allow you to define the relationship between an object and the ground around it. Your ability to group and align objects on a card and to make multiple selections facilitates layout. And the final version will probably include several image processing tools from stablemate Digital Darkroom.

Open more than one stack; design cards of any dimension; mix fonts, styles, and sizes of text in any given text field

SuperCard not only translates HyperCard stacks and HyperTalk scripts into its own SuperTalk environment, but it automatically brings resources such as icons, cursors and CLUTs (color look-up tables), and XCMDs and XFCNs into its stacks without resorting to ResEdit or ResCopy. You can import resources from other commercial programs, and you can insert the Apple icon into your menu for access to desk accessories.

SUPERCARD TO THE RESCUE

Other ways that SuperCard helps stack authors include giving them the ability to open more than one stack at a time; you even have access to external stacks, whether they are open or not. For those who feel constrained by HyperCard's window size, you can also design cards of any dimension up to 34-by-34 feet. Stack authors will appreciate the ability to mix fonts, styles, and sizes of text in any given text field. And, for professional-looking output, SuperCard supports high-resolution laser printing.

To ease the scripting of animated sequences, SuperCard introduces a few new commands. For instance, you can draw a path that you would like an object to follow and then write a button script using the new Move command that tells an object to travel along the preordained path. If you would like something to happen whenever two objects touch, you can use the Intersect command to define that action.

SuperEditor, a separate module that accompanies SuperCard, lets you see and work on cards, windows, menus, resources, and scripts in an environment optimized for speed and ease of use. Online support, font control, and scrolling for long scripts facilitate the editing process.

Application authors should take special note of SuperCard's ability to create stand-alone products. You can distribute your new stacks with all their graphics tools intact without a separate SuperCard runner and without licensing fees.

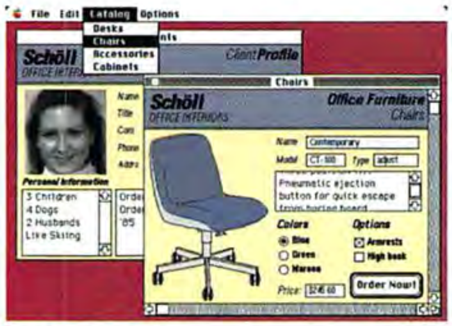
SuperCard is slated for second quarter release with a retail price of $199. While it is true that HyperCard 2.0 may include many of the enhancements written into SuperCard, Silicon Beach has done an excellent job of incorporating refined graphics tools that may well win the program a bevy of dedicated converts.

PLUS FILLS A SLOT

While SuperCard is distinguished by its graphics abilities, Format Software's Plus emphasizes its "software slots." Plus's slots allow third-party developers to create new fields—spelling checkers, telecommunications programs, or spreadsheets, for instance—in any language supported by the Macintosh Programmer's Workshop and include them in their Plus stacks.

Icons for these new fields are inserted into a bar at the top of each authoring card. Already inserted into the bar are icons for paint, text, word processing, database, and object-oriented drawing modes. The two slots for text input, for instance, include a text field similar to HyperCard's that is used for importing text from HyperCard stacks, and a word processing field that allows multiple fonts, sizes, and styles of text within any field, as well as justification, find and replace capabilities, and some mail merge functions. You can cut and paste data imported into a traditional text field into a more flexible word processing field.

For authors writing stacks that require



3 Children
4 Dogs
2 Husbands
Like Skiing

Name: Contemporary
Model: CT-100 Type: adult

Pneumatic ejection button for quick escape from boring board

◉ Blue ○ Green ○ Maroon

☒ Armrests ☐ High back

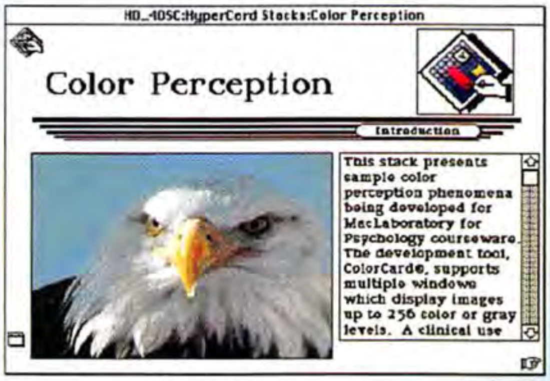
More Than One

One of the most frustrating limitations in HyperCard has been its inability to open more than one window or card at a time. This screen shot illustrates SuperCard's multi-window environment. Note also the customized menu bar and imported TIFF image.

EXTENDING HYPERCARD

While SuperCard and Plus offer integrated stack-authoring packages, many of the whizzes and bangs, such as color and multiple, resizable windows, have been available to HyperCard users for some time as separate XCMDs and XFCNs. Several of these have appeared recently:

- ColorCard from Drexel University can create a multiple-window environment in which you can view gray scales and color graphics.
- MacRecorder version 2.0, an integrated hardware-and-software package from Farallon, allows real-time recording and playback at compression ratios of up to 8 to 1. A SoundEdit module includes a Tempo effect that lets you play a sound at twice or half its recorded speed while maintaining normal pitch.
- Addison-Wesley's HyperComposer provides an on-screen keyboard and musical staff and lets you write up to 11,000 notes rather than HyperCard's limit of 256. The set of XCMDs comes with a full panoply of musical instrument sounds.
- Tim Pittman's CompileIt, distributed by Heizer Software, is an XCMD that lets developers without programming expertise turn their scripts into XCMDs and XFCNs. You can access the Macintosh ROM Toolbox from HyperTalk scripts. While it may not speed up all scripts, it's useful for protecting sensitive script elements from prying eyes.
- Icom Simulation's HyperTMON is a combination of XCMDs, XFCNs, and resources that make a variety of debugging options available as menu items.
- Symmetry's HyperEngine 1.1 allows developers to build stack access into non-HyperCard applications. Claris, for instance, is using HyperEngine to provide an online help stack.
- Oracle for Macintosh uses HyperCard as its Macintosh front end and offers database developers three levels of programming—a very simple HyperCard-based tool for users with little programming experience; Hyper SQL, a HyperCard interface for Oracle's Structured Query Language; and Pro C, a C precompiler for veteran programmers.
- GAVA's HyperCom includes an AppleTalk driver that allows HyperCard to communicate stack-to-stack over a network.
- CLR HyperArrays from Clear Lake Research provides XCMDs and XFCNs that manipulate numeric arrays, sort fields, and test variables.
- The HyperCard VideoDisc Toolkit and the soon-to-be-released HyperCard CD Audio Toolkit (written by Bill Atkinson and Apple's Mike Holm) from the Apple Programmer's and Developer's Association allow stacks to control videodisk and CD players.



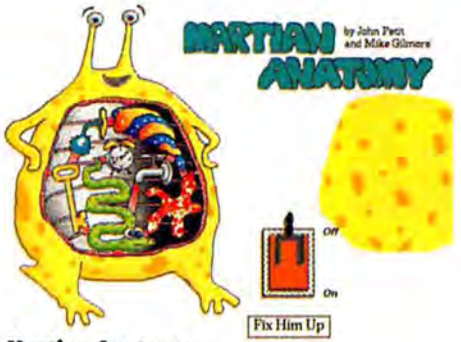
This stack presents sample color perception phenomena being developed for MacLaboratory for Psychology courseware. The development tool, ColorCard©, supports multiple windows which display images up to 256 color or gray levels. A clinical use

XCMDs to the Rescue

When Douglas L. Chute, a neuropsychdogist at Drexel University, needed color and multiple windows to finish a HyperCard project, he couldn't wait for an update from Apple or a third-party solution. So he created ColorCard, an XCMD package that imports color graphics and gray-scale images.

- HyperScan, the software accompanying AppleScanners, has been updated (as public domain software) to include an interpolation command that allows the software to scan a set number of magnifications as it zooms in on an image. The resulting scanned images can then be played back as an animated sequence.

Incidentally, here's an undocumented tip for all versions of HyperScan: type `show magic button` into the message box on the first card of the HyperScan stack and a host of additional features pop up. For instance, you can tell HyperCard to print an image that covers 16 pages—that's a 3-by-4-foot blowup.



Martian Anatomy
HyperCard stack authors have long lamented their inability to define an irregularly shaped graphic as a button. Now both SuperCard and Plus let you write a script for any object, even a text field to make it a button. Each of the elements in the thoracic cavity of this SuperCard alien is a button and has a mind, oops, a script of its own.

end users to type in numbers and dates, the database field in Plus also allows you to define the formatting for data entry, as well as parameters for on-the-fly input checking. No more February 30 entries. The draw field is for object-oriented graphics, and as in SuperCard, any object can have a script and act as a button.

MORE PLUSES

Like SuperCard, Plus can translate HyperCard stacks into its own environment or create new stacks. Any Plus stack can take advantage of the program's 8-bit color; multiple, resizable windows; and object-oriented drawing tools; as well as customizable menus and dialog boxes.

Plus cards can be as large as a LaserWriter page, and Plus supports high-resolution printing. The color capabilities include special effects like sunbursts and rainbows, and each card can have its own palette. While Plus can't import TIFF or PICS formats, it can import MacWrite files, complete with headers and footers (each on a separate card). Like SuperCard, Plus can import XCMDs and XFCNs as long as they don't assume anything like a HyperCard event loop. And Plus includes two kinds of Find functions: the default one works like HyperCard's and the other allows you to index large files for quicker searches.

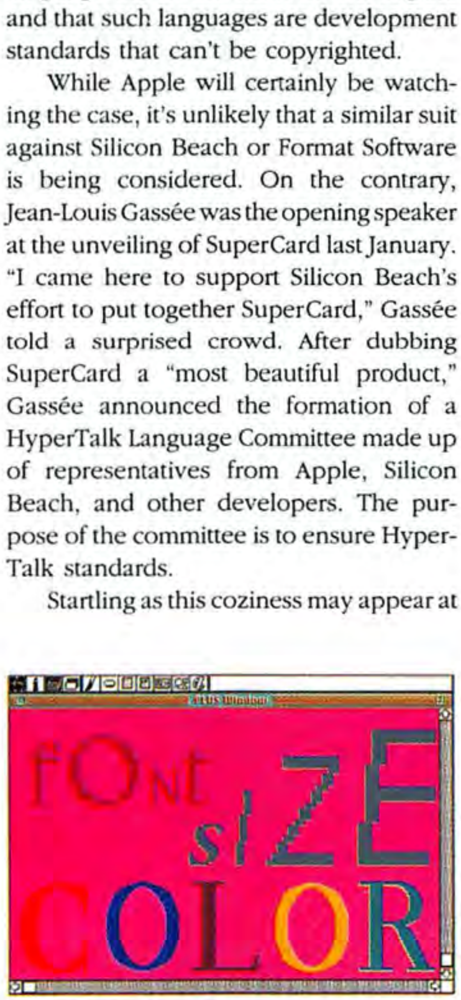
Applications created with Plus can't stand alone, but free run-time versions of Plus will be available for distribution with the stacks. Slated for an April 1 release in Europe, Format plans to sell Plus for $299. The company was still looking for an American distributor at press time.

WHO CARES?

The obvious similarities between HyperCard and the two supersets caused many to speculate on possible legal implications. In a parallel case, Ashton-Tate has a suit pending against Fox Software and The Santa Cruz Operation for selling software it views as clones of its dBase Mac program. Fox argues that a programming language lies at the heart of the dispute and that such languages are development standards that can't be copyrighted.

While Apple will certainly be watching the case, it's unlikely that a similar suit against Silicon Beach or Format Software is being considered. On the contrary, Jean-Louis Gassée was the opening speaker at the unveiling of SuperCard last January. "I came here to support Silicon Beach's effort to put together SuperCard," Gassée told a surprised crowd. After dubbing SuperCard a "most beautiful product," Gassée announced the formation of a HyperTalk Language Committee made up of representatives from Apple, Silicon Beach, and other developers. The purpose of the committee is to ensure HyperTalk standards.

Startling as this coziness may appear at first, it is certainly to Apple's advantage to maintain control over HyperTalk and its extensions. A quick look at the UNIX world reveals what happens when there are many versions of a scripting language. Besides, HyperCard is a free product. Apple isn't losing sales and the fact that the new products support color graphics means that more Mac IIs will be sold.



Mix and Match
Like SuperCard, Format's Plus allows a variety of type fonts, sizes, and styles to appear in a single word processing field. The icon bar at the top of the screen allows users to choose among browse, information, foreground, background, paint, button, text field, word processing field, database field, and object-oriented draw modes. Messages are typed to the right of the icon bar.

MAX AGUILERA-HELLWEG

Bill Appleton, creator of Telerobotic's Course Builder and Silicon Beach's World Builder, programmed SuperCard.

HYPERFUTURE

All this competition and enhancement bodes well for the future of hypermedia. Over a million copies of HyperCard have been distributed, and while not all Macintosh users are sold on the program's potential, it is gradually winning more and more favor.

Stack authors already familiar with HyperCard's abilities will appreciate the ways in which these improvements facilitate the creation of elegant, functional stacks. Those new to hypermedia may be won over by the increased ease and expedience offered by the new products. In any case, the number of researchers and developers devoted to augmenting HyperCard and its genre points to a future in which hypermedia may well play an integral part. The rumors that subsequent system software may include a scripting language to facilitate customization and communication may not be such a pipe dream after all. ◼

See *Where to Buy* for contact information.

HOW TO
SELECT A
SUPERIOR
DATABASE
PROGRAM

Choosing an ORGANIZER

by David Pogue

Whaddya gonna do with your new computer—organize your recipes?

It's not surprising that the first image many people get when they think of a computer is a database: organizing recipes, typing a grocery list, storing names and addresses. As it happens, they're not far wrong; managing tabular data is one of the things a computer does best. And with each new generation of software, database programs for the Macintosh get more powerful and flexible.

BACKGROUND DATA

You can organize information with any database product; any database software can search for a particular record, sort data alphabetically, and print it in rows and columns. Granted, a spreadsheet can do these things just as easily, but a good database program goes far beyond arranging data into tidy lists. The best of these programs help you enter data, sort it on multiple criteria, calculate totals, display the results in a variety of ways, and print reports in a multitude of formats.

If you're looking for a database program that's as easy to manage as a spreadsheet, you should check out the flat-file managers, or a program like Reflex Plus, which is halfway between a relational database manager and a flat-file program.

Here are some key ways to weed out the top-notch products from the ones that are only so-so.

LAYOUT AND DESIGN

Being able to tailor the look-and-feel of a filing system is one of the best features of a database program. The amount of power you have over setting up a database varies from program to program, however; here are some features that should be on your shopping list.

- *Multiple Layouts* A good database program enables you to format information in

RON CHAN

several different ways simultaneously. For instance, one view (or *layout* in database vernacular) of a name-and-address list might be standard mailing labels. A second layout might show only the name field, so you could print out name badges. This ability to use the same set of information in several ways is a hallmark of a flexible, state-of-the-art database.

- *User-Designable Interface* Can you customize the look of the data entry screen? Can you pop a corporate logo into the corner, or are you condemned to type information into a bare-bones spreadsheet? The best programs let you design a data entry screen, control the order in which you tab through the fields, and set a different font for individual fields.
- *Font Support* Even in this day and age, some database programs permit only a single font per file. Sending out invoices in 9-point Monaco may have been acceptable two years ago, but there's no excuse anymore.
- *Online Graphics* If you have anything more complicated than a mailing label to design, you'll appreciate the ability to quickly draw a border around a field, or to put a horizontal rule above the totals. The best database programs give you as much power in graphics (with a host of MacDraw-like tools) as they do in data processing.
- *Field-Placement Commands* A database should offer commands for manipulating the placement of fields and their labels as you create a layout. These crucial commands include Group/Ungroup, Align Top/Bottom or Left/Right, and even Cluster Resize (the ability to resize several fields in unison, which is essential for order blanks).

ENTER: THE DATA

There's no question about it: the worst part about placing an operation's data on a computer is typing every piece of information into the machine. If you've got a 5000-name mailing list, you'll be tapping plastic keys for quite a while. A good database product, therefore, should make data input easier.

- *Importing Data* Make sure the program you're considering can read in data from

Use the table at right as a starting point for comparing database features. Some database programs work differently than a traditional list manager. DAtabase is a desk accessory that comes with a separate application for designing and laying out data files. Business FileVision is a graphics-based interactive database program that lets you link data to graphic or text elements in a drawing sheet. Clicking on an element takes you to the corresponding record. Reflex Plus is a relational database. Since it offers dynamic links between files, it has no need for lookup files.

external sources—another Macintosh database, for example, or even another computer. The best programs can read files of various formats directly, with a minimum of reshuffling and format converting.

- *Typing Aids* If your information isn't already stored in some electronic form, you're not so lucky; you have to type it in piece by piece. But here, too, a good program helps you. Panorama (the greatly expanded reincarnation of OverVue), for example, offers a feature called Clairvoyance; as you're entering data, the program looks for similar data in previous entries. You have to type but a few letters of a word into a field, and the program fills in the rest of the entry automatically if it finds a match.

Data entry shortcuts save you time and typing, and ensure that entries are consistent

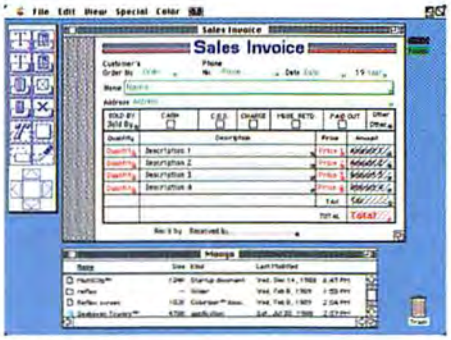
- *Default Values* The best database programs let you set up a default value for any field, sparing you the trouble of typing the same thing over and over again if the majority of the records contain the same data for that field.
- *Multiple Choice* If there are only a few possible values for a certain field, a superior program lets you set up a select-one-of-the-following dialog box; the user merely clicks on the proper choice, and the fully typed entry appears in the blank.
- *Lookup Fields* In the most flexible database programs, you can set up a semirelational link from one open file to another with very little effort. In other words, you might enter someone's name in an invoice file, and the program would automatically fill in the address and telephone number fields for you, by consulting a second file (which contains a full list of names, addresses, and phone numbers).

These data entry shortcuts don't just save you time and typing; they also ensure that entries are consistent from record to record (is it GE or General Electric?) and that names are spelled correctly.

DATA CRUNCHING

When you've finally typed or imported data into the program, you're ready to start crunching information. Here, too, the design and elegance of a superior database program are strikingly better than a mediocre one.

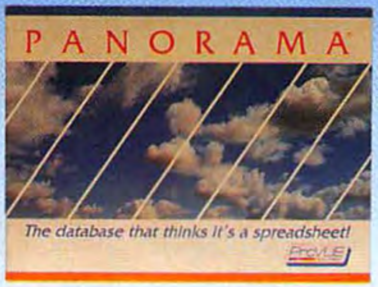
- *Mathematical Prowess* If you're going to set up a database that must perform a fair amount of number-crunching, make sure the program's calculation fields can do more than add and subtract; some programs are more mathematically gifted than others. While Microsoft File and DAtabase can only do simple arithmetic, Reflex Plus, FileMaker II, and Panorama contain built-in functions for financial, text (for example, profit = price – cost) and date calculations.



A Two-Part Program
DAtabase has two parts: a program for designing and laying out data files and a desk accessory for entering data. This DA (shown here) is handy for quick-and-dirty data entry needs such as filling out invoices.

If you need to generate reports with subtotals of the numbers in your fields, double-check to be sure that you can add such summaries, either on screen or when you print.

- *Searches and Sorts* Chances are good that one of your primary motivations for putting data on the Macintosh is so that you can reorganize it quickly. Database programs vary, however, in their implementation of searching and sorting routines. Ask: Can this program perform a one-pass search on several criteria? Does this database store the file in memory or, if it's disk-based, does it use an indexing scheme? You hope the answer to either question is yes. Memory-based and indexed database programs are much faster at searching and sorting than are programs that have to read the file from beginning to end to find specified data.
- *Macros* You may appreciate the ability to automate repetitive or complicated tasks, particularly if you're setting up a database for other workers to use. With a macro capability, a database program can search, sort, perform a calculation, select a layout and print—all with a single command. The best programs write the macros for you by recording the actions you perform.



PHOTOGRAPHS BY FRED STIMSON

DECIDING ON A DATABASE

	Business FileVision	DAtabase	FileMaker II	Microsoft File	Panorama	Record Holder Plus	Reflex Plus
	Marvelin	Preferred Publishers	Claris	Microsoft	ProVue	Software Discoveries	Borland
List price	$395	$129.95	$299	$195	$395	$99.95	$279
Maximum number of records	32,000	2500	disk-based	disk-based	RAM-based	disk-based	disk-based
Maximum number of open files	1	1	16	1	24	1	16
Creating a layout							
Number of field types	1	3	6	6	5	9	6
Default layout			•	•	•	•	•
Number of functions for calculated fields	6	4	37	4	37	38	55 plus
Window autoscroll when dragging object	•		•	•	•		•
Line, square, circle drawing tools	•		•		•	•	
Rulers for measurement	•		•		•	•	
Paste picture fields (black and white)	•	•	•	•	•	•	
Paste picture fields (color)		•	•		•	•	
Resize several objects at once	•		•*		•		
Data entry							
Automatic capitalization					•	•	
Automatic number formats			•	•	•	•	•
Default field values	•		•		•	•	•
Lookup fields			•		•		n/a
Multiple-choice fields		•	•		•	•	
User-defined range			•		•	•	•
Password protection		•	•		•	•	
Undo	•		•	•	•	•	•
Data processing							
Automatic macro generation			•		•		
Date calculations			•	•	•	•	•
Form letters	•		•	•	•	•	•
Multiple-criteria searches	•	•	•	•		•	•
Search and replace			•		•	•	
View multiple records	n/a	•	•	•	•		•
Printing							
Automatic date stamping	•	•	•	•	•	•	•
Automatic page numbering	•	•	•	•	•	•	•
Headers and footers	•	•	•	•	•	•	•
Concatenate blank spaces	•		•	•	•	•	•
Page preview	•		•		•	•	•
Print one record	•	•	•		•		

** Only in repeating field.*

FIT TO PRINT

Getting data into the program and manipulating it is only half the battle; often the most important function of a database is the printout.

- *Laser Printer Support* If you plan to print with a laser printer, be sure the database software can support pasted-in encapsulated PostScript or QuickDraw graphics; your corporate logo won't look very impressive if comes out of the LaserWriter as a 72 dots-per-inch (dpi) bitmap. Peruse the manual. Will the program let you design forms of any size, shape, and orientation, or are you limited to letter- and legal-size forms? Can you design a form that will fit on those bizarre one-across-by-seven-down mailing labels of yours?
- *Mail Merge* Until recently, you had to export data to Microsoft Word to merge a mailing list into form letters easily; no longer. A couple of the best database products let you perform mail merges from within the program.
- *Print Preview* Be sure your prospective database program can display a preview of any report you're about to print. There's no feeling worse than returning to an ImageWriter a half-hour after starting to print mailing labels, only to find that your layout chops off the first few characters of every line.
- *Label Flexibility* Speaking of mailing labels: lesser database programs only print one label in a row, and even some of the expensive ones don't let you decide whether to print them in order across the page or down the page. Needless to say, the best programs let you control all these variables.

DRAKE SOREY

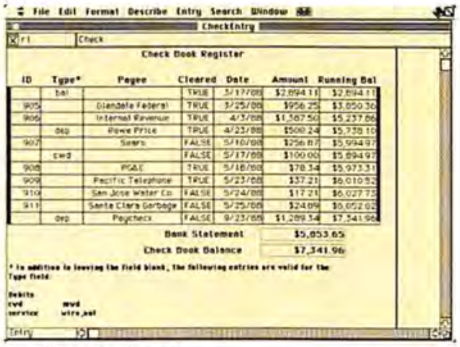
Mark Luhn of Jeffrey's Inc., a San Francisco toy retailer, uses Panorama to prepare a general ledger for his accountant, to control inventory, and to create mailing lists. As an amateur artist, Luhn appreciates Panorama's graphics abilities. For instance, Luhn frequently changes the look of his invoices to grab a customer's attention.

PERFORMANCE AND EASE OF USE

Even if there's a database that gets an A+ in all the feature checks so far, you should abandon it if it looks as if it'll be a chore to learn and use. The elegance of a program's design and operation is something you'll have to live with daily, and it should rank high on your list of priorities.

Are you going to have to train others to use the database? Will you have temporary personnel who won't have time to master a new program? How much time do you have to set up new files? Check the following points.

- *Password Protection* If several people will be using the program, you may want to consider controlling access to sensitive parts of it, or at least preventing some users from altering the setup. Some database programs permit password protection and can hide menus, assuring you that no one can (willingly or accidentally) destroy the delicate artistic balance of your layout.
- *Speed* Get some hands-on experience with the program. Functions you use frequently, for example searching and sorting, should be quick, or else you'll be frustrated when trying to find the data you've organized.
- *Complexity* Be acutely aware of your personal power-versus-learning-curve attitude. If you don't have the patience to putter through extensive tutorials to master high-level capabilities, by all means consider a simple-but-limited program like Microsoft File. Fortunately, we live in an enlightened age; committing priceless data to one program no longer means it's locked in that file format forever. If the time comes when you need more-sophisticated powers, you can export the data to another program.
- *Multiuser Capabilities* Only a couple of database products like FileMaker II support network access; be sure you read the fine print.
- *Online Help* The best programs spare you from having to crack the manual.
- *Capacity* Keep your eye on the number of records you expect to have in a file. Some programs have a fixed ceiling on this figure. Others, like Panorama, are limited by memory—which, depending on the size of your files and the amount of memory your system has, can be a strict limit indeed. Disk-based programs limit the number of records only to the size of your hard disk.



Check Book Register

ID	Type*	Payee	Cleared	Date	Amount	Running Bal
	bal		TRUE	3/17/88	$2,894.11	$2,894.11
905		Glendale Federal	TRUE	3/25/88	$956.25	$3,850.36
906		Internal Revenue	TRUE	4/3/88	$1,387.50	$5,237.86
	dep	Rowe Price	TRUE	4/23/88	$500.24	$5,738.10
907		Sears	FALSE	5/10/88	$256.87	$5,994.97
	cwd		FALSE	5/17/88	$100.00	$5,894.97
908		PG&E	TRUE	5/18/88	$78.34	$5,973.31
909		Pacific Telephone	TRUE	5/23/88	$37.21	$6,010.52
910		San Jose Water Co	FALSE	5/24/88	$17.21	$6,027.73
911		Santa Clara Garbage	FALSE	5/25/88	$24.89	$6,052.02
	dep	Paycheck	FALSE	9/23/88	$1,289.34	$7,341.96

Bank Statement $5,853.65

Check Book Balance $7,341.96

* In addition to leaving the field blank, the following entries are valid for the Type field:

Debits
cwd mwd
service wire,pal

Really Relational
Since Reflex Plus is a relational database, you can set up dynamic links between files. In this checkbook application, the date, identification number, and type fields are linked to separate databases.

FINAL REPORTS

While the checklists above don't cover every aspect of evaluating a database, the chances are good that the remaining signs of quality—such as clarity of the manual, availability of technical support, and frequency of upgrades—will go hand-in-hand with the other hallmarks of top-notch databases. Don't be afraid to shop around. You don't have to settle for something clunky. The best programs are dazzlingly efficient and flexible. ▣

See *Where to Buy* for contact information.

. . . .

David Pogue *is a writer, composer, and Broadway conductor in New York City. He's an avid member of the New York Mac Users' Group.*

·DO THESE THREE TOP DATABASES REALLY DO THE JOB?

by David Pogue

DATABASE Showdown

You're the president of a small business. You need a Macintosh database, but you don't have the money or time to bring in the big, expensive relational guns that require a programmer to set up (like Double Helix II and 4th Dimension). What's a president to do?

The best option is to choose a flat-file database, such as FileMaker II, Panorama, or Microsoft File 2.0. All of these programs provide multiple layouts of the same information; perform complex searches, sorts, and calculations; and offer picture fields and multiple fonts. And you can own any of them for under $300.

But if these three programs were thrown into a ring to battle it out, feature against feature, which one would emerge victorious? I challenged each program with a typical real-world task: managing the data for a fictional small business called Reciprocity, a recipe-exchange service. The test project incorporates the most important database features, such as lookup fields, automatic calculations, graphics generation, and shortcuts to data entry.

RON CHAN

INGREDIENTS

Reciprocity requires three complex data files. The first, the mailing list, manages the names, addresses, membership expiration dates, and account numbers of 8000 members. The second file, an invoice system, is cross-referenced to the mailing list. When you enter a member's account number on an invoice, the database program enters the name and address automatically. Tax and totals for each invoice are instantly calculated.

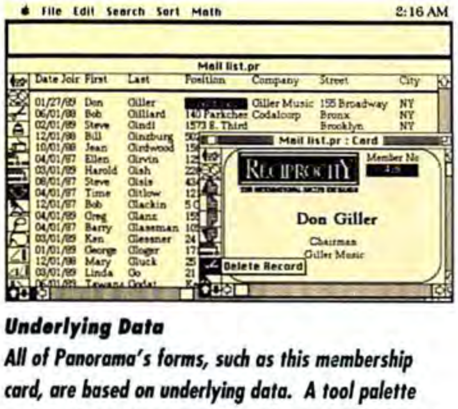
The third file contains the company's recipes. A subscriber to the Reciprocity service can specify any number of characteristics for a dish; for example, someone might be looking for a no-salt entrée that is made with wine, takes 20 minutes or less to prepare, and serves four. The database system must be able to find such dishes quickly, display a digitized photo, and print a recipe card.

The three rival programs await. Let's tear off the shrink-wrap and see how they perform.

TASK #1: DESIGN AND LAYOUT

Not very long ago, working with a database meant typing one-font information into fixed-length rectangles. Those days are over; all three of the database products reviewed here let you arrange information in many different ways.

Microsoft File 2.0 and FileMaker II offer extremely simple systems for defining the fields in a database: type each field name and select the data type (text, numeric, date, or picture). If you're using File, however, proceed cautiously; once you've created a field, you can never change its field type. Panorama and FileMaker are more forgiving—even when a file has data in it, you can still change a field's definition.



Underlying Data
All of Panorama's forms, such as this membership card, are based on underlying data. A tool palette contains icons for commonly used commands. As you drag the cursor over these icons, labels pop out to identify the command.

ROBERT HOLMGREN

Extending HyperCard
David Watson, of the Santa Cruz, California, post office, set up his data in HyperCard, only to discover that the program has limited reporting capabilities. So Watson created HyperCard extensions to Microsoft File. Now Watson keeps his card-based data in HyperCard and prints out mailing labels and postcard-format labels using File.

Unlike File and FileMaker, Panorama's field-definition routine uses a spreadsheet format. When you run Panorama for the first time, you can enter data into the spreadsheet *before* defining the fields, just as you can type numbers into a new Excel document. In fact, to define the fields, you must open a separate window.

Designing a Screen All three programs produce a simple default layout (fields lined up across the page, for example, or stacked in a column). But you'll probably want something more customized. You can reposition, label, resize, and format fields in a design window. You can attach as many different layouts to a file as you want; File even saves them separately, so you can use a specific layout with other files. All three programs accepted a logo designed in Illustrator; none had any problem storing digitized photos (although Panorama couldn't scale the image to fit the photo field).

Panorama offers a multitude of features that make form design simple. To create a multiline form such as an Invoice, for instance, you paste in a blank table structure from a template provided with the program. Then use Panorama's ingenious Cluster Resize feature, which resizes all selected objects at once when you drag one corner. Panorama also includes an extensive MacDraw-type graphics environment for further customizing forms.

The Rivals FileMaker's Layout mode is only slightly less capable. Its graphics implementation isn't as complete as Panorama's; you can draw lines, circles, and rectangles of any line thickness and any fill pattern, but the manipulation commands found in Panorama (like Group, Zoom, Duplicate, and Nudge) are absent in FileMaker.

FileMaker's grid is quirky, too; sometimes an object refuses to snap into alignment with other objects in a row, because the grid may have shifted a pixel or two since you placed the original objects. And because FileMaker has no Align Objects command (as Panorama does), when the grid fails to align you must turn it off and place the field by eye.

FileMaker has an elegant solution for creating an invoice—a feature called Repeating Fields. You can make any field Repeating, meaning it will sprout a specified number of clones within a single record, stacked vertically. When you resize the top field, its attached clones change size too.

Layout design is Microsoft File's weakest area. The most prominent deficiency is that File has no built-in graphics capabilities; you can't put in a horizontal line under your logo, or draw a box around the Total Due. You can position the fields anywhere, and make them any font you like; but without any drawing power, your ability to generate handsome business-oriented documents is limited.

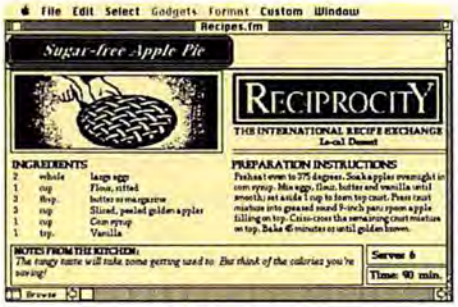
Furthermore, if you change a field's font, you won't see the change until you return to the data entry screen. Unlike the other programs, File doesn't change the dummy text inside a field (the field name) to the new font or style; you always see Chicago 12-point, which makes it impossible to tell which fields you've already formatted. File won't provide any help with a multiline invoice, either—you'll have to create an individual field for every blank on every line.

The Winners Though FileMaker and File offer much more straightforward field-definition routines, Panorama's graphics and layout capabilities—which you'll use much more often—make it far outshine its competition.

FIRST: ***Panorama.***
SECOND: ***FileMaker.***
THIRD: ***File.***

TASK #2: DATA ENTRY

If your data exists in electronic form already, you're in luck: all three database programs import tab-delimited text files with aplomb. It's during manual data entry that you'll learn to love or hate a database product.



Eliminating Gaps
When you type data into FileMaker, you may see gaps between fields (as in the ingredients list). If you select the Slide Objects menu command, however, the extra blank spaces won't appear on the printout.

FileMaker and Panorama try to help during data entry. Both let you create multiple-choice fields; when you click in (or tab to) one of these fields, a dialog box pops up listing all the predefined possibilities. This kind of field is ideal for Reciprocity's "Type of Recipe" field, where there are only six possible entries, such as Appetizer and Bread.

Both programs can also provide a default value for a field and can increment a default. For instance, as a record is created in the mailing list, the programs increase the four-digit serial number by one.

FileMaker and Panorama also feature lookup fields. When you want to send an invoice, you normally have to type in the customer's account number, first and last name, and address—not a comforting prospect when you realize that this information has already been typed into the mailing list.

When you assign the lookup option to a field, however, you can instruct the program to fetch data from another open file and to enter it into specific fields in the current file. In the ideal Reciprocity database you type an account number into the invoice; the database compares the number with the account numbers in the mailing list file. If it finds a match, it feeds the name and address information from the mailing list into the corresponding fields in the invoice. Not only have you saved typing time, but you're assured that there are no spelling inconsistencies.

Extrasensory Panorama Panorama offers even more time-saving features, going out of its way to make data entry as painless as possible. A Tabs parameter lets you advance from one field to the next by striking the space bar instead of pressing the Tab key. You can define 17 parameters for each field, such as number formatting, or checking for duplicates. Capitalization is an example of a parameter that may seem minor, but when you're typing in dozens of records, you'll love Panorama for automatically putting state abbreviations in all caps.

Finally, there's Clairvoyance. After each character you type into a Clairvoyance-enabled field, Panorama examines all the entries in previous records. If it finds a match, Panorama finishes typing the entry for you. Thus if you've enabled Clairvoyance for the City field, and you type "San Fr," the letters "ancisco" will instantly appear. If you actually meant to type "San Fritos," just keep typing; the guess will vanish.

The Winners FileMaker offers a few of the most vital data-entry features, but Panorama's extensive implementation of intelligent time-savers carries the top honor with ease. File's lack of lookup fields puts it miles behind the other two; in fact, it offers no data entry shortcuts at all.

FIRST: ***Panorama.***
SECOND: ***FileMaker.***
THIRD: ***File.***

SPEED TESTS FOR A 5000-RECORD DATABASE

	Panorama	FileMaker	File
Open file	9	10	**4**
Sort by last name	54	236	**34**
Select subset of sort	17	10	**6**
Find unique record	10	**1**	2
Search for nonexistent record	8	**0**	3
Drag scroll bar halfway down	12	**4**	8
Import 5000 records	**38**	2414	1680
Export 5000 records	646	**577**	656

(time in seconds)

When working with a 5000-record database, FileMaker and File are the fastest. Theoretically, Panorama should have been the fastest, since it stores entire files in memory instead of on disk. When I ran the same tests on a 1000-record database, Panorama came proportionally closer to its rivals' times.

TASK #3: DATA MANIPULATION

The names, addresses, and Easy Tuna Bakes are all typed in. Now it's time to crunch some data.

Because Panorama's spreadsheet format displays only a single font, and because it retains the entire file in memory, you'd expect the RAM-based Panorama to be far faster than disk-based File and FileMaker. Yet Panorama places last in the speed tests for finding a record, selecting a subset of records, and scrolling (see "Speed Tests for a 5000-Record Database").

Panorama concedes one other battle to its rivals: multiple criteria searches. To find a (1) vegetarian (2) entrée that (3) serves six, for example, you have to perform three separate searches, each time selecting a subset of the currently chosen records. This homing-in search routine is not as efficient as that of Panorama's rivals: both File and FileMaker find records that meet multiple search criteria in one swoop.

Math Transit When it comes to number crunching, both Panorama and FileMaker will impress you. The subtotal, sales tax, and grand total fields on the Reciprocity invoice are good examples; it's simple to make the program calculate them automatically, based on the prices of the items ordered. What's more, each of these programs offers 37 additional built-in math functions, ranging from text funnels to mortgage/principal functions. File's ability to perform simple calculations (addition, subtraction, multiplication, and division) is feeble by comparison.

All three programs perform summaries and grand totals handily, which makes monthly report-generation a snap. Panorama and FileMaker let you set up any number of nested subtotals, which can be placed anywhere. You can't put Microsoft File's summaries in the user-definable forms; they're only available in a fixed list format.

Finally, FileMaker and Panorama offer powerful macro capabilities. To generate the labels for a Past Due mailing, all the Reciprocity accountant has to do is select Print Past Due (or whatever you've called it) from the macro menu, and the database program selects the overdue records by checking their dates, chooses the correct report form, sorts the records by zip code, and prints them. Microsoft File has no macro functions, but comes bundled with AutoMac, a third-party macro program; it's not as effective, however, as the integrated approach of the other two programs.

The Winners Despite its clunky multiple-search routine (and slight speed lag), Panorama is a data cruncher par excellence. Its spreadsheet format is conducive to on-screen subsummaries and other groupings; there's even a pseudo-outliner to give you control over the amount of detail you see. Though the Reciprocity project didn't make use of them, Panorama also offers extensive charting capabilities. You can create Bar, Line, Pie, Area, and Scatter charts with your choice of font, tick-mark units, and patterns.

FileMaker's calculation fields are powerful and intuitive, and because of its indexing scheme, FileMaker can find a single record faster than either of its rivals. As for File, although its Sort function is quick and simple, its math capabilities do no better than a pocket calculator.

FIRST: ***Panorama.***
SECOND: ***FileMaker.***
THIRD: ***File.***

TASK #4: PRINTING

Microsoft File works easily when creating mailing labels and columnar reports—frequently used printing tasks that don't require much layout. The program comes with templates for numerous Avery printer labels; getting your mailing list to start printing correctly onto labels takes only a few minutes.

IT TAKES ALL SORTS

File	FileMaker	Panorama
1	1	1
2	2	2
A & A	A A	A & A
A A	A & A	A A
A a	A a	A Aa
A Aa	A Aa	A a
AA	AA	AA
Aa	Aa	AAaa
aA	aA	Aa
aa	aa	Aaa
Aaa	Aaa	AND
AAaa	AAaa	And
AND	AND	AVE
And	And	Ave
and	and	aA
AVE	AVE	aa
Ave	Ave	and
ave	ave	ave

How accurately do the programs sort? FileMaker and File produce consistent, logical sorts. The only difference between the two programs is the placement of **A & A** *and* **A A.** *Panorama, however, places more emphasis on capitalization than on alphabetical order. For instance,* **AND** *and* **And** *are placed together, but* **and** *is placed after* **Ave.**

But you'll be frustrated if you attempt anything more complex. Creating the Reciprocity membership card, for example, was a headache. File's form-design mode provides no method for defining the width of a card—on the screen, your layout goes all the way across the page. And since File also lacks a Print Preview command, printing cards of a certain size and shape was a trial-and-error affair.

Panorama and FileMaker do much better, especially since they offer a Print Preview command. FileMaker lets you set up individual parts on your printout; a part is a horizontal slice of the page which you can turn into a repeating header, a footer, or a summary section, for example.

Panorama takes the parts concept further. To put together a report, you drag rectangular tiles onto the screen. There are over 35 kinds of tiles, such as 1st Page Left Header, Group Sidebar, and Table Footer. Although learning the tiles' functions and effects takes time, you'll be able to generate such diverse printouts as seven-across labels or nested tables.

Showing Good Form A new Reciprocity subscriber is automatically sent a personalized letter of welcome. Anyone who's ever received a "You may have already won . . ." sweepstakes letter knows that these letters aren't personalized at all; they're generated by a database program's mail merge function.

Panorama's mail merge function is ingenious. All you have to do is type the text of the letter. At each place you'd like to insert information from the database, just select the field name from a menu. When you print, Panorama seamlessly integrates the information in the database with the text.

Such an effect is possible with FileMaker and File, but it's not easy. In FileMaker, you must create each line of the letter as a separate text object, place it manually in a form, then drag each field into place and hope it's aligned correctly with the text. If you decide to change a phrase, you must set up the whole paragraph again, line by line. With File, you can create each paragraph as a block, but again there's no way to integrate data fields with your text. With either program, you can export data to a word processor

ED KASHI

Tracking Votes

As assistant producer for San Francisco's Bay Area Music Awards, David Fauver uses FileMaker to count several thousand ballots. He enters the data from each ballot and then checks the categories to find out how many votes each nominee has received. He also uses FileMaker to track ticket sales to various events.

with a mail merge feature, but an integrated approach is vastly superior.

Memory Loss Before we award the Golden Index trophy to Panorama, however, it's time to confront the program's biggest weakness: memory usage.

The majority of Macs are blessed with exactly 1 megabyte of memory. Put bluntly, that's not enough for Panorama to handle large databases—including the 8000-record Reciprocity project. For instance, when you try to print without enough free memory, the print status dialog box appears for a few minutes—but the report doesn't print out, nor are you given any error messages.

For anything but simple printing tasks, you must increase Panorama's allotment of scratch memory—a chunk of RAM reserved for temporary tasks. But there's the rub. If you allot more of your 1MB to scratch memory, you'll have less RAM available for data. On a Mac Plus, with scratch memory set at a minimum, you can only work with about 6500 eight-field records. Keep in mind, too, that this assumes that a file has no forms or charts, and that you don't have any other files open (and thus have no lookup fields set). Unless you have small files, Panorama will force you to count bytes and fiddle with scratch-memory levels.

The Winners Panorama is clearly the most powerful printer. Yet figuring out the tiling scheme is a headache, and having to meddle with the computer's memory allocation is a hassle. By comparison, FileMaker has much of the power but few of the complications. File's trial-and-error method of printing just doesn't compare.

FIRST: ***FileMaker.***
SECOND: ***Panorama.***
THIRD: ***File.***

TASK #5: LEARNING CURVE AND PERFORMANCE

No one can challenge Microsoft File's small memory needs (512K) or its tiny learning curve. If you can't master File's layout, data entry, and searching skills in an evening, you should go buy some index cards.

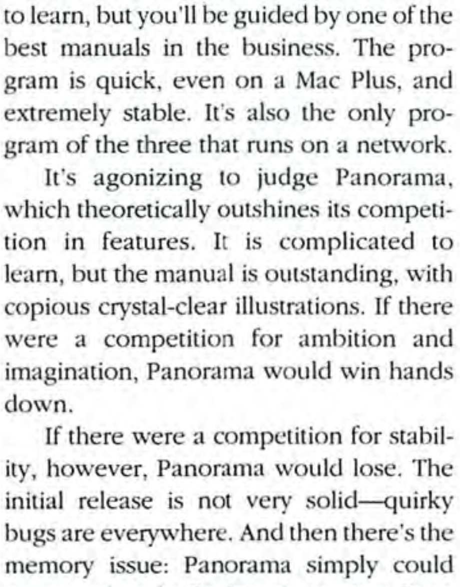
FileMaker will take you slightly longer to learn, but you'll be guided by one of the best manuals in the business. The program is quick, even on a Mac Plus, and extremely stable. It's also the only program of the three that runs on a network.

It's agonizing to judge Panorama, which theoretically outshines its competition in features. It is complicated to learn, but the manual is outstanding, with copious crystal-clear illustrations. If there were a competition for ambition and imagination, Panorama would win hands down.

If there were a competition for stability, however, Panorama would lose. The initial release is not very solid—quirky bugs are everywhere. And then there's the memory issue: Panorama simply could not complete the Reciprocity project. Even on a 2MB Mac, there wasn't enough memory to have three graphics-laden files open and still print.

The Winners For smaller projects than Reciprocity, you'll never have to worry about Panorama's memory-usage problems; the program will deliver all of its goodies without a whimper. As for the bugs, ProVue promises a cleaned-up version of the program by the time this article appears. If ProVue delivers as promised, then Panorama has a better shot at claiming the Best Database crown; until then, it will have to cede the title to its stabler and simpler rivals.

FIRST: ***FileMaker.***
SECOND: ***File.***
THIRD: ***Panorama.***



Jan 1, 1989
Linda Parish
President
Top of the Line, Inc.
200 West 83rd St.
New York

Designing for Data Entry

Microsoft File lets you open a form's design window (left) and data entry window simultaneously, so that you can see what effects your design has on data. That's fortunate, since File's design mode displays field names in 12-point Chicago, no matter what other style you choose for the data entry screen.

DATA BIRTH

In the end, only one database struggled through Reciprocity's demands with its dignity intact: FileMaker. Microsoft File, while it's the ideal choice for people with limited filing (and the only choice for Mac 512K owners), lacks too many key features to be a good candidate for a small business.

Only with great reluctance did I drag the Panorama Reciprocity files to the trash. With a 4MB or more Mac and a less buggy version of the program, things would be different. Even then, though, I could only use the RAM-hungry Reciprocity files on other high-memory Macs.

At last Reciprocity is on firm electronic footing. Without any real programming, I've created a professional data processing system. Lookup fields and data entry shortcuts minimize typing time, macros perform repetitive multistep chores, and the printouts look like they've been prepared by the art department.

Let's see how long it takes FileMaker to complete one more test: to find a high-calorie dessert that can be prepared in under five minutes, serves one, and contains lots of chocolate. ■

See *Where to Buy* for contact information.

. . . .

David Pogue *is a writer, composer, and Broadway conductor in New York City. He's an avid member of the New York Mac Users' Group.*

Making IBM Work for Your Mac

TO REMAIN INTEGRAL TO CORPORATE COMPUTING, MACS MUST KEEP UP WITH IBM'S FUTURE MAINFRAME NETWORKING STRATEGIES

It's a fact of life that most important corporate data—for example inventory, personnel, sales, or accounting information—lives on IBM mainframe computers. The overwhelming presence of the IBM machines in business means Macs need to communicate with those mainframes to be effective. Fortunately, a growing slate of products from Apple and third-party vendors allow just that.

To understand how Macs fit into the IBM mainframe puzzle, let's first take a look at the mainframes and different terminal-emulation/data-exchange strategies. Then, we'll examine IBM's strategy for connecting personal computers and mainframes, called the Systems Application Architecture (SAA). Finally, we'll see how vendors are taking advantage of SAA to integrate the Mac—Mac user interface intact—with IBM mainframes.

WELCOME TO THE WORLD OF BIG BLUE

IBM's largest computers belong to the System/370 family, which includes mainframes like the 308X, 309X, and 43XX. (In IBM-speak, *X* is a number that further specifies system models.) System/370 also includes the 937X computer, which is—relatively speaking—smaller and designed to serve as a departmental computer.

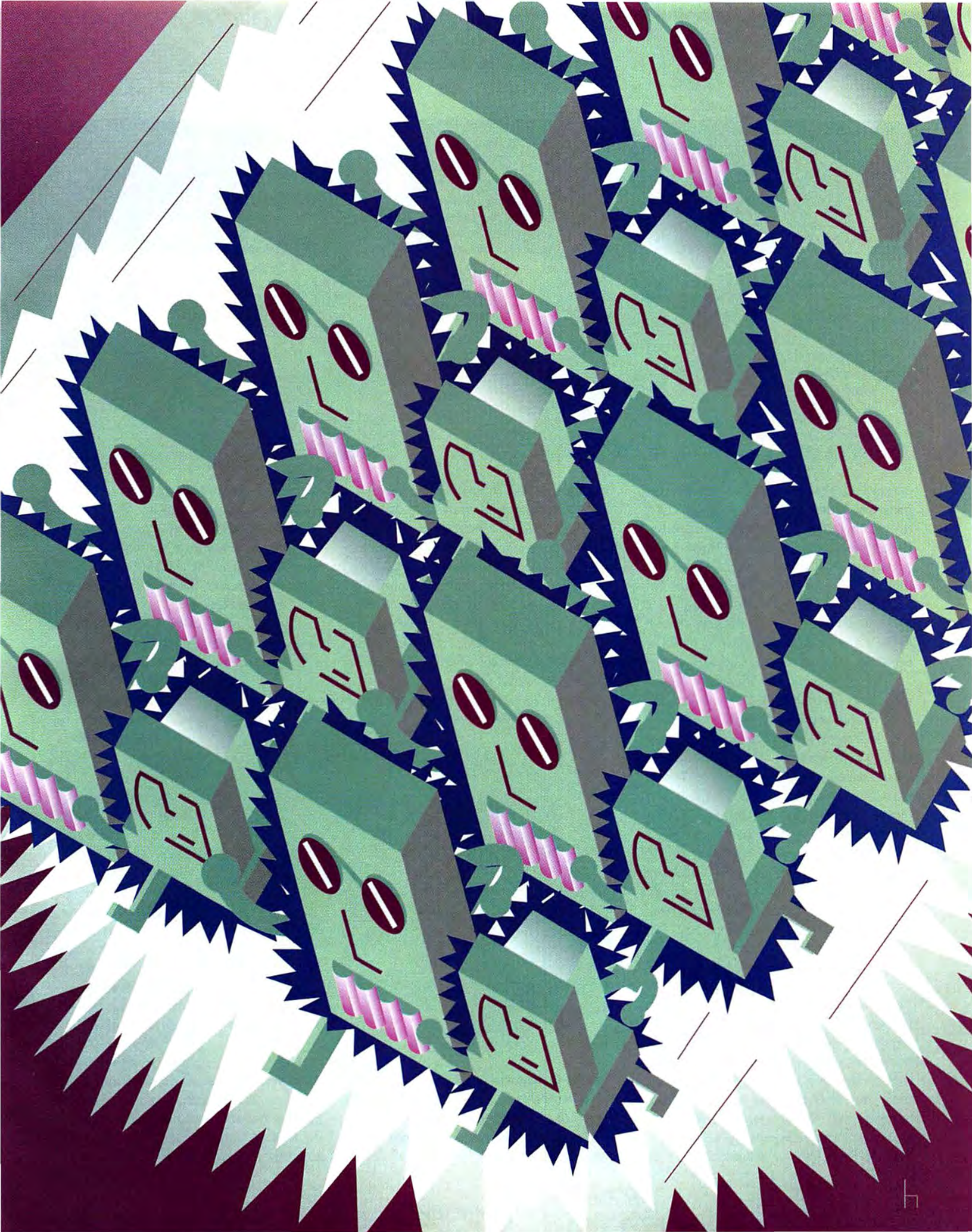
The most popular terminals for System/370 hosts belong to IBM's 327X series. The 3278 (monochrome) and 3279 (color) are strictly character-based terminals, much like the old IBM PC displays.

Linking a terminal to a System/370 mainframe is nothing like hooking together two Macs (or even connecting a VAX to a terminal for that matter). Rather than using RS-232 serial cables, most IBM terminals use coaxial cable to transmit data. That data is transmitted synchronously, not asynchronously, between the mainframe and its terminals. And unlike the Mac, which uses ASCII to represent characters, an IBM mainframe employs a scheme called Extended Binary Coded Decimal Interchange Code (EBCDIC).

Nor do IBM terminals connect directly to the mainframe. A terminal must plug into a *cluster controller,* or communications controller, that in turn interfaces to a front-end processor in the mainframe (see "Big Blue Connections").

Cluster controllers are responsible for

by Dave Kosiur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LINKING UP WITH IBM

	AppleLine Apple Computer	MacBlast Communications Research Group	MacIrma SE Digital Communications Associates	MacIrma II Digital Communications Associates	MacMainFrame DX Avatar Corporation	MacMainFrame SE Avatar Corporation
Price	$1295	$195	$1195	$1195	$1195	$795
Computer	Mac 512KE to Mac II	Mac 512KE to Mac II	Mac SE	Mac II	Mac 512KE to Mac II	Mac SE
Connection	coax	serial	coax	coax	coax	coax
CUT terminal mode	•	•	•	•	•	•
DFT terminal mode						
Keyboard Mapping		•	•	•	•	•
INDSFILE Transfer	•		•	•	•	•
Other file transfers		Blast	ForteNet	ForteNet	HFT	HFT
Multiple sessions						
Macros		•				

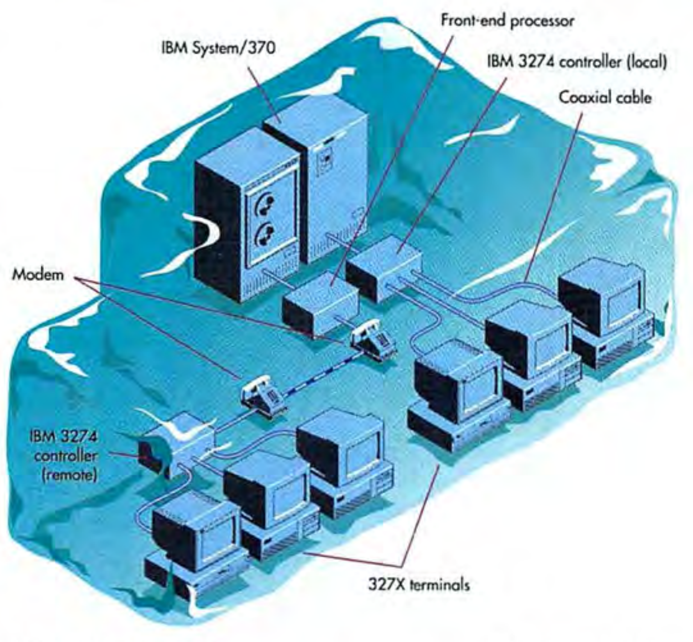
controlling communications lines, error recovery during communications, and for distributing the correct data streams to the right terminals. Off-loading these functions to a cluster controller provides the high-speed mainframe with a buffer for linking in the low-speed terminals. IBM 3X74 series cluster controllers can attach to the mainframe either via a direct link, or remotely through high-speed modems.

The 3174 controller uses the Centralized Unit Terminal (CUT) mode, and requires no intelligence within the terminal. However, it's limited to just one host session per terminal. Another controller mode, called Distributed Function Terminal (DFT) mode, requires an intelligent terminal to help process mainframe communications. Terminals that support DFT make fewer demands on the newer 3274 controllers; they also provide multiple sessions with the host (over a single coaxial cable) and offer improved color, graphics, and local printer support.

THE MAC IN A 3270 WORLD

The simplest way to connect a Mac with an IBM mainframe is via 3270 terminal emulation, which supports synchronous communications protocols on coaxial cable (see "Pretending to Be 3270"). However, there are also software products from Simware and Communications Research Group that enable asynchronous communication with the mainframe (see "Asynchronous 3270 Terminal Connections").

Other packages—available from Apple Computer, Avatar Technologies, Digital Communications Associates (DCA), Novell, and Tri-Data Systems—allow the Mac to adapt to IBM's terminal connection scheme (see "Linking Up with IBM"). Such terminal emulators consist of two parts: a hardware device or board that provides the coaxial cable connection to attach to the mainframe's cluster controller; and terminal-emulation software that creates an IBM 3278-style display on the Mac screen. Either the software or hardware must also translate the Mac's ASCII characters to and from the mainframe's EBCDIC representation.



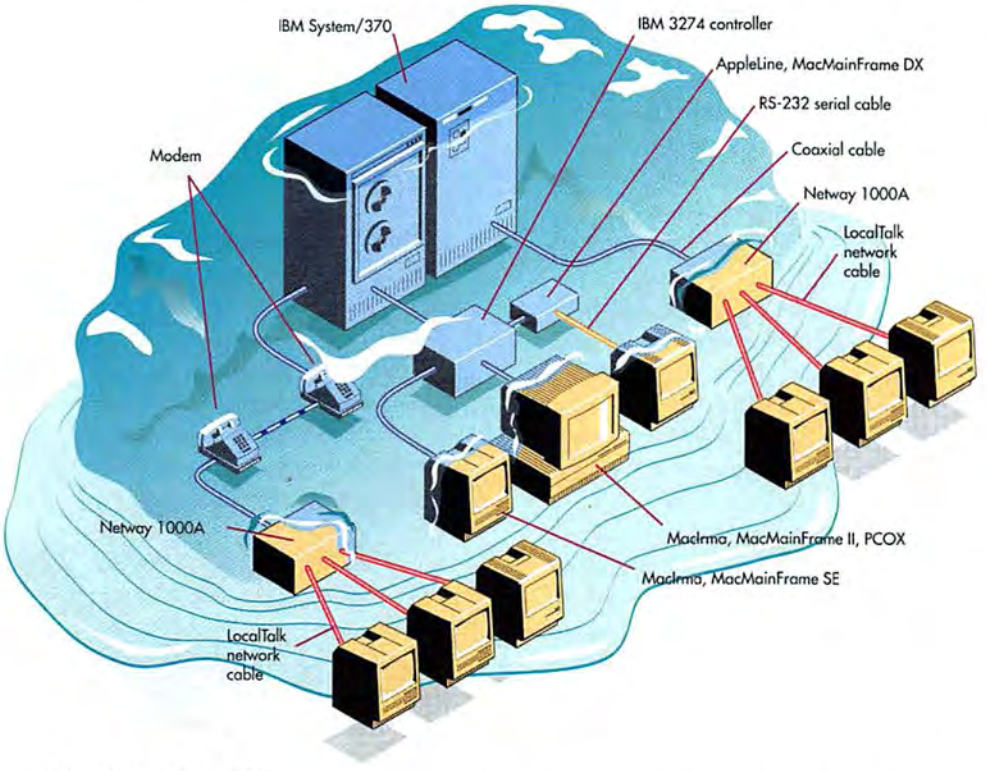
Big Blue Connections

IBM's 3274 controllers can attach to a mainframe either via direct link (local) or via high-speed modem link (remote controller). The 3270-style terminals attach directly to the controllers with coaxial cable.

Apple's AppleLine, a self-contained protocol converter, is the oldest emulation product available for the Mac. Used in conjunction with MacTerminal, AppleLine connects to the Mac through a serial port. Avatar's MacMainFrame DX is a similar external protocol converter. MacMainFrame DX uses Avatar's own MacMainFrame 3270 software as the terminal emulator; you can use the MacMainFrame DX with Shiva's NetSerial to provide IBM connectivity for an AppleTalk network.

The advent of the Mac SE and the Mac II offered developers the opportunity to produce 3270 interface add-in boards. (Similar boards have long been available for IBM PCs and compatibles.) Companies that now offer such 3270 emulation

MacMainFrame II Avatar Corporation	MacMainFrame II/DFT Avatar Corporation	Mac3270 Simware	Netway 1000A Tri-Data Systems	PCOX/Coax-M Novell	PCOX/Multi-M Novell
$995	$1295	$250	$3995	$545	$675
Mac II	Mac II	Mac 512KE to Mac II	Mac 512KE to Mac II	Mac II	Mac II
coax	coax	serial	coax	coax	coax
•	•	•	•	•	•
	•				•
•	•	•			
•	•		with MacMover	with 3270 SR-M	with 3270 SR-M
HFT	HFT	SIM3270	HFT		
	•		•		•
		•	•		



Pretending to Be 3270

Macs can link directly to an IBM mainframe as 3270 terminals. The product names next to the Mac icons show the appropriate configurations for available products. Because it replaces the 3274 controller, you can attach the Netway 1000A either directly or with a modem.

boards for the Mac SE and Mac II include Avatar, DCA, and Novell.

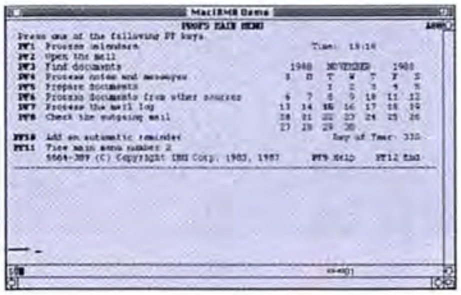
In general, the functionality of these boards is about the same; all provide CUT-style terminal emulation. Only in the past year has multiple-session support (via DFT) become available—first from Novell, then from Avatar. DCA has gone the next step by providing support in its MacIrma product for mainframe-generated graphics displays that can be saved and manipulated on the Mac.

Tri-Data's Netway 1000A takes a very different approach to IBM mainframe-to-Mac connectivity. Instead of being the intermediary between the Mac and a cluster controller, the Netway 1000A substitutes for IBM 3174 or 3274 controllers. It uses AppleTalk to connect Macs running 3278 emulation software with the mainframe; printer output from the mainframe can be directed to a LaserWriter on the local AppleTalk network. Up to 16 sessions per network are possible with the Netway 1000A, and the recently announced 2000A handles up to 64 users. Because Tri-Data's emulation software, SNA3278, supports DFT mode, Macs can also run multiple sessions.

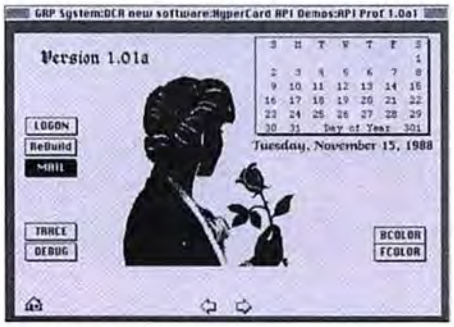
PUTTING ON A HAPPY FACE

Working with the character-based terminal screens of an IBM mainframe is a far cry from using the Macintosh interface. Luckily, there are a number of tools that provide more of a Mac look to IBM mainframe communications. These tools support a range of applications, from simplifying navigation through a series of screens to view a memo, to providing transparent access to IBM databases within a Mac application.

First we'll deal with a class of tools called Applications Program Interfaces, or APIs. An API is a way to simplify the use of hardware interfaces when different computer systems communicate. For example, as a programmer, you might regularly use **write** and **read** statements to output or input data. Coupled with an API, the commands (**write** and **read**) could



```
                      PROFS MAIN MENU
Press one of the following PF keys.
 PF1  Process calendars                        Time: 15:14
 PF2  Open the mail
 PF3  Find documents                       1988  NOVEMBER  1988
 PF4  Process notes and messages             S  M  T  W  T  F  S
 PF5  Prepare documents                            1  2  3  4  5
 PF6  Process documents from other sources   6  7  8  9 10 11 12
 PF7  Process the mail log                  13 14 15 16 17 18 19
 PF8  Check the outgoing mail               20 21 22 23 24 25 26
                                            27 28 29 30
PF10  Add an automatic reminder                   Day of Year: 330
PF11  View main menu number 2
      5664-309 (C) Copyright IBM Corp. 1983, 1987    PF9 Help   PF12 End
```



Which Interface Would You Rather Use?
These two screens illustrate what APIs can do for the IBM mainframe interface. The top window shows the 3278 terminal's character-based display of one IBM PROFS (Professional Office System) screen. Function keys are an integral part of the interface. The bottom window uses DCA's MacIrma API in HyperCard; it offers the same functions as the IBM screen, but you use a mouse to select functions.

be used to communicate transparently with a mainframe, simply by using commands (**send data** and **receive data**) comprehended by the IBM operating system.

Both Avatar and DCA have defined APIs, and are shipping API libraries for use with the MacMainFrame and MacIrma boards, respectively. Avatar and DCA also include XCMDs or XFCNs so that you can design a mainframe interface with HyperCard (see "Which Interface Would You Rather Use?").

Although IBM has defined a series of APIs for communicating with their machines, any vendor of communications hardware can develop its own. Avatar chose to develop its own API, called the MacMainFrame Programmer's ToolKit. Avatar's API stresses conformance to Apple's interface guidelines and toolbox calls for the Mac, as set forth in *Inside Macintosh* (Addison-Wesley, 1984–1988). DCA's MacIrma API, meanwhile, conforms to an IBM standard called HLLAPI (High-Level Language API). This means any previously developed IBM PC code supporting HLLAPI can run on the Mac with MacIrma, although you may want to change the interface.

MACWORKSTATION

APIs are convenient tools for customizing and simplifying interfaces to existing mainframe applications and operating systems. However, corporate MIS (management information systems) departments may want to design new applications on the mainframe that use the Mac interface. Or such departments may wish to add a standard Mac interface for existing applications on a corporation-wide level. If that's the case, Apple's MacWorkStation (MWS) fits the bill.

MWS is basically a series of programming protocols designed to support remote communications between a Mac and a mainframe. On the host mainframe, any standard application continues to communicate by means of a stream of characters. MWS intercepts those characters and puts them in a form more in keeping with the Mac interface.

Then, using one of MWS's supported communication protocols, character streams representing commands and data are sent to the Macintosh. Simple character codes—like D007, which causes a dialog box to appear on the Mac screen—give the application windows, dialog boxes, and menus, just like a typical Mac program. The only difference is that the application generating or processing the data is actually running on the mainframe.

Initially, the only IBM mainframe communications link for MWS was the AppleLine protocol converter and coaxial cable. In the past few months, however, two significant mainframe drivers have been added to MWS—Avatar's and DCA's versions of TLPM, or the Transport Layer Protocol Module. Thus either MacMainFrame or MacIrma now supports MWS links with a mainframe.

APIs and MacWorkStation are not the only ways to add a Mac interface to mainframe programs. Originally marketed for Mac-to-VAX connectivity, the connectivity language CL/1, from Network Innovations, is being expanded to include

ASYNCHRONOUS 3270 TERMINAL CONNECTIONS

Communicating with an IBM mainframe via modem may sometimes be more convenient than through the cluster controller. For example, you may not need to be continuously connected to the mainframe, just every once in a while to exchange data.

Simware's Mac3270 behaves like a regular terminal emulator on the Mac. One of Mac3270's strengths is its macro editor and compiler, and Mac macros can be used with Simware's IBM PC version of Mac3270. The software also allows you to transfer text and binary files with the mainframe, provided text files are not formatted.

A similar product called MacBlast, from Communications Research Group, is part of a larger series of Blast terminal-emulation and file-transfer products. In addition to IBM mainframes, the Blast series supports Wang, DEC, Data General, and Hewlett-Packard computers.

Finally, Kermit, a very popular public domain program maintained by Columbia University in New York, offers file-transfer features to bridge the Mac and IBM mainframe. Several Mac communications packages—MicroPhone II, Red Ryder, and VersaTermPro—support Kermit protocols.

IBM mainframes don't innately support asynchronous terminal communications. As a result, Mac3270, MacBlast, and Kermit require that you install file-transfer software on the mainframe. In the case of Mac3270, it's SIM3278 Simware's IBM mainframe application. MacBlast needs the IBM mainframe version of Blast from Communications Research Group, and Kermit requires the mainframe application of the same name.

IBM-based database servers. CL/1 allows Mac users to extract or modify data found in SQL (Structured Query Language) databases, such as IBM's DB2. Several Mac databases already include support for CL/1. The same CL/1 procedures used to access VAX-based data can be used with IBM databases. Network Innovations also offers a HyperCard CL/1 library in case you'd rather use HyperCard to manipulate IBM databases.

Another approach to connectivity is provided by Oracle Corporation. Oracle sells database systems for a wide variety of computers, including IBM mainframes and Macintoshes. For mainframe databases that already use Oracle all you need to do is purchase Oracle for the Mac and you can access the mainframe-based data.

JONATHAN LEVINE

Andersen Consulting, in Hartford, Connecticut, has developed a product called MAC-Bench for shop floor and inventory control. MAC-Bench runs on a Mac II and uses Avatar's API and MacMainFrame II to communicate with MAC-PACD on an IBM mainframe. Pictured here are John Atkinson from Andersen Consulting and Al Leites from Sargent, an architectural hardware manufacturer.

KEEPING UP WITH IBM'S LATEST NETWORK

IBM's older strategy for networking large mainframes revolves around what is known as SNA, or Systems Network Architecture (see "Alphabet Soup: SNA, LUs, and PUs").

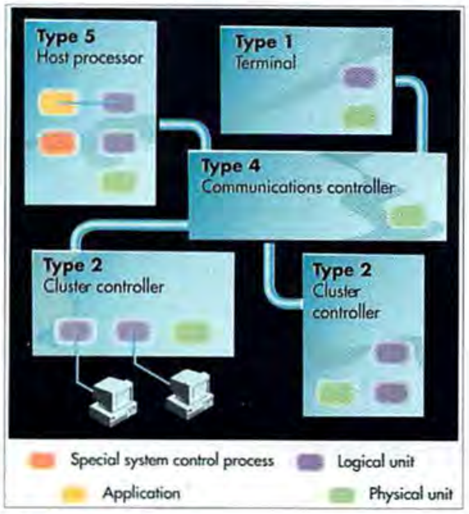
Systems Application Architecture (SAA) is a networking strategy developed by IBM for connecting all types of computer systems—mainframes, minis, and personal computers—and applications running on those systems. You can think of SAA as an extension of SNA. SNA first introduced the concepts of Logical Units (LUs) and Physical Units (PUs), but within the context of mainframe communications; SAA organizes those units and attempts to provide a common interface for program-to-program communications among mainframes, minis, and personal computers.

A primary component of SAA is the *peer-to-peer protocol* called LU 6.2. Rather than assume that only one of the conversing devices has intelligence, peer-to-peer protocols assume that both members of the conversation are equally intelligent. Hence the use of the word *peer.*

As an example, communications between a mainframe and the DFT-style terminals mentioned earlier assumes that the terminal has no local intelligence. On the other hand, a Mac or PC has a great deal of local intelligence. With the Mac and an IBM mainframe working as peers, a database program on a Mac could tell a mainframe what kind of data it wanted, whereupon the mainframe would find that data and send it to the Mac for display in the database.

IBM's most powerful API, one designed more for the future than the present, is Advanced Program-to-Program Communications (APPC). As the name implies, this API allows programs on different machines to communicate with each other as peers. There is no master program and no slave program, as is the case with the older terminal-to-mainframe (3270) and micro-to-mainframe protocol (HLLAPI) sets.

The intent is for SAA to provide links to all of IBM's major services for all kinds of users (see "SAA's Bits and Pieces"). Unfortunately, all of SAA's supporting cast has yet to be implemented across the board of IBM computers and operating systems.



Putting SNA Together
The different types of PUs are shown here in a typical SNA network of host, controllers, terminals, and IBM PCs. Typical configurations of LUs and PUs are given for each device. The box labeled SSCP in the host is a special system-control process responsible for controlling the rest of the network.

ALPHABET SOUP: SNA, LUs, AND PUs

The building blocks of an SNA network are Logical and Physical Units. Logical Units (LUs) provide points of access through which users interact with the SNA network. Different LU types are identified by numbers in SNA (see "Logical Unit Types").

Logical Units allow users to communicate without knowing anything about each other's hardware. For instance, you don't need to know whether the other user is using an IBM PC/AT or a 3033 mainframe.

Of course, an SNA network needs more than Logical Units—after all, something has to connect the devices and maintain communications. Enter the Physical Unit (PU). SNA uses PUs to represent actual devices on the network (see "Putting SNA Together").

Each PU is responsible for providing the services necessary to manage and use a device. The PU also handles any resources, such as communications links, that are associated with it.

Physical Unit does not necessarily mean a piece of hardware; it can be implemented in hardware, software, or a combination of both. For those used to dealing with the AppleTalk or Digital Network Architecture (DNA) networks, SNA is radically different. In AppleTalk and DNA, all nodes are equal in the eyes of the network. SNA, on the other hand, demands that a central point of control exist.

LOGICAL UNIT TYPES

Type	Purpose
LU 0	Supports user-defined data stream within SNA formats and protocols.
LU 1	Supports multiple I/O devices for applications designed to communicate with a terminal.
LU 2	Supports communication with 3270 terminal types (3270 data stream).
LU 3	Supports communication with 3270 printer devices (3270 data stream).
LU 4	Peer-to-peer communication for certain devices (SNA data stream).
LU 5	Not defined.
LU 6	General peer-to-peer communication with a user-defined data stream.
LU 7	Supports applications that communicate with 5250-type terminals.

MacAPPC

With this—admittedly brief—introduction to the IBM networking world and APPC, let's take a look at Apple's product for IBM networking, MacAPPC. MacAPPC allows a Mac II to serve as a gateway between an AppleTalk network of Macs and an SNA network. You install the MacAPPC's communications coprocessor board and a communications board on a Mac II to link to an SNA network. Plugging that Mac II (now the MacAPPC platform) into an existing AppleTalk network provides APPC support for the rest of the Macs on that AppleTalk network.

In addition to providing interfaces for C and Pascal with MacAPPC, Apple also includes a HyperTalk interface. The latter will probably prove to be a real boon for developers who would like to experiment with different parts of APPC before casting any code in stone.

The implementation of MacAPPC has certain advantages. First, the MacAPPC board in the Mac II is actually a coprocessor board, requiring very little of the Mac II's processing power to function. Thus, the Mac II can continue to be a regular workstation.

Second, MacAPPC memory requirements are low because most of the APPC code actually resides in RAM on the MacAPPC board. By way of contrast, IBM's APPC/PC loads into each PC's main memory, taking up valuable space—particularly true for MS-DOS machines, which have a 640K RAM limitation.

Third, MacAPPC reduces the cost of connecting Macs to mainframes. Only the Mac II equipped with MacAPPC requires the added hardware for connecting to the SNA network. The other Macs, all connected to the MacAPPC platform via AppleTalk, don't need protocol converters or add-in boards.

At the moment, there is but one choice for linking MacAPPC to an SNA network—AST Research's Intelligent Communications Processor (ICP), a NuBus add-in board that implements the SDLC (Synchronous Data Link Control) data communications protocol. Apple has continually promised an IBM Token-Ring board for over a year, but at the time this article was written, the board had not yet been introduced.

SAA'S BITS AND PIECES

Documents and Applications		Network Communications	
Data Streams	• 3270 data stream	Session Services	• LU type 6.2 formats and protocols
	• Document Content Architecture (DCA)		
	• Intelligent Printer Data Streams (PDS)	Network	• Node type 2.1—low entry networking
			• X.25 interface
Application Services	• SNA Distribution Services (SNADS)		
	• Document Interchange Architecture (DIA)	Data Link Controls	• Synchronous Data Link Control (SDLC)
	• SNA Network Management Architecture		• IBM Token-Ring network

SAA's Bits and Pieces

IBM's attempts to place a wide variety of network services under the umbrella of SAA are evident.

Unfortunately, the computer community is not being overrun with APPC-based applications. Implementing APPC requires a lot of coding and familiarity with distributed processing to create new applications. This is probably one reason that APPC hasn't caught on overnight. The foremost reason, however, is probably IBM's delay in implementing APPC on more of its own machines.

WHAT NOW?

If you want to keep Mac-to-IBM-mainframe links simple, the best solution is terminal emulation. Avatar's MacMainFrame and DCA's MacIrma provide good one-on-one coaxial links to System/370 computers. However, if you have to connect a number of Macs to a mainframe (especially if they already share an AppleTalk network), Tri-Data's Netway 1000A is a very cost-effective solution.

To progress beyond simple terminal emulation and file transfer, take advantage of the APIs offered by Avatar and DCA. If your corporation has no programmers who can create a custom application, I recommend that you look at the HyperCard support proffered by these APIs. HyperCard can provide you with all the flexibility you need to create a usable custom stack for communicating with a mainframe. An added advantage is that you can use HyperCard to create prototypes of API-based communications programs.

The Mac and IBM mainframes can be good partners. The tools are there for you to access the data you need on IBM mainframes. And thanks to Apple and third-party vendors, you can do so with the interface and ease-of-use of the Mac, leaving IBM's interface where it belongs—on the IBM.

See *Where to Buy* for contact information.

. . . .

Dave Kosiur, *a* Macworld *contributing editor, is the publisher of* Connections, *an international newsletter concerned with Macintosh networking. Despite having been exposed to Big Blue's radiation, Dave still prefers to do his computing with a Mac.*

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Circle 11 on reader service card

Ramses II was not one to mince words. When it came to getting a point across, he was very direct—what was written was in fact etched in stone.

If he ruled today—in this exciting *Information Age*—he'd feel compelled to update his method to input and retrieve information. Being the meticulous type, Ramses would choose page recognition software that was accurate, fast and above all, flexible. Ramses would definitely choose *OmniPage®* to get the job done.

Let's face it, some scribes have less than perfect "*chipmanship*." Ramses would require the most versatile page recognition software—one that could scan any font or font size, even multiple columns of text—no matter which scribe created it. There's nothing more frustrating than a misplaced hieroglyph. He'd definitely want it to support *MacWrite*™ and *Microsoft Word*,™ two of the most popular word processors within his kingdom. When it comes to page recognition software, he'd want the very best product at the best possible price.

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Circle 230 on reader service card

REVIEWS

WINGZ 1.0

Spreadsheet with 3-D Graphics

Pros: *Three-dimensional charting ability; full complement of graphics tools; large number of submenus; macros can be accessed through buttons placed on chart.* ***Cons:*** *Lack of sort or number series dialog boxes reduces alternatives; doesn't save in SYLK; cannot format full rows or columns of blank cells.* ***Company:*** *Informix Software.* ***Requires:*** *Mac Plus; second disk drive. 2MB for MultiFinder, hard disk for Help. Hard disk recommended.* ***List price:*** *$399.*

While Wingz isn't the first spreadsheet to include graphics tools, it is the only one that lets you create 3-D charts and that gives access to the full range of Mac II colors. If you'd like to create bar charts that look like cityscapes, stacked charts that bring to mind mountain ridges, or line charts that resemble flying carpets, Wingz is the only speadsheet that can do it for you.

Wingz is also generally easy to work with: menu items are well placed, the manual is excellent, and the program's structure is so similar to Excel's (for example, = before formulas, $ before absolute references) that Excel users should be able to use Wingz with little training. In addition, Wingz has a full measure of ingenious minor features.

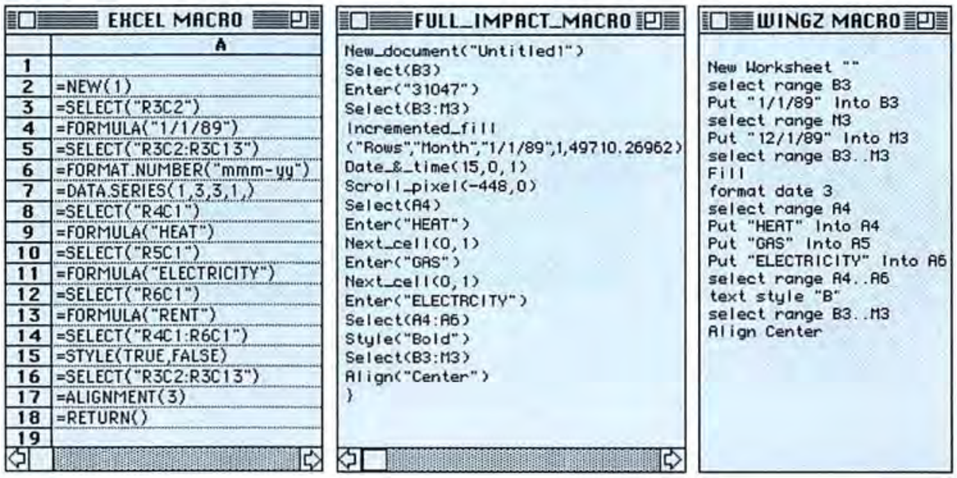
Unfortunately, the program lacks some features we have grown to expect in Mac spreadsheets.

Unlike Excel, Wingz lets you spruce up worksheets with lines, arrows, circles, polygons, and text fields. Wingz's ability to place charts on a worksheet, instead of in a separate document as Excel requires, makes it better for presentations. In all fairness, however, Full Impact provided these features months before Wingz (actually Trapeze provided them first). The one major advance in worksheet layout that Wingz offers is the ability to add a scroll bar to text fields. If you are creating templates for others to use, a scrolling text field can be an invaluable way of providing instructions.

Easier to Use, but There's a Catch

Wingz replaces the time-consuming dialog boxes found in other spreadsheet programs with 26 submenus that control everything from simple functions like changing the font style and type size, to more advanced activities such as setting the attributes and format of numbers, sorting database entries, choosing a chart type, and scaling the worksheet. While the single-mouse-click nature of submenus is convenient, there are times when you might want more choices than a submenu can hold. Excel and Full Impact, both of which make extensive use of dialog boxes, usually offer more alternatives. In Wingz you can't format dates as: month, day, year (for example, July 3, 1989). Nor can you format integers to display leading zeros, or eliminate the leading zero to the left of a decimal point, as you can in Excel.

Wingz offers an efficient method of specifying sort keys without using a dialog box, but this feature, too, is a double-edged sword. You don't lose functionality with the lack of a sort dialog box, but you do lose the ability to check and alter your sorting plan before you actually sort. To add sort keys, you select the columns or rows one at a time in order of sort preference, selecting Add Ascending Key or Add Descending Key from a submenu each time. The database then sorts in the order you select. If you selected the sort columns in the right order, you'll like Wingz



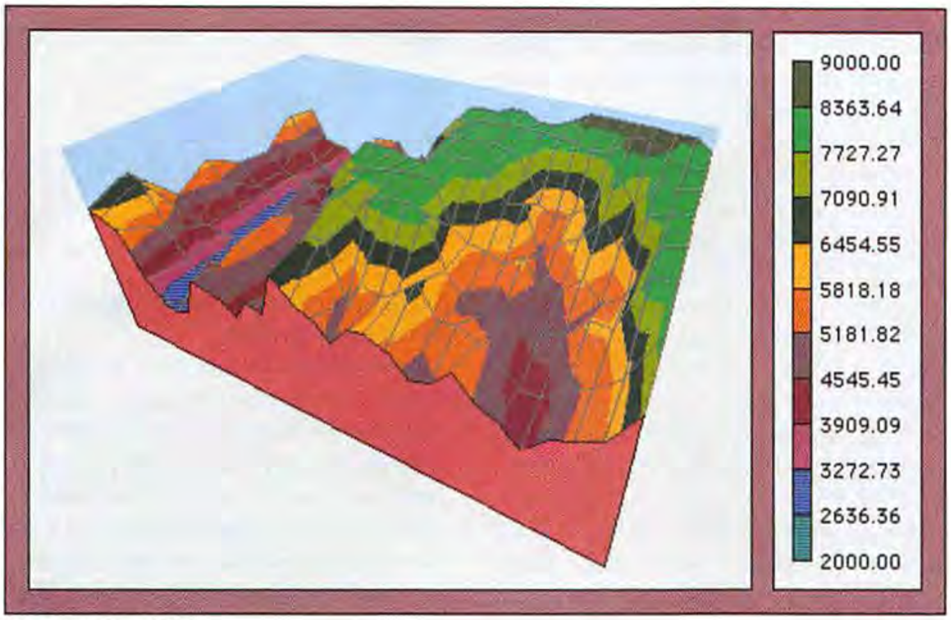
```
      A
1
2   =NEW(1)
3   =SELECT("R3C2")
4   =FORMULA("1/1/89")
5   =SELECT("R3C2:R3C13")
6   =FORMAT.NUMBER("mmm-yy")
7   =DATA.SERIES(1,3,3,1,)
8   =SELECT("R4C1")
9   =FORMULA("HEAT")
10  =SELECT("R5C1")
11  =FORMULA("ELECTRICITY")
12  =SELECT("R6C1")
13  =FORMULA("RENT")
14  =SELECT("R4C1:R6C1")
15  =STYLE(TRUE,FALSE)
16  =SELECT("R3C2:R3C13")
17  =ALIGNMENT(3)
18  =RETURN()
19
```

```
New_document("Untitled1")
Select(B3)
Enter("31047")
Select(B3:M3)
Incremented_fill
("Rows","Month","1/1/89",1,49710.26962)
Date_&_time(15,0,1)
Scroll_pixel(-448,0)
Select(A4)
Enter("HEAT")
Next_cell(0,1)
Enter("GAS")
Next_cell(0,1)
Enter("ELECTRCITY")
Select(A4:A6)
Style("Bold")
Select(B3:M3)
Align("Center")
}
```

```
New Worksheet ""
select range B3
Put "1/1/89" Into B3
select range M3
Put "12/1/89" Into M3
select range B3..M3
Fill
format date 3
select range A4
Put "HEAT" Into A4
Put "GAS" Into A5
Put "ELECTRICITY" Into A6
select range A4..A6
text style "B"
select range B3..M3
Align Center
```

Macro Language Compared

Of the three spreadsheets, Wingz's and Full Impact's macro languages are more like English than Excel's. These three macros perform the same activity: place 12 monthly labels along a row, place expense labels along a column; make the expense labels bold, and center the monthly labels. Excel uses numeric and logical codes that you have to memorize. Excel Macros are accessed through Option-⌘ key combinations or from a dialog box. Full Impact macros are easier to access, since you do so through a submenu or icons on the title bar. Wingz is easier still, because it lets you access macros through a HyperCard-type button, which you can place anywhere on the worksheet .



Wingz 3-D Graphics

Creating a 3-D chart is as easy as creating a 2-D one. Just select the cells that contain data, use the chart tool to specify where the chart should appear on the worksheet, and select the type of 3-D chart (bar, line, layer, step, or combination) from a submenu. Once the image is created, you can rotate it in any direction.

for making it so easy, but if you are as prone to error as I am, however, you might want to be able to preview the list of selected sort keys and edit them, as you can in Excel's and Full Impact's sort dialog boxes.

Fill is another example of a Wingz function that's either convenient or inconvenient, depending on how you use it to fill cells with incremental numbers. It's a great feature for generating lists of consecutive numbers or dates. Just type in the first number, select the range of cells by dragging the cursor, and choose Fill from the Select submenu. Nothing could be simpler. But when you are adding increments other than one, Excel and Full Impact let you use a dialog box to specify how much to add to each number and at what number you should stop. The same operation is more cumbersome with Wingz. You must type the start value in the first cell and then enter the stop value in the last cell of the range. Wingz then automatically divides the difference between the two values by the number of cells in the range and adds the result incrementally to each cell.

Surprises, Pleasant and Otherwise

Wingz has some pleasant surprises that will make you wonder why rival spreadsheet developers hadn't thought of them first. But you'll also wonder why Informix omitted certain features generally considered desirable by spreadsheet users.

One nice addition that can save you time in creating and debugging worksheets is the capability to select a range of cells by type of data. For example, you can select all text, value, formula, or error cells. You can also select all blank cells, all unreferenced cells, or all cells having a direct or indirect formula reference to or from a specified cell.

WINGZ BENCHMARKS

	Excel	Full Impact	Wingz
Mac SE			
Open	8	39	56
Recalc	8	10	7
Save	56	5	5
Mac II			
Open	19	2	2
Recalc	3	3	2
Save	17	1	1
Document size	187K	143K	127K

This test was performed on a worksheet that was 28 columns by 250 rows. Files were opened from within the application. Times are in seconds.

An unwelcome surprise is that when you select a row or column and format it, Wingz formats only the filled cells. You can't, for example, format a column to have a dollar sign appear before all numbers you enter. In Full Impact or Excel you can click on a row or column designator, and the entire row or column will be selected. You can then specify, for example, that all text be formatted in bold. If you select column A, from that point on, everything you type in column A will be formatted in bold. With Wingz, if you select a full column or row, only those cells which contain data will be formatted. The blank cells (which probably make up the vast majority of cells in the row or column) are not formatted, and anything later typed in those cells will not contain the specified format.

A potentially more serious drawback is that Wingz doesn't save in SYLK. You can save your worksheet in text, but when you export the resulting files to Excel or Full Impact, you will not be able to include formulas. You can, however, import SYLK files and either import from or export to Lotus's 1-2-3.

3-D Wins

If Excel, Full Impact, and Wingz were all just arriving on the market today, Microsoft's Excel would probably be considered a weak cousin and would have to sell for less. Now there are thousands of commercial and private templates and macros available for Excel, dozens of books and training materials, a large installed base, and the promise of version 2.0; but if the three spreadsheets were starting together from scratch, either Full Impact or Wingz would be a better choice. These two products are close in functionality. While I prefer Full Impact's greater number of choices over the easier-to-use submenu system incorporated in Wingz, I would ultimately buy Wingz because it can create three-dimensional charts. Trust me, it'll make you the life of the boardroom.—*Lawrence Stevens*

See* Where to Buy *for contact information.

ALDUS FREEHAND 2.0

Professional Illustration Program

Pros: *Allows editing in preview mode; smaller memory requirements than Illustrator; excellent color-manipulation and color-separation; improved user interface; better text manipulation than Illustrator.*
Cons: *Autotracing is disappointing, nearly useless for some graphics; requires intensive study to master program; requires PostScript printer to proof images.*
Company: *Aldus Corporation.* ***Requires:*** *Mac Plus; PostScript printer or imagesetter.* ***List price:*** *$495.*

The duel between FreeHand and Illustrator has been fascinating to watch. In no other software category, it seems, has there been a harder-fought feature fight. And in the long run, we users are the beneficiaries of the hot competition between Aldus and Adobe, creators of these two PostScript-oriented drawing programs.

If you're reading this review, you probably fall into one of three camps: you own and use Illustrator 88 and wonder whether the new FreeHand version has enough additional features to make you switch; you own the previous version of FreeHand and wonder if the new one is worth the $75 upgrade fee; or you're interested in buying your first PostScript drawing program and wonder if FreeHand's the one. Well, I won't keep you in suspense. The answers to these questions are No, Yes, and Maybe, respectively.

The Adobe/Aldus Wars

FreeHand came out after the original Illustrator and offered several unique strengths—the ability to work on art in a preview mode (which Illustrator still doesn't allow), the ability to draw lines in freehand mode (hence the name), more flexible text handling, and the concept of working in layers of a drawing. Many of us switched from the original Illustrator to the original FreeHand, mostly because we could approximate a shape by drawing it freehand and then refine it using the other tools. Then Adobe introduced Illustrator 88, which added professional color handling and separations, freehand drawing, autotracing of bitmapped images, and several other useful features. The color handling alone won most of us back to the Illustrator camp, and the autotracing was a very nice plus.

The new version of FreeHand brings it back into parity with Illustrator. The color handling has been improved and now includes color separations, Pantone color matching, variable screen ruling in separations, and better registration and overprinting support. FreeHand's toolbox now includes autotracing, magnification, path splitting, and hand grabber (for moving the paper in the window) tools. The user interface has been refined and made more like that in other Aldus products, most notably PageMaker. Other, more subtle changes have been made in some of the tools as well.

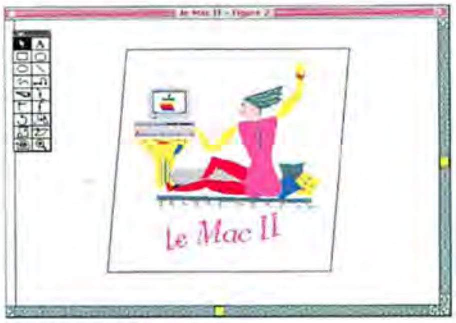
Features, Features, and More Features

Overall, FreeHand 2.0 and Illustrator 88 match up almost identically in the features arena. For that matter, I've found them approximately equal in performance as well. So the decision as to which is the one for you boils down to a lot of subtleties, plus a judgment about which one best suits your work style.

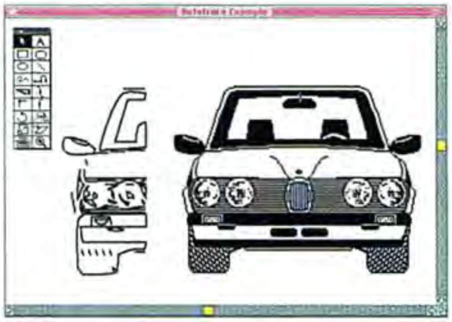
Take layering, for example. Illustrator 88 handles layering object by object. The program puts each new object in front of previously drawn objects. You must use the Move to Front or Send to Back commands to alter this arrangement. I've always had problems with this method, because I never quite seem to be able to draw from the background forward as Illustrator would like me to. FreeHand also includes object-by-object layering, plus up to 200 layers on which to draw. For those who like to create one layer of a drawing at a time—and to have that layer unaffected by drawing in subsequent layers—FreeHand is probably the better choice. It allows you to step back and forth between layers as the inspiration comes, without having to move individual objects forward and backward in the drawing.

Other calls go Illustrator's way, however. Autotracing is one example (see "Autotrace"). You can make Illustrator understand the difference between a line and a black shape, and it will create a single-line path for both. FreeHand, on the other hand, can't. While FreeHand outlines black shapes properly (as in the side-view mirrors in "Autotrace"), it sometimes doubles lines or fails to trace them at all (look closely at the hood and roof lines in the figure). Moreover, FreeHand's autotrace tool requires that you select a rectangular area to convert, while Illustrator 88 requires only that you click within a few pixels of the line or shape you want to autotrace. Thus, tracing large complex

(continues)



Text Applied to a Path
This illustration was originally done in PixelPaint. FreeHand's autotrace function was used to get the general shape of things; then a lot of fine-tuning went into fixing the problems (about two hours' worth of work). Finally, text was applied to a path at the bottom. In contrast, creating the same graphic in Illustrator would take less time on the autotracing, but more time in specifying the strokes and colors; also, Illustrator cannot bind text to a path, so the text would have to be hand drawn, a time-consuming task.



Autotrace
On the right is a simple MacPaint bitmap; on the left is the result of having FreeHand 2.0 autotrace part of it. Large black block areas in the bitmap (like the side-view mirror) trace well, while small lines and details (like the tires and grill) trace poorly. Unlike Illustrator 88, FreeHand 2.0 offers no method of fine-tuning the autotrace function, so what you see here is representative of what you'll get.

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objects requires one command with FreeHand (select the area), while it might take quite a few with Illustrator (select each continuous line or shape individually). Even so, with Illustrator 88 I've had to perform far less work to convert autotraced objects from bitmaps and TIFF images into final, publishable form.

Some Colorful Comparisons

Both these drawing programs now support Pantone color specification, as well as the traditional CMYK process color method. FreeHand performs separations from within the program, a plus when compared to Illustrator's stand-alone separation utility. FreeHand also gives you more control over the separation process, especially if you want to overprint custom colors.

Because FreeHand supports drawing in the preview mode, you can see the colors of objects on screen as you draw, if you don't mind the slight performance penalty for doing so. Illustrator forces you to toggle back and forth between drawing and preview modes to see the effects of coloring objects. FreeHand's graduated fills look better on the screen, and appear to have more subtlety and fuller gradations than Illustrator's, but FreeHand 2.0 seems to be quite susceptible to creating moiré patterns and crashing the typesetter (see "Selecting a Color Separator," March 1989). On the plus side, FreeHand lets you control the screen angles for each color in separations. This is something that Illustrator doesn't give you much control over; I'd give the color-handling nod to FreeHand by a slight margin.

Other things that give FreeHand the edge over Illustrator include more extensive text-handling features, such as the ability to fit text to a curve; a set of additional keyboard shortcuts (many tools can be selected from the keyboard); better support materials for first-timers, including a set of Advanced Techniques cards that show how to perform particular jobs, like making an Excel graph into a rotated 3-D chart); and an advantage in restricted memory environments—FreeHand can perform small tasks in a 750K MultiFinder space while Illustrator 88 absolutely requires a 2048K one. There's even a slight difference in the way each program handles bezier-curve control points; I prefer FreeHand's because I find them easier to grab; this makes it easier to change the curve predictably.

The Final Mix (And the Winner Is . . .)

But what it all boils down to is work styles and personal preferences. You won't go wrong buying either FreeHand 2.0 or Illustrator 88. If you already have the first version of either of these products, update today, because the additions have made them both professional, publication-quality drawing programs. I use both regularly, often alternating between them just as an artist might alternate between brushes. But if I had to settle on only one product, FreeHand 2.0 would be my all-purpose brush.

FreeHand 2.0 is a state-of-the-art drawing tool that I can recommend without reservation. Its performance, feature mix, and supporting materials are all professional in caliber. If you're still shopping for a drawing tool to create high-quality color images, these programs stand out in my mind as two of the best the Macintosh has to offer.—*Thom Hogan*

See Where to Buy ***for contact information.***

* * *

MATRIX TT200

Thermal-Transfer Color Printer

Pros: *Good-quality images; compact; easy to use; flexible printing software.* ***Cons:*** *No Chooser-level driver; software not MultiFinder compatible.* ***Company:*** *Matrix Instruments.* ***Requires:*** *Mac II with one slot available.* ***List price:*** *$4995.*

The thermal-transfer color-printer market is heating up. The latest entry is Matrix Instruments' TT200, which in many ways reflects Matrix's experience designing high-quality film recorders. The TT200 Thermal Transfer Color Printer, together with its flexible, easy-to-use software, prints 200 dots-per-inch (dpi) 8½-by-11-inch output onto special paper or overhead-transparency film (both come in rolls). The TT200 is a quality piece of hardware and an effective device for capturing full-color presentations and graphics.

Matrix TT200 from Matrix Instruments

MARK JOHANN

To set up the TT200, you open the Mac II and insert an interface board (the interface kit includes well-written step-by-step installation instructions and a 6-foot connecting cable). Then you install a thermal-transfer ribbon inside the printer. The documentation for installing the ribbon and inserting the printer paper could be clearer, but fortunately the procedures it covers aren't much more complicated than installing an ImageWriter II. With a little patience and common sense the job should go easily.

Conductor Driven

The TT200 differs from most printers in that you can't select it in the Chooser and then access it directly from within a graphics application. Instead, you must access the printer from the TT200's software, Conductor (an enhanced version of the software supplied with Matrix's film recorders). Conductor lets you preview, rotate, cut, paste, and scale images prior to printing. It can substitute high-resolution fonts for standard Macintosh screen fonts, though the only fonts supplied are Courier, Helvetica, Symbol, and Times, plus the variations of same that you might find in the Style menu. You can add a background color and select a single color for all noncolor (black) text. You can select and preview multiple images, then print them all in one batch (unfortunately, you can't print in the background). You can also open a Scrapbook file and print all of the images in it.

(continues)

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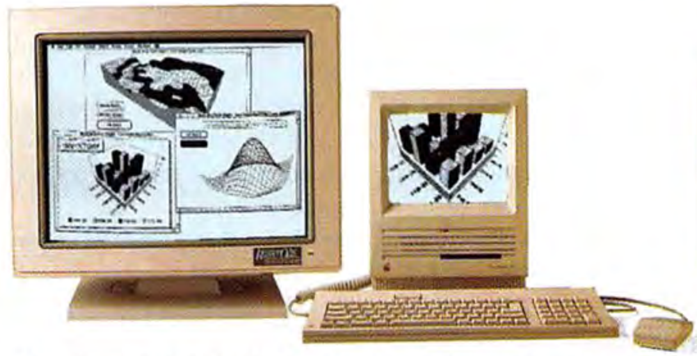
RasterOps: First with color for the SE/30. Our brilliant, 8-bit ColorBoard 108+/SE30 with built in Pan and Zoom lets you use affordable smaller displays, including Apple's® 13" or equivalent, sliding around a "virtual" 19" display at will. Or power large displays, like our 19" Trinitron. Naturally, you get 100% application software compatibility.



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Good Coverage
Even though the TT200 uses only a three-color ribbon (many color printers add a black pass to the usual yellow, magenta, and cyan), its colors are rich and the blacks dark and solid.

BURT MONROY

While Conductor provides a lot of flexibility and the ability to manipulate images prior to printing, using it can be a problem with some applications: you must save color images to disk before you can print them. That can be trickier than it sounds. Conductor only supports images in PICT2, Scrapbook, and Clipboard format when printing to the TT200. Many programs let you display color images and print them with Chooser-driven devices like the ImageWriter II. Unfortunately some of the programs won't let you save in PICT2 format or copy to the Clipboard in color. Matrix describes workarounds for some popular applications that do not save in PICT format. These workarounds are thoroughly documented in the back of the well-written Conductor user guide. Many of the workarounds require Solutions' SuperGlue, a Chooser-level driver that offers a print-to-disk feature. Unfortunately, TT200 doesn't include SuperGlue.

There are other drawbacks to using Conductor as well. Dragging images is painfully slow, unless you're willing to disable the redraw function and drag blindly. Though the user guide discusses running under MultiFinder, a Matrix representative recommended against it. I tried anyway and had a few crashes. Because Conductor and MultiFinder don't seem to get along; you have to quit your application to do any printing. When you're using applications that don't directly save in PICT2 format, and you're tweaking an image to get it to look just right, the cycle can get rather involved: launch the application, edit the image, save it to disk via SuperGlue, quit your application, launch Conductor, import the saved image, print it, and if the image isn't yet perfect, quit Conductor and start over. It's a process that gets old quickly. You also wouldn't want to try to use the TT200 for everyday printing; its limited selection of high-quality fonts and its 200 dpi resolution mean that it won't replace a LaserWriter in desktop publishing applications.

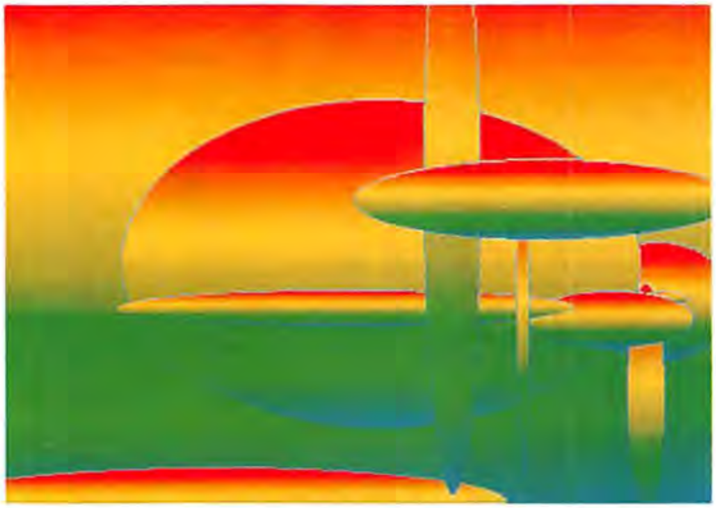
High-Quality Images

The image quality of the TT200 is impressive, despite having only a 200-dpi resolution. All of the current crop of thermal-transfer color printers really only print seven colors: red, green, blue, yellow, cyan, magenta, and black. Other colors are simulated by dithering, which results in a loss of effective resolution (see "Printing a Rainbow," *Macworld*, January 1989). Unlike most other color printers, the TT200 allows you to select from several different dithering patterns (see "Choice Dithering"). You can often improve the apparent resolution of a dithered print by choosing a dithering pattern that's well suited to the image you're trying to reproduce.

The TT200 also differs from most other color printers in that it only accepts a three-color ribbon (see "Good Coverage"). Many printers add a black pass to the yellow, magenta, and cyan passes required to produce the seven colors. Adding some black can improve the overall sharpness and density of color images and avoids the brownish cast that often results from trying to produce solid black by mixing yellow, magenta, and cyan. The TT200 doesn't suffer from its lack of black ink, however; the blacks are crisp and sharp, and the color images are clear.

Although the lack of a Chooser-level driver is a major drawback, the Matrix TT200 is a quality color output device with few problems and an attractive price/performance index. Still, if you work primarily with an application that cannot save in PICT2 format, and the type of work you do requires numerous revisions, you'll soon miss the convenience of being able to print from within an application. If Matrix were to offer a Chooser-level driver in addition to the Conductor application, the TT200 would become a hot contender among thermal-transfer color printers.
—Ron Risley

See Where to Buy *for contact information.*



Choice Dithering
The TT200 gives a choice of dithering patterns to allow good apparent resolution of 256-color images at 200 dpi.

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HYPERANIMATOR 1.5

Animated Lip-Sync Toolkit

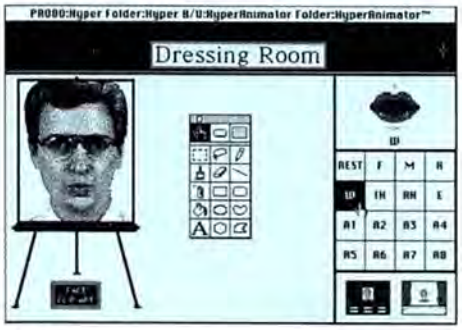
Pros: *Creates realistic animation; automatically synchronizes digitized sound and text.* ***Cons:*** *Limited size of talking faces; works only with HyperCard.* ***Company:*** *Bright Star Technology.* ***Requires:*** *Mac Plus; System 6.0.2 and Finder 6.1.* ***List price:*** *$199.95.*

It seems silly, but we all talk to our Macs now and then. A bomb that sends hours of work into limbo, for instance, sets me off. But when was the last time your Macintosh spoke to you, moving lips and all? You might be surprised to learn that this is easy to arrange simply by adding animated talking faces to your HyperCard stacks with HyperAnimator.

Talking Heads

Each HyperAnimator face (called an actor in the program's Hollywood metaphor) consists of 16 bitmapped images of 160 by 128 pixels each. Seven of the images are assigned to the lip positions most commonly used in spoken English (see "Lip Sync"). The Rest image appears when the actor has nothing to say. You can designate the remaining 8 images to correspond to any expression you care to imagine, from shock to ecstasy.

If HyperAnimator's original nine-member cast isn't enough, you can draw a new actor with HyperCard's built-in painting tools. You can also import images from other drawing programs via the Clipboard. If you're not an artist, HyperAnimator comes with enough clip art to keep you busy for days. For a more realistic effect, you'll want to work with digitized images. HyperCard limits you to MacPaint-style bitmaps, however, and it takes a lot of tinkering to properly convert gray-scale images to black and white.


PROOO:Hyper Folder:Hyper B/U:HyperAnimator Folder:HyperAnimator™
Dressing Room
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A8

Lip Sync
One of a HyperAnimator actor's 16 face images. Here, the actor is pronouncing the "W" sound.

The Director's Chair

Actors are manipulated from within HyperCard scripts using Bright Star's external command (XCMD) language RAVE (Real-Time Animation and Vivification Engine), which lets you access functions not normally available in HyperCard. RAVE commands tell the actors where to appear on the screen, what to say, and what facial expressions to show. As with most XCMDs, though, the syntax is so rigid that it's easy to make mistakes. Bright Star ought to consider adding a set of tools that would build scripts for you.

The simplest command consists of the word RAVE followed by a string of text, which makes the actor speak in Macintalk, the Mac's speech synthesizer. HyperAnimator matches the sounds with the correct lip positions, giving a surprisingly realistic illusion of speech. (Unfortunately, since Macintalk sounds remarkably like an old college professor of mine, I can only bear to listen for a few minutes at a time.)

HyperAnimator's real power lies in its ability to give actors a digitized voice. For example, using Farallon Computing's MacRecorder, you can record speech to import into your stacks. Then you enter the corresponding text, and HyperAnimator's speech-sync function selects the appropriate lip positions for you. Add a few facial expressions and a bit of tweaking, and you'll be asking if it's live or if it's Macintosh. One minor problem I encountered was HyperAnimator's inability to copy sounds from any file that isn't a HyperCard stack; if your digitizer can't save sounds directly into stacks, you'll have to resort to ResEdit to do the job.

The Envelope, Please

Like many of the HyperCard add-ons available today, HyperAnimator is implemented as a stack, so it's not difficult to learn if you're already familiar with HyperCard. The manual does a good job of explaining how everything works, although the lack of an index leads to superfluous page turning. HyperAnimator's most obvious shortcoming is the limited size of the actors—that and the fact that its tools are available only from within HyperCard. Still, if you need to synchronize speech and animation in your stacks, HyperAnimator is the only game in town. And it's an impressive one at that.—*Franklin Tessler*

See* Where to Buy *for contact information.

ALDUS PERSUASION 1.0

Desktop Presentation Manager

Pros: *Clean, simple interface; careful integration of modes; potent drawing and graphing features; templates ensure graphic unity throughout presentation.* ***Cons:*** *No dissolves or other screen effects; can't change template while constructing presentation.* ***Company:*** *Aldus.* ***Requires:*** *Mac Plus; second disk drive. Hard disk recommended.* ***List price:*** *$495.*

It takes a certain audacity to introduce a new desktop-presentation program that offers no dramatic new features when there are already a host of excellent presentation managers on the market. Aldus Persuasion, however, offers two distinct advantages: integration and simplicity. Persuasion, it turns out, is both more complete and less daunting than its rivals.

Online Outline

Persuasion's structure is like a three-dimensional ticktacktoe game. The bottom level consists of master slides, or templates—essentially shells containing formatting, text, and color information into which the text and graphics of a presentation flow. The next layer consists of the slides (or overheads or printouts) themselves. At the topmost layer, you choose the appropriate mode for viewing: outline, slide, speaker's notes, or audience handouts.

Persuasion's interface surpasses those of its competitors because it makes mov-

(continues)

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MacUser

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- Compresses fonts and alert sounds

PostScript is a registered trademark of Adobe Systems, Inc.
Alert sounds feature requires a Mac II or System version 6.0 or later.

The new SUITCASE II is really packed. Now you can have up to 99 suitcase files full of fonts and DAs, or files containing FKEYs and alert sounds, that you can access at any time—and you don't have to install them in your System file. Plus you can see in the menu what a font will look like before you use it. By merging PostScript® fonts into one family, SUITCASE II unclutters your font menus. And by compressing fonts and sounds, SUITCASE II saves you precious space on your hard disk. So, whether you're a new Mac user or a dyed-in-the-wool Mac enthusiast, you need SUITCASE II.

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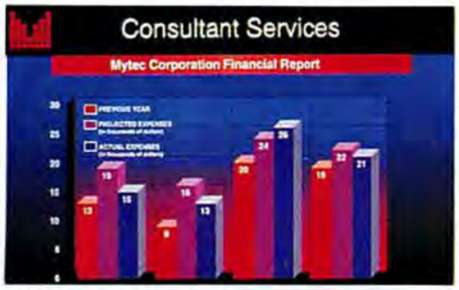

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Dressed for Success
Aldus Persuasion's color-coordinated AutoTemplates include graduated-tint backgrounds. All of the slides in a presentation have the same background, logo, and type specifications.

ing from one view, layer, or slide to another easy and straightforward; all paths lead everywhere (see "Easy Transposition"). As an example of Persuasion's intuitive, integrated approach to presentation design, when you're working in the outliner, all four edges of the screen contain paths to other modes. There are pop-up menus across the bottom, icons on the right and left, and menus across the top.

The outliner, which can import Acta or text files, comes equipped with all the handy features of current Mac outliners. You can create, reorder, and collapse headings with little effort—in fact, Persuasion's keyboard commands for those manipulations are even easier to remember and use than those in Acta or More II. But Persuasion also shares the faults of other outliners: you can't move a heading to put it between two lesser-level topics, for example, and you can't select more than one topic at a time.

Masters of the Universe

To each heading in an outline (each heading becomes a separate slide) you must assign a master—a blank template with preformatted placeholders for text and graphics—as you would in Cricket Presents.

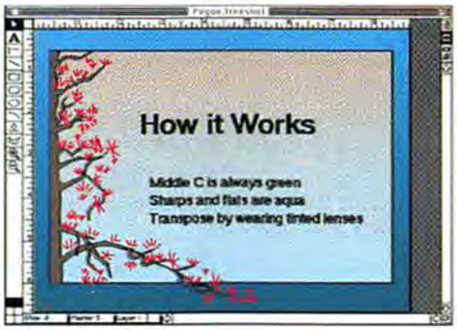
What makes Persuasion better, however, is that it comes with 18 monochrome and 6 color AutoTemplates (see "Dressed for Success"). These color-and-design-coordinated sets each include master slides for title slides, text, graphics (including graphs), and organizational charts. The AutoTemplate system ensures that a presentation's slides have a uniform look, and it also handles universal tasks such as text formatting. The AutoTemplates included with the program are attractive and functional; you can modify them or create your own.

The AutoTemplates come so close to being an ideally simple, quick, and professional system that their fundamental flaw is especially painful: you can't switch AutoTemplates in midstream. Once you have started flowing text or graphics, you can't decide you should have been using a different set of master slides; "what-if" design comparisons are out of the question.

Go Forth and Modify

Persuasion's drawing, graphing, and text tools are extraordinary. Its object-oriented slide-editing mode often outdraws MacDraw, featuring special options like nested Ungroup/Regroup commands and various graduated fills (available in color for spectacular shading effects). The program also comes with Times and Helvetica screen fonts in presentation-ready sizes such as 48-point and 72-point. This crucial option is lacking in other presentation programs, and it means that practice sessions as well as slide shows will feature smooth, high-quality on-screen text.

If graphs are a part of your talk, you can either import an Excel spreadsheet saved in WKS format or use Persuasion's own data sheet, where you can type or paste in the numbers to be charted. The resulting graphs are a joy to work with. Even the minutest elements of numerical, tabular, or organizational charts can be ungrouped, recolored, moved, and manipulated—including labels, slices of pie charts, drop shadows, individual planes of 3-D bar charts, height and width of rows in tables, and so on. You can flip axes and resize charts. You can even assign bars or pie slices to any of 30 layers to create a *build chart:* in a talk on your company's progress, for instance, you could make the profit bar for each successive year magically pop into the graph.



How it Works

Middle C is always green
Sharps and flats are aqua
Transpose by wearing tinted lenses

Easy Transposition
You can move from slide to slide, from slide type to slide type, and from layer to layer on a given slide by using the pop-up menus at the bottom of Persuasion's screen. By clicking the icons along the right scroll bar, you can move between outline, slide, and speaker's-notes views.

Aldus Effort

Once you've created the text for slides in the outliner, entered numbers for charts in the data sheet, and fine-tuned individual slides with the MacDraw-type tools, you're ready to get ready. You can rearrange the order of slides in the Slide Sorter window, use the built-in spelling checker (which checks everything from body text to chart labels), add graphic accents from the included disk of EPS clip art, and edit the text either in outline view or in slide view (changes show up in both).

You can then prepare speaker's notes (each page containing a mock-up of a slide and a user-definable text box for comments) and four-slides-on-a-page handouts for the audience. To practice the talk, use the Slide Show command, which advances through the slides (including the layered build slides) automatically or at a mouse-click command. You can also use the Mac screen as the medium for the presentation itself. You'll sorely miss the fades, dissolves, and wipes of More II as you move from one slide to another.

Persuasion is ready for output to either Genigraphics or Autographix; overnight service is about $12 per slide. You can, of course, print the slides of a presentation on any printer, including a film printer.

The Art of Persuasion

True, there's not much new thinking evident in Persuasion; most of its features can be found in one presentation program or another. But Persuasion's features outshine its competition's, if only slightly.

(continues)

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Circle 196 on reader service card

The integrated outliner, for instance, gives it a crucial advantage over PowerPoint, StandOut, and Cricket Presents; and More II—which offers a supremely flexible outliner—lacks Persuasion's graphing and slide-sorting capabilities.

In short, Persuasion's features allow it to do a simple thing very, very well: to quickly turn an outline into a sharp-looking series of design-coordinated slides. Its outlining, graphics, and charting skills are exemplary, and its crystal-clear interface assures that you'll never get lost. There's no doubt that Persuasion's predecessors will reattack the desktop-presentation market with a vengeance in upcoming versions. But for this moment in marketing time, at least, Persuasion is the best program of its type.—*David Pogue*

See* Where to Buy *for contact information.

* * *

DAC-EASY LIGHT 1.0

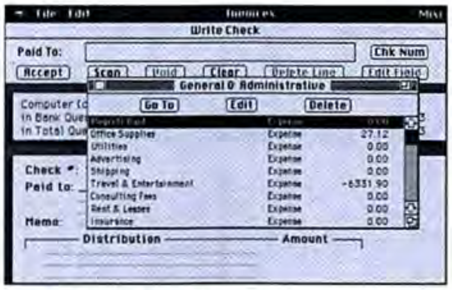
Bookkeeping and Accounting Program

Pros: *Inexpensive and practical accounting.*
Cons: *Slow for data input; no file import; limited file export; awkward for accrual accounting; can't customize reports or statements; no graphics.*
Company: *Dac Software.*
Requires: *Mac 512KE.* ***List Price:*** *$69.95.*

Dac-Easy Light will serve you well, so long as you stick to personal and small-business bookkeeping. Although the program is slow and awkward at times, and makes little use of the Macintosh's particular strengths, it is priced right, it's reliable, and it does what it sets out to do. However, if your business involves employees, multiple products, accounts payable, monthly statements, and accrual accounting, you need something more powerful.

Dull, Practical Data Entry

The transaction input process is practical but dull, and so are the financial statements you get in return. True to its MS-DOS heritage, the program makes little use of Macintosh graphics capabilities. It cannot generate bar charts, line graphs, or customized reports with your logo on them. It does offer tools for budgeting and variance analysis, and has some limited data-export capabilities for spreadsheet analysis.



[illegible]	[illegible]	[illegible]
Office Supplies	Expense	27.12
Utilities	Expense	0.00
Advertising	Expense	0.00
Shipping	Expense	0.00
Travel & Entertainment	Expense	-6331.90
Consulting Fees	Expense	0.00
Rent & Leases	Expense	0.00
Insurance	Expense	0.00

Paying by the Numbers
Dac-Easy Light sometimes requires a few extra keystrokes or mouse clicks to get to the right account. After pressing Return to bring up the accounts shown, you still have to click the Go To button on that screen to get to additional accounts.

You can enter transactions from several different menus. Checks, deposits, and withdrawals go through the Banks menu; credit card payments and other accounts payable go through the Credit Cards menu; invoices, through the Invoice menu; and other transactions, through a catch-all Accounting menu. As you input check information Dac-Easy doesn't advance the check numbers automatically, and it does a poor job of guiding you through the chart of accounts to debit an account (see "Paying by the Numbers"). A single-transaction entry can involve three or four different steps through the chart of accounts. I ended up entering information into the wrong account by accident on several occasions. Everything works, however, and any confusion is eventually cleared up, but the program could be more nimble getting from one place to another.

Printing Statements and Forms

Dac-Easy Light's data output format follows the same theme as its input process: dull but practical. The program prints checks, invoices, and customer statements—but on its own terms. You can buy printed forms and checks through Dac Software and other vendors, but you can't have your LaserWriter put out nice, customized statements or invoices. Furthermore, you can't use a nonstandard invoice system (for example, including project codes in invoice numbers), because Dac-Easy demands sequential invoice numbering.

The Reports menu includes standard business statements such as chart of accounts, balance sheet, income statements, several comparative statements for budgeting and variance analysis, customer statements, account directories, and mailing labels. These reports follow an acceptable business format and do the job well enough; but you cannot make them less busy or detailed, and almost all of them will print out only horizontally across the page, in multiple columns of relatively small type.

No File Import, Limited Export

Like most accounting programs, Dac-Easy refuses to recognize any input files except its own. You can't keep records in HyperCard and ship them over to Dac-Easy; you have to retype instead.

Dac-Easy's chart of accounts and its balance sheet will export to files that you can access with Excel, HyperCard, and other programs. This is not the case, however, for most of the program's other reports and listings. I was unable to export my income statement or budget—not even a variance report—into a text file for Excel.

Since begrudgingly accepting my place in the adult world, I've learned to live with the painful chore of keeping track of my personal financial obligations. I've tried solutions ranging from a $695 full-featured business-accounting package that I hated; to hand-written systems in dBase, HyperCard, and CBASIC, which I also hated; to Intuit's $49.95 quick-and-dirty solution, Quicken, which I tolerate. Dac-Easy Light arrived in my office offering the hope of something as practical and simple as Quicken, but with a little more sophistication to make it work for the small business. And by and large, it fulfills its promise. Although you have to make compromises with your invoice forms and statements because the software won't, you certainly do get a workable, small-time accounting package for an attractive price.—*Tim Berry*

See* Where to Buy *for contact information.

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

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

The Apple Lisa with MacWorks Plus runs the latest Macintosh software.

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NEMESIS GO MASTER 3.0

Go-Playing Program

Pros: *Best available program in playing competence; game and tactics; can view program's strategy.* ***Cons:*** *None.* ***Company:*** *Toyogo.* ***Requires:*** *Mac 512K.* ***List price:*** *Version 3.03 $79.*

Go is the national game of Japan and one of the most abstract, aesthetic pastimes ever developed. The game can be played for fun, however, even at the beginning level. At the highest level of play, it calls for formidable quantities of both intuition and analysis.

The main problem with go is that unless you live on the West Coast, in Hawaii, or in a relatively large college town or other such citadel of enlightenment, you won't find anyone to teach you the game or to play it with you. An ideal solution would be a computer program capable of teaching the game and playing at a reasonably challenging level. Nemesis is that solution. As a bonus, it costs only as much as a decent low-end go set with a proper wooden board. If you don't play go but would like to start, start here.

The game itself is simple to describe. A go board is a square ruled with a 19-by-19 grid, giving 361 *points*, or intersections. Players take turns placing round stones on the points, black stones versus white ones, and attempt to occupy territory by enclosing it with connected chains of stones of the same color. A few more rules are used to decide the ownership of territories within territories. By the end of the game, the board is a complex mosaic, often strikingly beautiful, of black and white stones.

Although the rules can be explained in a few pages, the larger strategy of the game is the subject of scores of books. As recently as the 1970s, Japanese authors confidently predicted that no computer could play a creditable game even against totally incompetent humans.

Can It Really Play?

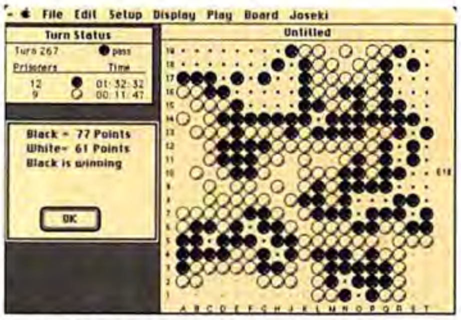
So much for predictions. Claims for the quality ratings of computer go programs warrant some critical examination. Go is a well-organized competitive activity, with player ratings falling into two classes: *dan* (the extremely competent players' ratings) range from 1 up to 10, and *kyu* (the non-expert class) start at the absolute beginner's rating of 35 and move to successively smaller numbers (down to 1 kyu) for better players. In practice, the ratings are used to give different-level players an even chance by giving the weaker player a number of free moves at the beginning of a game. No program now (or even on the experimental horizon) plays go at the lowest dan grade. There are now some computer chess games, on the other hand, in which the program plays near the master level. What a go player asks of a program like this, therefore, is its approximate rating in kyu.

Bruce Wilcox, the author of Nemesis and a leading go theorist, has taken a simple step toward clarification of program ratings. He conservatively rates Nemesis at 15 kyu, a figure derived from playing the program extensively against rated human players. This is a much stiffer challenge than that provided by Nemesis's only Mac competitor, Go for the Macintosh from Infinity Software. It is also, in the opinion of an assortment of club players in San Francisco, an underestimation, with a plausible case to be made for a rating of around 12.

This snappy performance grows out of the effort Wilcox has put into defining programming approaches to go strategy. Basically, the program uses the tactics described in his book *Instant Go*—tactics that enable a quick appraisal of board position and selection of appropriate moves without tracing a huge search tree of moves, the brute-force approach used in chess programs. Nemesis isn't just good, it is fast, and its exceptional quality indicates that clear, straightforward analysis (and subsequent programming) of the stategies of professional players is going to contribute more to computer go progress than parallelism, neural nets, or modestly faster processors.

Promising Beginnings

Nemesis provides the expected amenities: a game can be edited, modified, and saved; level of play can be specified; board size (9 by 9, 13 by 13, 19 by 19) can be adjusted for fast or standard games; display size can be adjusted for large screens. You can have the program suggest moves, and you can watch it try out intermediate steps as it picks its moves. Beyond this, you can install Toyogo's Joseki Tutor ($49), a program that helps you practice the basic sets of opening moves in go, can be installed directly in Nemesis and appears as part of the menu bar. This is without question one of the most extraordinary automated aid to go instruction developed.



Turn 267 ● pass

Prisoners Time

12 ● 01:32:32

9 ○ 00:11:47

Black = 77 Points
White= 61 Points
Black is winning

Going for a Score

You can ask Nemesis to evaluate the game at any point, and of course it gives you a score at the end. By choosing Tactics under the Display menu you can also watch the program's decision-making process at work.

An overall tactics tutorial (currently being programmed into a hand-held electronic go game by Toyogo) will be available in the spring of 1989. Being able to see, over and over again, sets of solid elementary moves and their explanation is probably the fastest way to gain the level of proficiency in go that makes it really interesting.

Nemesis is the leading go game for the Macintosh (or the Atari or the IBM PC, for that matter), and it is still being improved by Bruce Wilcox at Toyogo. Using it is an improvement over learning the game from books or from all but the most patient humans, and with the addition of the Joseki Tutor Nemesis should become a standard introduction to the game. Go players will undoubtedly like it, but non-players also might consider getting interested in the last game left in which mere mortals can routinely trounce computers.—*Charles Seiter*

See *Where to Buy* for contact information.

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PC TOOLS DELUXE 1.0

Disk Maintenance and Repair Utilities

Pros: *Good selection of easy-to-use preventive maintenance, recovery, and efficiency utilities.*
Cons: *Needs polish; documentation needs improvement.*
Company: *Central Point Software.*
Requires: *Mac 512KE. Hard disk recommended.*
List Price: *$79.95.*

PC Tools Deluxe is a collection of seven utilities that protect against disk inefficiency, hardware disaster, and unauthorized intruders. These utilities are PC Backup, FastCopy, Mirror, MacTools, PC Secure, Optimizer, and Locate. Because the PC Tools programs take advantage of all the memory they can find, they run more efficiently without MultiFinder or a disk cache.

Be Prepared

You should assume that it's just a matter of time before your hard disk gives up the ghost. PC Tools Deluxe provides a series of complementary tools designed to make it easier to cope with this inevitability.

PC Backup offers complete or incremental backups; it also restores floppy disks, hard disks, or Apple-compatible tape drives. It is faster than DiskFit, and almost as fast as FastBack (see "Backup Times Compared"). You can also copy files using the accelerated copy utility in FastCopy. This feature formats a disk in just 30 seconds, a little more than half the Finder's time, and automatically names the destination disk instead of prompting you to name it as the Finder does. FastCopy's ability to read an entire source disk into RAM once and write multiple copies is a faster and less cumbersome alternative to the Finder, especially on machines that have just a single floppy drive.

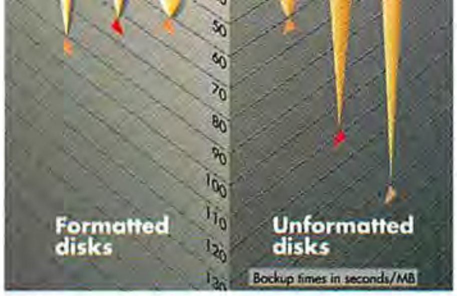
If you forget to make a backup and you lose important data, you may still be able to recover it using one of three PC Tools Deluxe utilities. Mirror saves an image of the information the computer uses to keep track of where data is stored on a disk and writes the image to a storage file; if disaster strikes, you can rebuild the disk from the Mirror file. If you accidently delete files or folders, MacTools offers you several ways to undelete them, as well as tools to repair "unreadable" disks. The Track Editor in FastCopy lets you read and edit individual sectors for repair of severely damaged disks.

The documentation for file-recovery procedures is quite rightly divided into sections for the average and the advanced user. Nontechnical information, such as how to undelete files, is presented clearly and is easy to understand. More technical subjects, however, are not explained very well. The documentation needs a troubleshooting guide, a better index, and a clearer warning about what precautions to take before running potentially damaging programs.

Hands Off

PC Secure will discourage the casual snoop, but not experienced thieves or hackers. This program uses the standard DES (data encryption standard) encryption algorithm and offers password protection for an entire disk, for individual folders, and for files. You've really got to want to secure a file to type a password twice and wait for that file to be decrypted every time you open it.

PC Secure's master key feature works like a spare key: with it you can decrypt a file even if you've forgotten the password. Expert Mode enables you to allow access by the password only. But watch out, in Expert Mode there's no way to get into a file if you forget the magic word. To doubly secure a file and optimize disk space, you can also run the utility's compression routine, which eliminates redundancy that might make the file more cryptanalyzable; or you can make the file invisible with MacTools.



Backup Times Compared

Where Did that File Go?

Even though the Mac operating system doesn't forget where it puts files on your hard disk, there are times when you're both going to have difficulty finding them. The Optimizer helps your Mac; Locate helps you.

When files are written, the Mac operating system tries to put the information in contiguous blocks. As information is written and deleted, holes are created, some of which are too small to efficiently hold data. The result is that in order to bring up especially large files, the disk heads have to seek far and wide. Optimizer defragments files; it frees up space and makes reading files more efficient because the disk doesn't have to work so hard when looking for all the pieces. Although there are no statistics to prove it, reducing how hard it works should extend a drive's average mechanical (as opposed to electronic) life expectancy.

The Locate desk accessory, which is an expansion of the Mac's Find File, has added a three-level keyword search within files using the Boolean AND or OR operators. You can limit a search by specifying: all files or only text files, only file names or keywords, or folders or subfolders. Once you've found what you're looking for, the Copy More function enables you to append items to the Clipboard without affecting text that is already there.

PC Tools Deluxe is a useful selection of tools. In some cases it has less polish than competitors' programs, like DiskFit, Sentinel, 1st Aid Kit, Symantec Utilities for the Macintosh, or FastBack. While there are some more sophisticated programs individually addressing specific utility areas, PC Tools Deluxe offers all of them in one package, and for a reasonable price.
— *Nancy Canning*

See *Where to Buy* for contact information.

INTERFAX 12/48

Fax Modem with Data Modem

Pros: *Fax modem can switch to data modem function; supports wide range of magnifications for viewing faxes; allows polling of regular faxes for waiting mail.*
Cons: *Does not support special cover pages; fax modem is one-half maximum speed of most other faxes.*
Company: *Abaton, a division of Everex Systems.*
Requires: *Mac 512KE; hard disk recommended.*
List price: *$495.*

There are some of us who want to be able to combine different telecommunications functions in one unit. Abaton's InterFax 12/48 appears to partially fill the bill by combining a 4800-bits-per-second (bps) facsimile modem with a Hayes-compatible 1200-bps data modem. In opting for comparatively slow transmission speeds, however, the company didn't go far enough.

InterFax's design enables you to switch between fax operation and other telecommunications tasks (like calling your favorite bulletin board) simply by switching programs.

Gaining Control

When you're setting up InterFax 12/48, you can copy the FaxMaker and InterFax Control files to the System Folder and then use the InterFax application to set up your address books. The application serves as your main control center; it allows you to reschedule fax transmissions, and view or print fax documents you receive.

The InterFax 12/48 software controls only the fax modem components of the hardware. The software consists of the FaxMaker fax driver (selectable via the Chooser DA), an InterFax Control file for the Control Panel DA, and the InterFax application itself.

The InterFax Control CDEV provides the more frequently used fax options, so that you can make fax transmissions through the Control Panel without having to exit the program you're in. This can be especially useful if you're not running under MultiFinder. Not only can you turn the fax modem on or off, but you can also use the InterFax Control CDEV to monitor a current fax transmission or receipt, cancel the transmission, and see the unopened faxes you've received.

It's a Fax

The InterFax application is the first fax program that allows 5 percent to 1000 percent magnification of a document. If you're concerned about the on-screen legibility of a fax document, you can have the InterFax application map an integral number of fax pixels to one screen pixel. You might find this necessary because a fax's 203-by-98 or 203-by-196-dot-per-inch (dpi) resolutions aren't easily converted to the Mac's 72-dpi screen resolution. Also, I like to scan my faxes first on the Mac and then decide if I want to print them. InterFax is currently the only program that lets me do that easily.

The InterFax application lets you format fax documents as MacPaint, PICT, or TIFF files. You can also use the same graphics formats to create a fax document. Normally, however, you would use the FaxMaker driver to create fax documents for transmission to other faxes. Once you have selected the FaxMaker within the Chooser DA, you can use any Mac application to print to the fax modem. When you select the Print command in a Mac application, you're given the choice of immediately sending the document as a fax, or of scheduling the fax for later transmission. If transmission is delayed, the document is spooled to your disk.

Some of the first fax programs for the Mac (from Apple, Solutions, and STF Technologies) used the ImageWriter LQ fonts for preparing high-resolution fax documents for transmission. However, the 216-dpi resolution of ImageWriter LQ fonts doesn't quite match that of fax machines, so you can often see some distortion of the fonts. Abaton got around this by providing two outline fonts from Bitstream—SWA Dutch and SWA Swiss—to serve as substitutes for Times and Helvetica. When you create a fax document, InterFax asks you if you wish to substitute these fonts for Times and Helvetica. If you use any other fonts in the document, you have to live with whatever bitmapped sizes are in your System file, with less than satisfactory results.

The Interfax 12/48 is designed to complement the Mac II.

It's a Modem

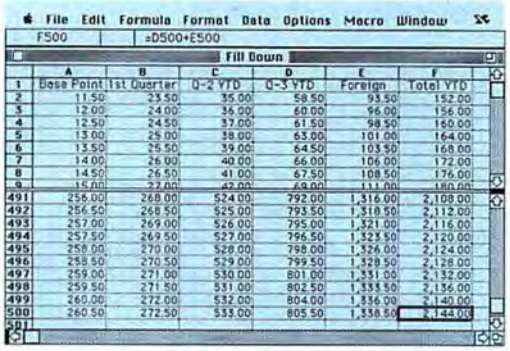
The InterFax 12/48 hardware includes a 1200-bps modem chip set. The regular modem chip set understands the industry-standard AT or Hayes command set for controlling communications. That means you can use the 1200-bps modem for ordinary telecommunications with just about any telecommunications program that runs on the Mac. When a telecommunications program tries to use the 1200-bps modem, the InterFax background software turns itself off. When the telecommunications program quits, the InterFax software turns back on. Unfortunately, InterFax cannot detect when certain software packages are through using the modem. With software packages such as AppleLink and most telecommunications DAs, you have to return to the InterFax CDEV in the Control Panel and turn InterFax back on manually.

There, but Not All There

Although I found many of InterFax's features useful, I was disappointed to see the software tied to a 4800-bps fax modem. The most common fax machines, Group 3 machines, are designed to run at 9600 bps. A 4800-bps fax modem can still talk to them, but at half the speed (obviously). Thus you're forced to pay twice as much for faxes that you send with the InterFax 12/48 as you would with another fax modem—like Apple's, for instance. Even though you might be only an occasional fax user, you'll find that the size of your fax phone bill quickly compensates for the price differential between the InterFax and more expensive but faster fax modems.—*Dave Kosiur*

See *Where to Buy* for contact information.

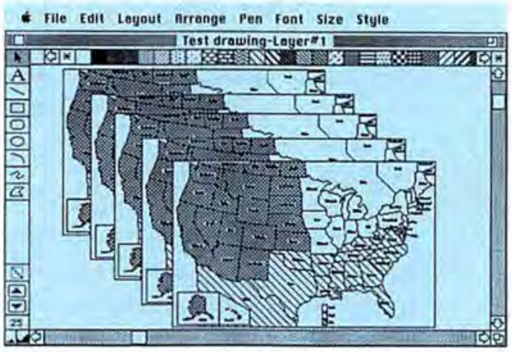
Quit wasting time.



F500 =D500+E500

	A	B	C	D	E	F
1	Base Point	1st Quarter	Q-2 YTD	Q-3 YTD	Foreign	Total YTD
2	11.50	23.50	35.00	58.50	93.50	152.00
3	12.00	24.00	36.00	60.00	96.00	156.00
4	12.50	24.50	37.00	61.50	98.50	160.00
5	13.00	25.00	38.00	63.00	101.00	164.00
6	13.50	25.50	39.00	64.50	103.50	168.00
7	14.00	26.00	40.00	66.00	106.00	172.00
8	14.50	26.50	41.00	67.50	108.50	176.00
9	15.00	27.00	42.00	69.00	111.00	180.00
491	256.00	268.00	524.00	792.00	1,316.00	2,108.00
492	256.50	268.50	525.00	793.50	1,318.50	2,112.00
493	257.00	269.00	526.00	795.00	1,321.00	2,116.00
494	257.50	269.50	527.00	796.50	1,323.50	2,120.00
495	258.00	270.00	528.00	798.00	1,326.00	2,124.00
496	258.50	270.50	529.00	799.50	1,328.50	2,128.00
497	259.00	271.00	530.00	801.00	1,331.00	2,132.00
498	259.50	271.50	531.00	802.50	1,333.50	2,136.00
499	260.00	272.00	532.00	804.00	1,336.00	2,140.00
500	260.50	272.50	533.00	805.50	1,338.50	2,144.00
501						

Excel with Excel. It takes almost 17 seconds to fill this spreadsheet on the Mac SE. Or less than 4 seconds with the Excelerator XL 25 board.



Be quicker on the draw. You can draw this on the Mac SE in about 42 seconds. Or under 6 seconds with the Excelerator XL 25 board.

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MEAN 18 ULTIMATE GOLF

Interactive Golf Game

Pros: *Challenging; extensive player setup options; supports Mac II color and large monitor; displays statistics.* ***Cons:*** *Slow graphics redraw; no breaks in putting green; no wind factor.* ***Company:*** *Accolade.* ***Requires:*** *Mac 512K.* ***List price:*** *$44.95.*

WORLD CLASS LEADER BOARD

Interactive Golf Game

Pros: *Challenging; extensive player setup options.* ***Cons:*** *No color support; no large monitor support.* ***Company:*** *Access Software.* ***Requires:*** *Mac 512KE.* ***List price:*** *$49.95.*

When four friends recently wanted to play golf, I offered to caddy. Luckily, I didn't have to carry four sets of clubs. Instead I brought my Mac II and two new golf games for the Mac. These new games—Mean 18 Ultimate Golf and World Class Leader Board—want to usurp MacGolf Classic's position as king of the tee (see "Golf as a Matter of Pixels," *Macworld,* October 1988).

This Green Is Mean (18)

We opted for Mean 18's Augusta National course, rather than St. Andrews, Pebble Beach, or Accolade's own Bush Hill course. The foursome chose to score our match by strokes. Mean 18 also offers match play for two players and best ball play for four-player team golf.

You choose from two tee options: regular and pro; the pro tee is set farther back, making each hole more difficult. You also choose either beginner or expert playing level. Beginner provides perfect aim and an all-knowing caddy who recommends the best club for each shot. Playing at expert level means you choose your own clubs and aim your own shots.

On a color Mac II, the course appears in 16 colors and expands to fill the entire monitor screen. While Mean 18 offers some nice animation and sound effects, the program's graphics are definitely not as nice as those of MacGolf. In fact, trees, hazards, and buildings look downright chunky. The program suffers from colorization problems, too: the putting green appears blue during approach shots. You see aerial views of each hole before tee off, but they're too small for a lot of detail, and you don't get a true overhead view since the aerials are really 60-to-70-degree angle views.

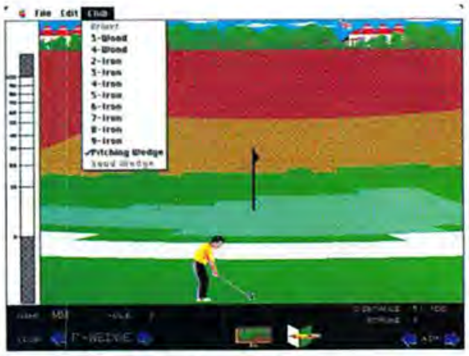
Unlike MacGolf's phantom trees, Mean 18's trees affect the flight of the ball. Your ball will also ricochet off the pin if you hit it, but Mean 18 doesn't include wind factor, as does MacGolf.

It took a bit of practice for everyone to hit the ball in Mean 18. Everything is based on the Power Meter. It gives you a visual way to gauge the power, slice, and hook of your swing. Each shot requires three mouse clicks. The first one starts your swing, and the barometer begins to rise. As it reaches the top of the Power Meter, you click again to release the ball. As the barometer falls back to zero, you click a third time to control the hook or slice of the shot (see "Approaching with Mean 18"). This is substantially different from MacGolf, where you're only concerned with power. In Mean 18, a good shot results from good timing and good hand-eye coordination. A quick mouse finger doesn't hurt either. Putting is much easier than driving, because aiming a putt is very clear-cut. You never need to worry about the green breaking (sloping off at an angle), either. It doesn't.

Mean 18's biggest drawback is slow drawing speed. To aim a drive or approach shot, you click on two arrow icons at the bottom right of the screen. Your player moves incrementally in the direction of the arrow, and the program completely redraws the course from each new viewpoint. As a result, if you want to dramatically reaim your shot, you must keep clicking the arrow and wait for the program to redraw the screen after each click. As one of the foursome said, "It's so slow that you'd rather hit a tree."

The Wide World of World Class

Having tired of aiming shots in Mean 18, we traveled to St. Andrews in Scotland with World Class Leader Board. Other available courses included Champions Cypress Creek, Doral, and Access's own Gauntlet.



Approaching with Mean 18
In Mean 18, the green is blue and the golfer gray. Depending on your shot, the program limits club selection. For example, you can use a driver only at tee off; the sand wedge club in the menu is only highlighted when you're in a sand trap.

World Class offers numerous levels of play: kids, amateur, and professional. Shots taken at the kids level do not hook or slice, nor are they affected by wind. Amateur balls do hook and slice, but are not affected by wind. The professional level goes all out with hook, slice, and wind; this level also offers more difficult putting conditions. You can choose to play rounds by medal (or stroke), match, or best ball methods. However, if you decide on match play or best ball play, you have to keep track of your scores; World Class doesn't keep score that way.

Because it supports neither color on the Mac II nor the large Mac II monitor, World Class Leader Board is more difficult to play than Mean 18. You just can't easily identify the rough, water, or other hazards in black and white, and the trees and backgrounds all look the same. World Class does offer true overhead views of each hole, but again, you'll find it hard to see detail. On the plus side, the animation is realistic (for example, the ball will bounce off the cup if you hit a putt too hard), and the sound effects are good.

Aiming an approach shot or drive in World Class was a breath of fresh air for the foursome after playing with Mean 18. Instead of repositioning the golfer (and redrawing the screen), all you do is drag

(continues)

How To Triple The Speed Of Your Mac For Under $250

by Randall D. Smith, Founder of MacAcademy™

A few years ago I wanted to be a better golfer so I went out and bought the same clubs that Jack Nicklaus uses. Today we play exactly the same clubs ... he's still great and I'm still terrible.

Last month I bought a Porsche 911 Turbo. I now have one of the fastest, most powerful cars in the world. As I was reading through the manual I came across a statement that suddenly made me realize the error of my thinking. The manual basically said that *the only weakness this car has is the driver*. In other words, no matter how good the equipment, the key element is still the operator!

As you read through the Mac magazines you'll realize that the same delusion exists among Mac users. People believe that to dramatically increase the productivity of the Mac they simply need to buy bigger, better, and faster hardware and software. If you don't believe me take a look at all the ads in this magazine for the newest Macs, fastest hard drives, and the latest in accelerator boards.

Usually the difference is a matter of milliseconds. Imagine the person who passes up a Mac Plus and spends an extra $4,000 to get the fastest Motorola processor, spends another thousand on an accelerator board, two thousand on a huge hard drive, and now spends two hours trying to figure out how to do a mail merge on Microsoft Word!

If you want to save **hours** instead of **milliseconds**, invest your money *in training the user instead of upgrading the equipment*. Training is the wisest and least expensive investment you can make in your Mac.

If you have a *hardware and software surplus, but a training deficit*, I'd like to invite you to attend MacAcademy. Over 2,000 companies have found MacAcademy to be the low cost solution to their training needs. MacAcademy is a full two day Macintosh training course that costs only $249. MacAcademy offers both basic and advanced training on the Mac, Microsoft Excel, Works, and Word. Also included is training for Aldus PageMaker, Claris HyperCard and FileMaker II.

After spending two days with our unique, all-star, teaching staff you will dramatically increase your productivity and cut your learning curve in half. Your work will be done faster, more professionally, and you'll feel 10 times more confident with your machine. One MacAcademy graduate recently wrote us that if he had to choose between a MacAcademy trained employee on terrible equipment or a non-MacAcademy trained employee on the latest equipment he'd choose the MacAcademy trained employee any day. He'd get more work done in less time.

Here are a few comments from people who attended MacAcademy in Boston on March 20th:

"This has been the most productive two days I have ever spent. Well worth the price, very cost effective, the most knowledge per dollar I've seen. Quality instructors who understand and respond to the needs of the attendees."
K. Hemeon, Norwell, MA.

"I felt all classes contained excellent material. All the instructors maintained a level of patience and support which surpassed all of Macintosh's user friendly features."
D. Quinn, Seabrook, N.H.

"Bravo! What a fantastic learning experience! I really think that 2 days at MacAcademy should entitle every graduate a week's vacation to absorb! Thank you. Thank you."
C. Bancroft, Plymouth, MA.

"This is my second venture at MacAcademy and I again feel it was well worth the money. I have 10 of your video training tapes which I also find extremely helpful."
C. Allen, Framingham, MA.

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Like any other successful program MacAcademy has recently seen its share of "clones". There are those out there who have attempted to copy our format, our brochure, even our price. What they can not copy is our quality.

MacAcademy Schedule

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Los Angeles	May 15, 16
San Jose	May 18, 19
San Francisco	May 22, 23
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Denver	June 5, 6
Spokane	June 8, 9
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Atlanta	July 20, 21
Raleigh	July 24, 25
New Orleans	July 27, 28

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a crosshair marker to aim your shot. As in Mean 18, hitting a ball in World Class takes skill and coordination. World Class—like Mean 18—offers a much more active swinging process than MacGolf does. Power, hook, and slice all depend on how you use the Power/Snap Indicator in the right-hand portion of the screen. You start the swing by holding down the mouse button, release the button for power control, and click the mouse again to set the snap.

Trees in World Class pose real obstacles. The greens slope away at an angle, indicated on a sundial-like gauge that shows you both the angle and the grade of the slope. These breaks make putting in World Class more challenging than in Mean 18.

Some strange inconsistencies in World Class may confuse you. For example, your selection of clubs doesn't include a sand wedge, a club that's handy for those hapless golfers stuck in sand traps. It does, however, include a #1 iron, which is a hard club to master. Equally puzzling is World Class's penalty system: if you hit into the rough, you are not penalized, even though you do receive a distance penalty if your ball should land in a water hazard.

Picking the Right Club

After playing rounds with MacGolf Classic, Mean 18, and World Class, duffers and hackers alike agreed. Everyone liked the way Mean 18 and World Class challenged you to shoot the ball, which took more skill and coordination (luck, too) than in MacGolf. And one of MacGolf's inconsistencies with the real game of golf has been corrected by Mean 18 and World Class: the winner of the previous hole does tee off first at the next hole.

In the end, however, the foursome agreed that if they were to buy a golf game, they'd choose MacGolf. The slow graphics of Mean 18 knocked it out of the running. The lack of Mac II large-screen and color support effectively whiffed World Class. MacGolf may hold on to its position of preference for now, but if Mean 18 or World Class are upgraded, this game of golf will go another round.—*Brita Meng*

See Where to Buy *for contact information.*

VANTAGE 1.0

Desk Accessory Text Processor

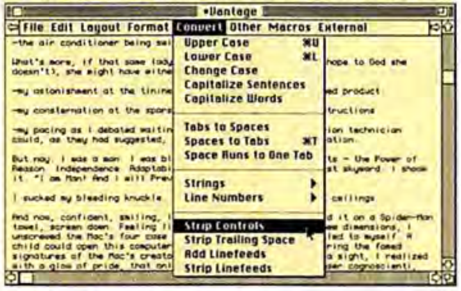
Pros: *Reads Word 3.01, MacWrite, and WriteNow files; superb manual; indispensable in many situations.*
Cons: *No word wrap; no multiple-font support.*
Company: *Preferred Publishers.*
Requires: *Mac 512KE.* ***List price:*** *$99.95.*

Vantage, a text processing desk accessory, is what's known as a niche product. In other words, only some people desperately need it. Vantage is not a word processor. Not only does it not support tab stops or more than a single font per document, but it lacks word wrap. If you delete a phrase on one line, the words on the next line don't move up to close the gap.

Believe it or not, these preposterous limitations are worth accepting because Vantage can do dozens of incredible things with text. Its features work brilliantly but are utterly unrelated to one another; each individual menu item seems to be the answer to someone's specific prayer (see "Potpourri on the Menu"). The result is a hodgepodge of utilities that, in their precommercial incarnation, were aptly called McSink (as in "the kitchen").

Vantage Points

Since Vantage is not a general-use product, the best approach is to outline specific situations where you might need it. For example, if you transfer data from non-Mac computers, Vantage's Strip Control Characters command is indispensable. In less than 1 second, Vantage strips all the little squares and ampersands out of a 20-page file, leaving only the English behind in a clean, simple document.



Potpourri on the Menu

Vantage is, in essence, a collection of useful text processing tools clumped together into loosely related menus.

Or if, in a blaze of inspiration, you type a full chapter of your novel and then realize the Caps Lock was down the entire time, Vantage will save you. A single command, Capitalize Sentences, converts all-caps documents into upper- and lowercase text, ready for pasting back into your word processor (see "In Any Case").

Or perhaps you're a programmer. Vantage will instantaneously insert any prefix string, including line numbers, into your listing. Vantage is also ripe for picking by telecommunicators; its strange, word-wrapless format is just right for composing messages offline (most telecommunications programs need a carriage return at the end of each line).

The grandest concession Vantage makes to the vast word processing populace is that it can directly open Microsoft Word 3.01, WriteNow, and MacWrite files (however, all formatting is lost). If you're using, say, a spreadsheet program, and you need to recall the exact wording of a letter you mailed last week, Vantage is the only DA that will let you read a file in any of these three word processing programs without leaving the spreadsheet program.

Vantage reads non–word processing files, too. If you hold the Option key down as you select Open from Vantage's File menu, you can see and open any file on the disk. A moment of creative thinking reveals that this tool is immensely valuable in the event of an unreadable trashed file. Not only can Vantage read it, but the above-mentioned Strip Control Characters command will strip out the formatting garbage and enable you to recover the priceless text contained within that More, Illustrator, Finale, MacDraw, or Excel document, or within any other.

Laundry Lists

Vantage performs dozens of other instantaneous miracles; some are more obviously useful than others. It's easy to appreciate Vantage's ability to count the letters, words, sentences, and paragraphs in a

(continues)

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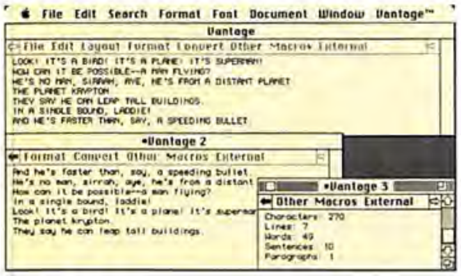
File Edit Search Format Font Document Window Vantage™
Vantage
File Edit Layout Format Convert Other Macros External
•Vantage 2
Format Convert Other Macros External
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Other Macros External

LOOK! IT'S A BIRD! IT'S A PLANE! IT'S SUPERMAN!
HOW CAN IT BE POSSIBLE--A MAN FLYING?
HE'S NO MAN, SIRRAH, AYE, HE'S FROM A DISTANT PLANET
THE PLANET KRYPTON
THEY SAY HE CAN LEAP TALL BUILDINGS.
IN A SINGLE BOUND, LADDIE!
AND HE'S FASTER THAN, SAY, A SPEEDING BULLET

And he's faster than, say, a speeding bullet.
He's no man, sirrah, aye, he's from a distant
How can it be possible--a man flying?
In a single bound, laddie!
Look! It's a bird! It's a plane! It's supermar
The planet krypton.
They say he can leap tall buildings.

Characters: 270
Lines: 7
Words: 49
Sentences: 10
Paragraphs: 1

In Any Case
In a flash, Vantage converted the all-caps text of the top window to the corrected upper-/lowercase passage in the lower window; a Sort alphabetized the lines. In a third window, Vantage pasted the passage's statistics: character count, word count, and so on.

document; or its power to display a table of contents for any folder on the disk. The Compare Windows command, which compares the text of one open Vantage window (out of 16 possible) with another, could also be useful for tracking revisions of a document. There's an extremely fast spelling checker, as well; unfortunately, you can't add unrecognized words while spell checking a document, so if you wish to add words to the dictionary, you have to type them out in a separate text file.

More difficult to imagine is the situation that led to the development of the Reverse Line Order command (it moves the first *line*—not sentence—of the selected text to the bottom line position). There are powerful commands, too, for sorts and for columns, which can make horizontal or vertical columns out of a string of numbers or words. Using the Columnize command and Vantage's excellent search-and-replace features, you could reverse the axes (swap rows and columns) of a spreadsheet in seconds.

A Distinct Advantage

But what if none of Vantage's eclectic collection of features does what you need? What if the editor of your new book, *The Left Brain,* decides that your words ought to read from right to left across the page? Are you condemned to retype your entire 1000-page manuscript?

The initial answer is yes; even Vantage offers no right-for-left word swap function. However, Vantage comes equipped with two startlingly empty menus: one called Macros and one called External.

The first menu is for the user to fill up with easy-to-write macro commands. The second menu, External, is something like a computer expansion slot: any programmer can write a new feature for Vantage, and you can install it into this menu. You can get new features from CompuServe, from friends, or even download them from the publisher's bulletin board (free to registered users). Several of these XCMDs come with the program, including a curly quotes converter and an icon grabber.

Ad Out

The main problem with Vantage—the lack of automatic word wrap—is a very big problem. The fact that words don't rewrap correctly when you add or delete text isn't even the worst of it.

When you import a file, or paste in text, all you see in the Vantage window is the first part of each sentence; the rest stretches out invisibly for several feet to the right of your screen. To pull the text onto the screen, you select Wrap to Window, which snaps the text back into sight. This command has a nasty side effect of its own, however: it removes any carriage returns that were in the text. The result is that your entire document appears onscreen as one massive, run-on paragraph.

Unfortunately, these limitations mean you can't really use Vantage as a handy mini–word processor like MockWrite, MiniWriter, and MicroEditor (which, however, are limited to editing 32K files; Vantage can handle up to 500K files).

So long as you're aware of these quirks, Vantage will delight you with its powers. It effectively adds spell checking, line numbering, and word counting to any program you're using; it permits you to read any kind of file without leaving the program you're in; and it offers a host of rarely used but powerful text tools. Vantage is also polished, well documented, and innovative (double-clicking a word is nothing; in Vantage you can triple- and *quadruple*-click to select chunks of text).

Vantage is a niche product, yes; but if you happen to need any of its features, you should see to it that Vantage has a niche of its own—on your Apple menu.
—David Pogue

See* Where to Buy *for contact information.

MORE II 2.0

Presentation Graphics—Capable Outliner

Pros: *Powerful outliner with word processing and presentation graphics capabilities; templates, libraries, and style rules simplify graphics creation; extremely versatile.* ***Cons:*** *No quantitative charting capability; not available as desk accessory.* ***Company:*** *Symantec Corporation.* ***Requires:*** *Mac Plus; one 800K drive, hard disk.* ***List price:*** *$395.*

Back in the days when you could count all available Macintosh applications while waiting for MacPaint to open, a small company called Living Videotext introduced an idea processor named ThinkTank. This program evolved into More, and each new version along the way has had more features for idea processing, word processing, personal-information management, and presentation graphics. In fact More II sports so many diverse capabilities that it's impossible to classify as part of any single software category.

More Ideas

More II is at its core an outstanding outliner. Ideas (More calls them headlines) are organized hierarchically, so that main points can be broken into finer and finer levels of detail. When you move any headline to another part of the outline, all attached subheadlines automatically move with it. An outline can be instantly expanded or contracted so you can focus on the forest, the trees, or individual leaves.

More II has several features that make it especially useful for personal productivity applications like to-do lists, address books, and time management. Calendar creates a customized appointment calendar. Date Stamp, Time Stamp, and Calculate allow you to quickly insert the date, time, or sum of a set of numbers anywhere in your outline. Dial Phone dials a phone number through your modem. Sort, Clone, Mark, and Gather lend themselves particularly well to organizing information.

More II also enables you to reorganize and navigate through your information

(continues)

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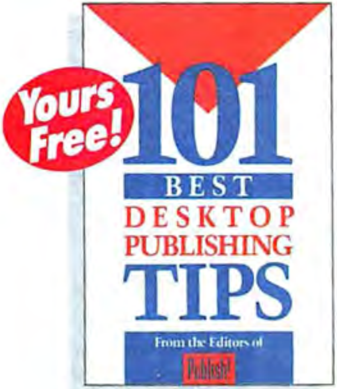

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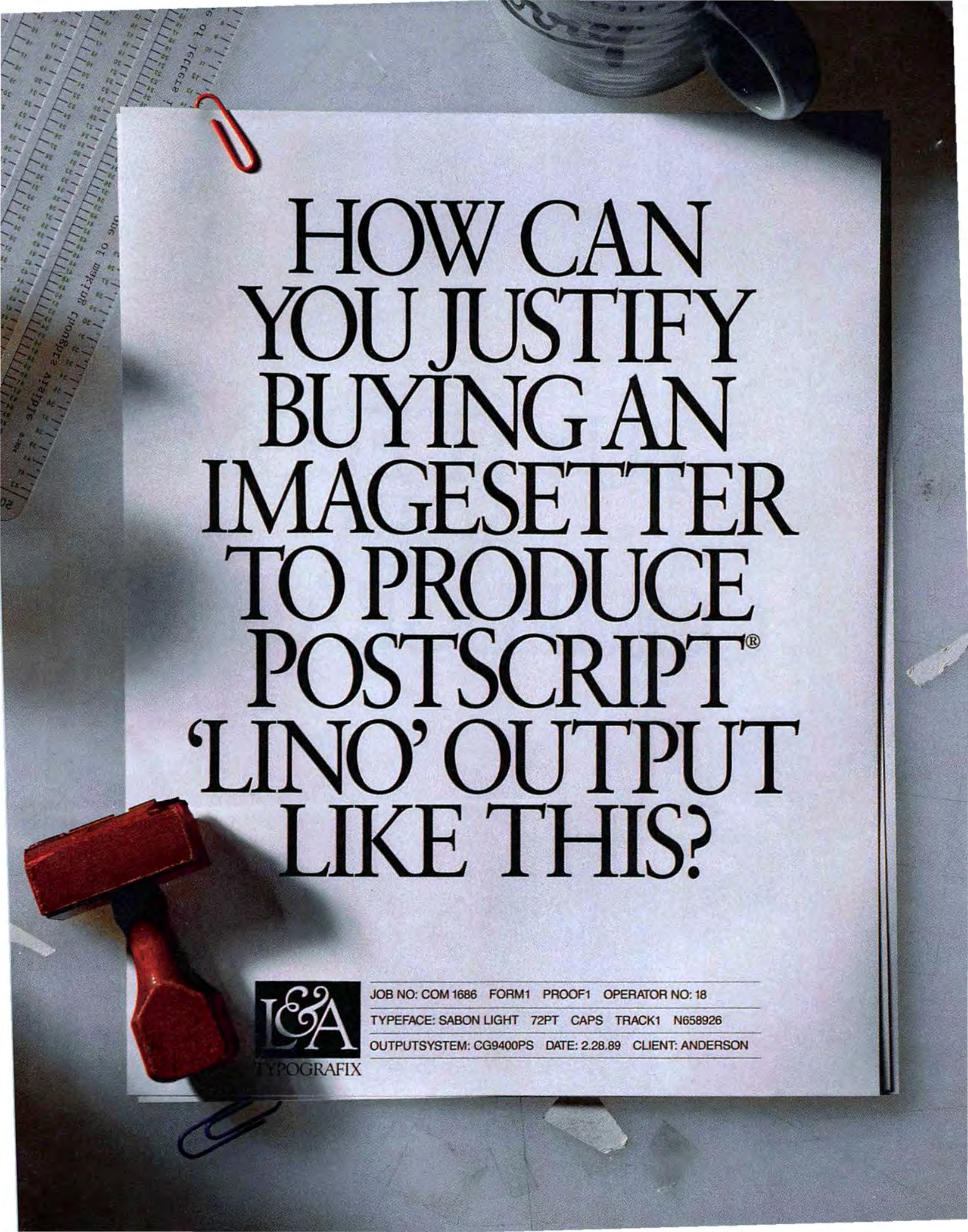

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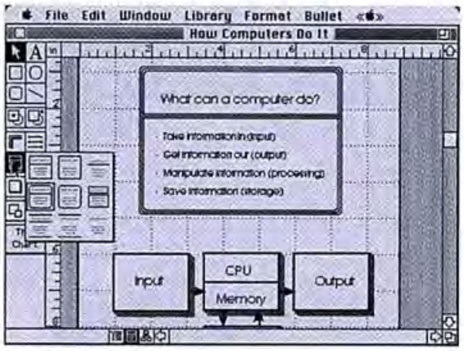


What can a computer do?

- Take information in (input)
- Get information out (output)
- Manipulate information (processing)
- Save information (storage)

Bullets and Palettes

Pop-up palettes in More II's bullet chart view make graphic embellishments easy.

with both mouse and keyboard. Headlines can be displayed or printed with different label styles. And like its predecessors, More II allows you to attach graphics or lengthy text documents to headlines in document windows, which travel with their associated headlines.

More Words

More II offers powerful word processing capabilities. Long headlines can be collapsed to display just one line or expanded to reveal the complete text. Menu commands control indentation, justification, page breaks, font, style, headers, footers, and other facets of a document to such a degree that for most purposes there's no need to export the outline to a word processor.

More II also has a powerful search-and-replace function with a wild card, a special character that represents one or more characters in a pattern. A spelling checker with a 100,000-word dictionary, and a table-of-contents generator are also included. Although More II lacks automatic footnoting, multiple-column printouts, and other features important to power wordsmiths, it's a convenient and functional tool for the kinds of word processing that most of us do most of the time.

More Presentations

You can transform a More II outline into an impressive graphic presentation. Any outline (even part of an outline) can be viewed as a tree chart or as a series of bullet charts. However, you must return to the outline view to make any changes to the outline text.

MacDraw-like tool palettes enable you to add caption text or graphics to tree charts or to the master page, which underlies all bullet charts. Pop-up picture menus enable you to choose among different types of boxes, backgrounds, patterns, lines, and styles of alignment for the current chart or for an entire series. Speakers' notes, which aren't visible in the final presentation or printed outline, can be added to any bullet chart (see "Bullets and Palettes").

You can also create style rules that apply to outline, bullet, and tree chart views. Style rules are similar to the style sheets found in many word processors, but they are more versatile because they take advantage of an outline's hierarchical structure. These rules are easy to install and change; they can even be copied and pasted into different outlines.

More II makes it easy to reuse graphics, standard charts, parts of outlines or rules by letting you store them in libraries. Libraries appear as items on the Library menu. More II comes with several libraries that can be used as templates for color slides, overhead transparencies, and other common display formats.

More Output

More II offers many ways of going from outline to output. Printouts from any of the three views can be previewed on screen. You can export part or all of any More document to a word processing, page-layout, or graphics program; More II includes import/export drivers for 11 common applications, and Symantec plans to put updates and additions to these drivers on the LVTFORUM on CompuServe. And More II files can be turned directly into 35mm color slides overnight by Magicorp.

But More II is most impressive when viewed directly on a Mac screen (or overhead projection) using the Slide Show command. A series of bullet charts becomes a dynamic presentation, complete with dissolves, wipes, point-by-point builds, and other effects. Slide shows can be controlled with the Mac's keyboard, the mouse, or a Kodak Datashow Presentation Remote, or they can be set to run indefinitely on automatic pilot. If your computer has multiple monitors, you can even display speaker's notes and controls on one screen while displaying the show on the other.

More or Less?

While More II is occasionally frustrating, it's much more flexible, powerful, and satisfying than its predecessor. If all you need, however, is an idea processor, you're probably better off with Acta Advantage, an outliner that comes with a desk accessory version. If you want a presentation graphics tool that includes quantitative charting capabilities and maximum design flexibility, you may prefer Aldus Persuasion. But if you want a single program that can sit on your screen all day long, taking care of everything from appointments to slide shows, look no more.

—George Beekman

See Where to Buy ***for contact information.***

* * *

DATABASE 1.11

Desk Accessory Database

Pros: *Powerful and well designed; superb manual; supports text, graphics (including PICT), and calculated fields.* ***Cons:*** *Limited printing options; weak layout program.* ***Company:*** *Preferred Publishers.* ***Requires:*** *Mac 512KE.* ***List price:*** *$129.95*

It's amazing what they can squeeze into a desk accessory nowadays. Take DAtabase, for instance: a flat-file database manager that supports picture and calculated fields, user-definable check boxes and pop-up menus, multiple fonts and sizes, even phone dialing—and it resides in the Apple menu.

Oh, What a DA

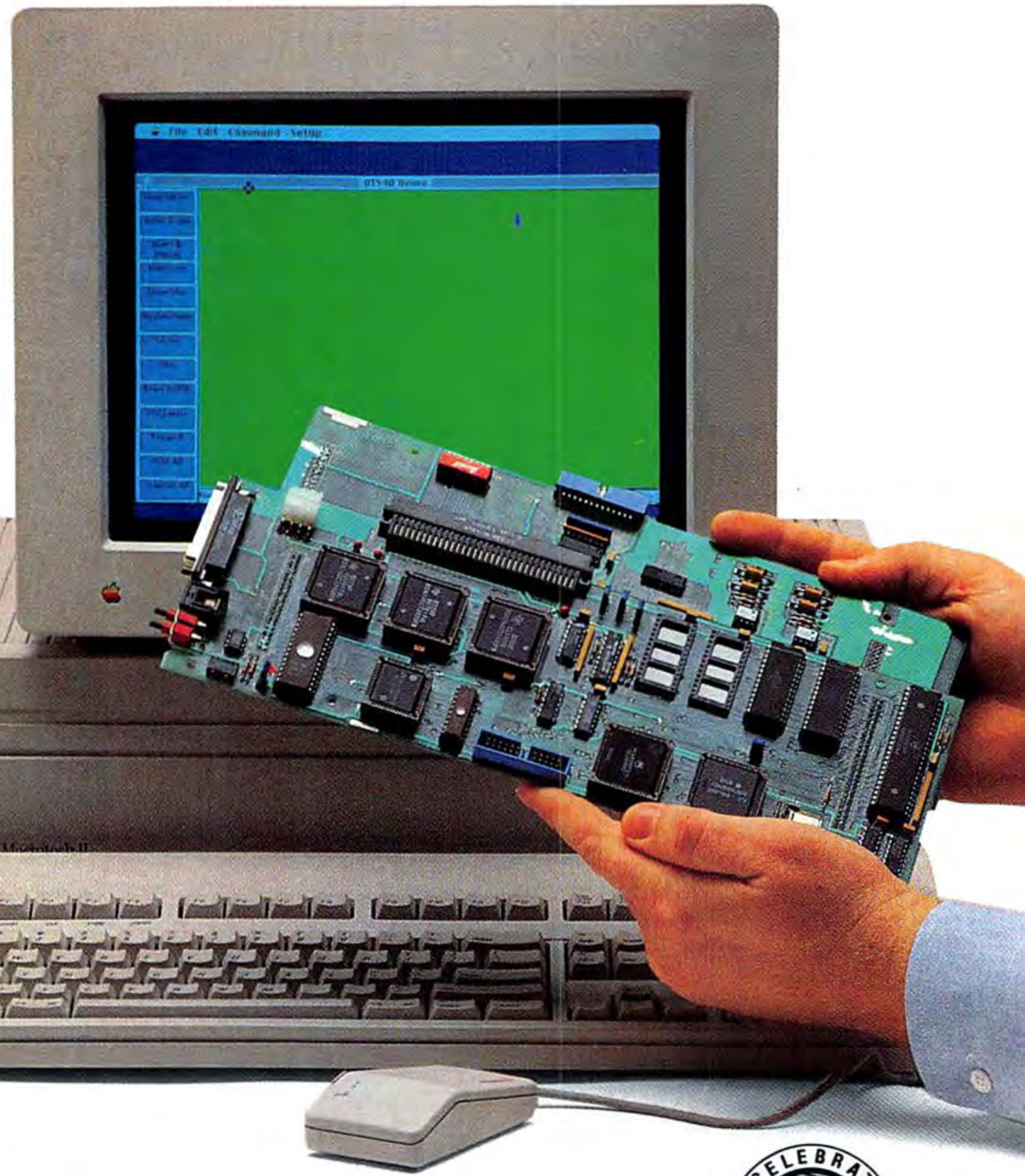
DAtabase does not itself offer any design or layout tools—those are in the accompanying DAtabase Builder. Once you lay out a file to your satisfaction, you enter data with the desk accessory.

The DAtabase Builder is a stripped-down cousin of the Layout mode in FileMaker II; it's here that you define fields, set

(continues)

AMIE is the newest addition to our family.

Air Land Systems' Apple Macintosh Interface Emulator lets you connect the Macintosh II to your Unisys/Sperry host.



Now you can have the tremendous capabilities of the Macintosh running on your Uniscope network with AMIE, the newest member of Air Land Systems' family of interface emulators. AMIE is a hardware/software package that emulates the UTS40 terminal, allowing the features of the Mac II to be retained and interactively used in the Unisys environment. ■ AMIE supports various forms of connectivity and handles the communication line protocol. The software emulator is fully compatible with a UTS40 terminal and includes a multitude of features, such as file saving and printing, color capability, menu selections, help screens, and cut/copy/paste to and from other applications. ■ For more information on sales and service for this product, contact Air Land Systems.

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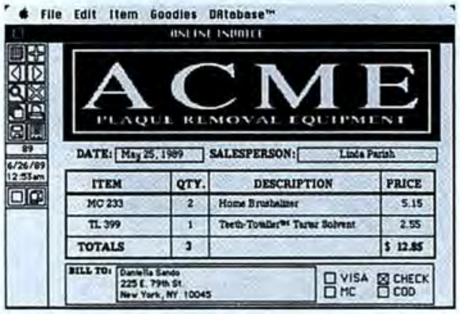
their font characteristics, and place them on the page. A snap-to grid and nudge commands help you place text labels and fields, which can be any one of five types: text/number, picture, calculation, pop-up menu, or check box. To determine the look of a new database file, you can import a MacPaint, MacDraw, or EPS graphic to serve as a static backdrop to the data fields, much as a single HyperCard background might lurk behind the fields of several cards.

In general, the DAtabase Builder is DAtabase's weakest link. There's no provision for drawing lines, squares, or circles; if you want these accent graphics in your design, you'll have to paste them in from a graphics program (and you can't resize them once they're in the DAtabase Builder). Worse, there's no way to select more than one field label or text label at a time; if you decide to change the font characteristics of ten fields, you're forced to step through the font dialog box for each, one at a time.

Living DAngerously

DAtabase is something of a cross between HyperDA and QuickDex, with which it will inevitably be compared. Unlike HyperDA (which lets you look at—but not edit—HyperCard stacks), DAtabase lets you enter, change, and manipulate the data on the fly. And unlike QuickDex, DAtabase offers infinite font, layout, and graphics capabilities, as well as sorting, multiple-criteria searching, and dozens of other true database skills.



89

6/26/89
12:53am

DATE: May 25, 1989 SALESPERSON: Linda Parish

ITEM	QTY.	DESCRIPTION	PRICE
MC 233	2	Home Brushalizer	5.15
TL 399	1	Teeth-Totaller™ Tartar Solvent	2.55
TOTALS	3		$ 12.85

BILL TO: Daniella Sando
225 E. 79th St.
New York, NY 10045

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Daily Accounts

The icons at the left side of a DAtabase window represent, from top left: view by list, add record, previous record, next record, search, delete record, sort, print, open file, and preferences. Below the palette there's a number-of-records indicator (89), the date and time of this record's creation, and buttons to Mark This Record or Erase This Record's Mark. Dozens of other options are in the menu.

When you open DAtabase, you see a MiniFinder of up to 60 icons, each representing a file that you've set up. You can, if you wish, select one file to be opened automatically when you start DAtabase. Files can also be password protected.

DAtabase looks phenomenal. All of its graphics—program, manual, and packaging—are striking and tasteful. The actual desk accessory feels solid; tabbing, calculations, and pop-up menu selections are immediate and responsive. You can even opt for a digitized clicking sound when you click the mouse. There are no data entry shortcuts like default field values or lookup fields, but the package includes a powerful import program with one-click options for creating DAtabase files from QuickDex, PictureBase, tab-delimited text, and other files.

The latest version (1.11) includes a substantial packet of new features, including a splendid command called View As List. This feature brings to the screen a spreadsheet-like representation of your data, giving you an overview of dozens of records; a double-click on any row takes you instantly to that record

The new DAtabase is fast, too: if you choose the Load File Into RAM option, finding a record is only a blink shy of instantaneous, and you can sort 500 records in just over 15 seconds.

Insufficient DAta

DAtabase was designed to be the best possible online data-management system—the operative word being *online*; the program's printing skills are weak. You can print a subset of your records, but you only have two choices of layout: record-by-record or list format.

The single-record approach is appropriate for full-page invoices or receipts. The list format (columnar report) is good, too, as far as it goes; you can select which fields should be included and choose a page reduction if you want to include more fields per row. But there are no other options. If the fields you'd like to include won't fit on one line, DAtabase can't put the remainder on a second line. Nor can you specify the order of the fields on the page, or change fonts or type size (except to select Print All in Monaco). Be glad, therefore, that DAtabase includes an extremely powerful Export Data command.

The Break of DA

There is no limitation, however, for which there isn't hope in the form of DAtabase's most brilliant option: Xtra Features. These are small chunks of computer code that can be written by any programmer and can be appended to a DAtabase setup one by one.

These Xtra Features, according to Preferred Publishers, are available on bulletin boards, CompuServe, and the publisher's own registered-user BBS. The sophisticated dialing feature, improved sorting routines, any F-key—all of these are Xtra Features that you can add to one or more of your DAtabase files. In the unlikely event that the current DAtabase program is missing a feature you need, there's no need to wait months for version 2.0; developers all over the country are busy sprucing up the program.

A DA to Remember

Certain applications already cry out for DAtabase: a Rolodex, simple forms, and rosters are all good bets; the latter could include digitized photos (DAtabase supports color). DAtabase also makes a knockout phone system; one of its features is a sophisticated auto-dialer that supports various calling-card sequences. DAtabase can time calls and calculate long-distance charges. You could also use DAtabase as a desk accessory front-end for a real database. When you close up shop each day, export the new DAtabase records into the main database application.

DAtabase delivers everything it promises with style. Time/date stamping is automatic; there's online help; for added speed the program loads as much data as it can into RAM; it even runs on a Mac 512KE. Because DAtabase is only a desk accessory, however, you can't have multiple layouts of one set of data, you can't have more than 2500 records in a file, and the printing options are limited. But DAtabase comes admirably close to applicattion-league functionality.—*David Pogue*

See* Where to Buy *for contact information.

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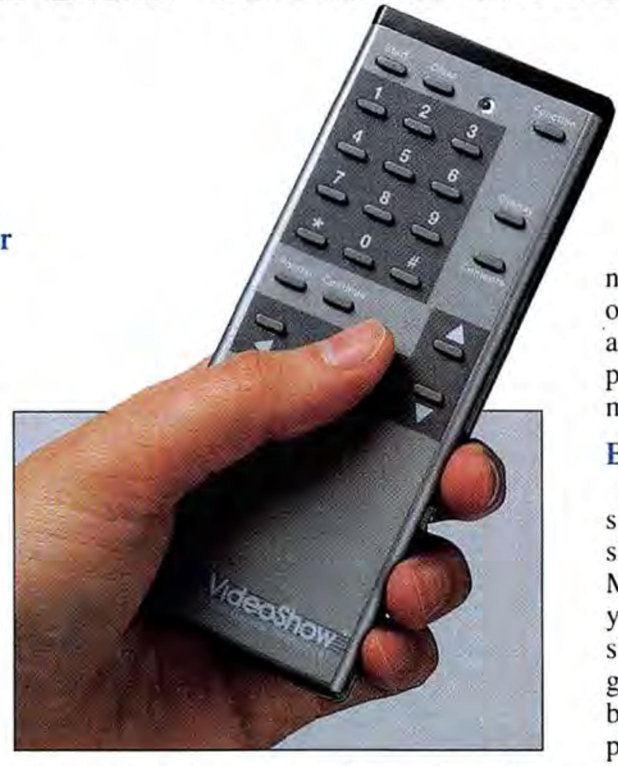

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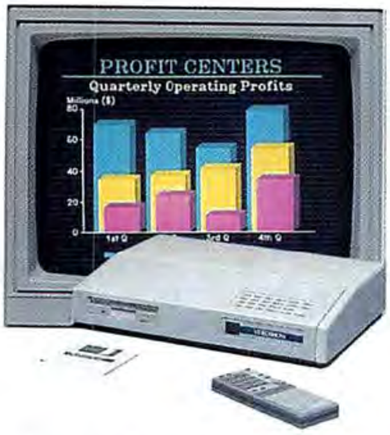

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LIGHTSPEED PASCAL 2.0

Pascal Compiler and Development System

Pros: *Significantly improved compiler.* ***Cons:*** *No MacApp support yet.* ***Company:*** *Symantec Corporation.* ***Requires:*** *Mac Plus; second disk drive.* ***List price:*** *$149.*

TML PASCAL II 3.0

Pascal Compiler and Development System

Pros: *Runs under MPW shell, supports MacApp, extensive source-code library of utilities available, authoritative support.* ***Cons:*** *Edit/link/compile not as convenient as Lightspeed's.* ***Company:*** *TML Systems.* ***Requires:*** *Mac Plus; hard disk.* ***List price:*** *$195.*

Think's Lightspeed Pascal and TML Pascal were the first third-party Pascal compilers for Mac professionals. Originally engineered for the 512K environment, both have been revised significantly to accommodate changes in hardware, and both products have seen improvements in compilers and linkers. Fortunately, a choice between them is a matter of picking your favorite strong points.

Light and Speedy

Lightspeed Pascal and its sister language, Lightspeed C, were specifically developed to help with the tiresome realities of applications programming by streamlining and speeding up the edit/link/compile cycle. Still, many developers felt that Lightspeed Pascal generated object code that was bulkier and slower to execute than TML's; a major part of Lightspeed's upgrade to 2.0 is an improvement in the compilation engine itself. Object-code size on a test suite of smaller programs (source-code size 20K to 40K) was 5 percent to 25 percent smaller using 2.0 instead of 1.11. Symantec has improved execution speed of compiled code by a similar amount. Compilation speed and linking speed, already quite respectable, are also marginally better.

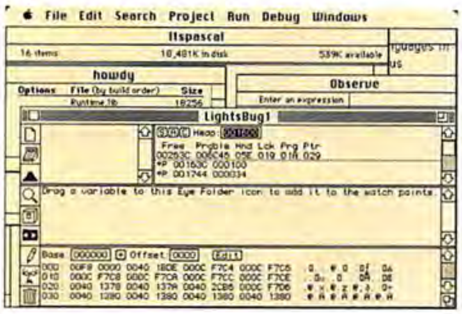
The upgrade also supports Object Pascal extensions, larger projects (to 255 files), larger arrays (over 32K), and conditional compilation. Lightspeed Pascal now also comes with an entertaining tutorial called Just Enough Pascal that steps a beginner through an animated mini-application. LightsBug, the convenient built-in debugger, has also been enhanced, allowing variable manipulation and setting of watchpoints in code (see "Bugs under the Light"). It's not quite as comprehensive as the best stand-alone debuggers—Jasik Designs' The Debugger and Icom Simulations' TMON—but it's an amazing offering in a product at this price. Lightspeed's only obvious weakness is its documentation, a well-written 460-page paperback that falls apart after a few weeks' use.

TML and MPW

TML Systems now offers its well-regarded compiler in a package that runs under the Macintosh Programmer's Workshop 3.0 (MPW) shell. It supports Object Pascal, generates both object and assembly language code as output, and lets you easily include assembly, C, and MPW Pascal code in TML Pascal project files. TML directs file management from a special menu item that appears in the MPW menu. Most significantly, TML Pascal now supports MacApp.

The changes to the compiler mostly involve extensions rather than speed or code-quality improvements. In fact, developers consistently praise TML's object-code optimization on large programs, despite its middling performance on the tiny benchmark programs so beloved of reviewers. Extensions include MultiFinder support and a well-documented HyperCard interface. More than a megabyte of examples and utilities illustrating extensions and basic features (windowing, menus, Color QuickDraw, F-keys, DAs, and so forth) are available, for $69.95, in the TML Pascal Source Code Library. Although Macsbug is the only debugger provided, TML includes a few tools for spotting potential code improvement in successfully compiled programs.

Not much concession is made to beginners. The MPW package assumes you are an experienced programmer, and poring through the source-code library is the closest thing to a tutorial you'll get from TML. On the other hand, a phone call to TML with a serious question will generally get you Tom M. Leonard himself; most developers rate the product's phone support as exemplary.



Drag a variable to this Eye Folder icon to add it to the watch points.

Bugs under the Light
LightsBug, Lightspeed Pascal's built-in debugger, offers a variety of viewing facilities so you can watch your program go wrong.

A Pleasurable Choice

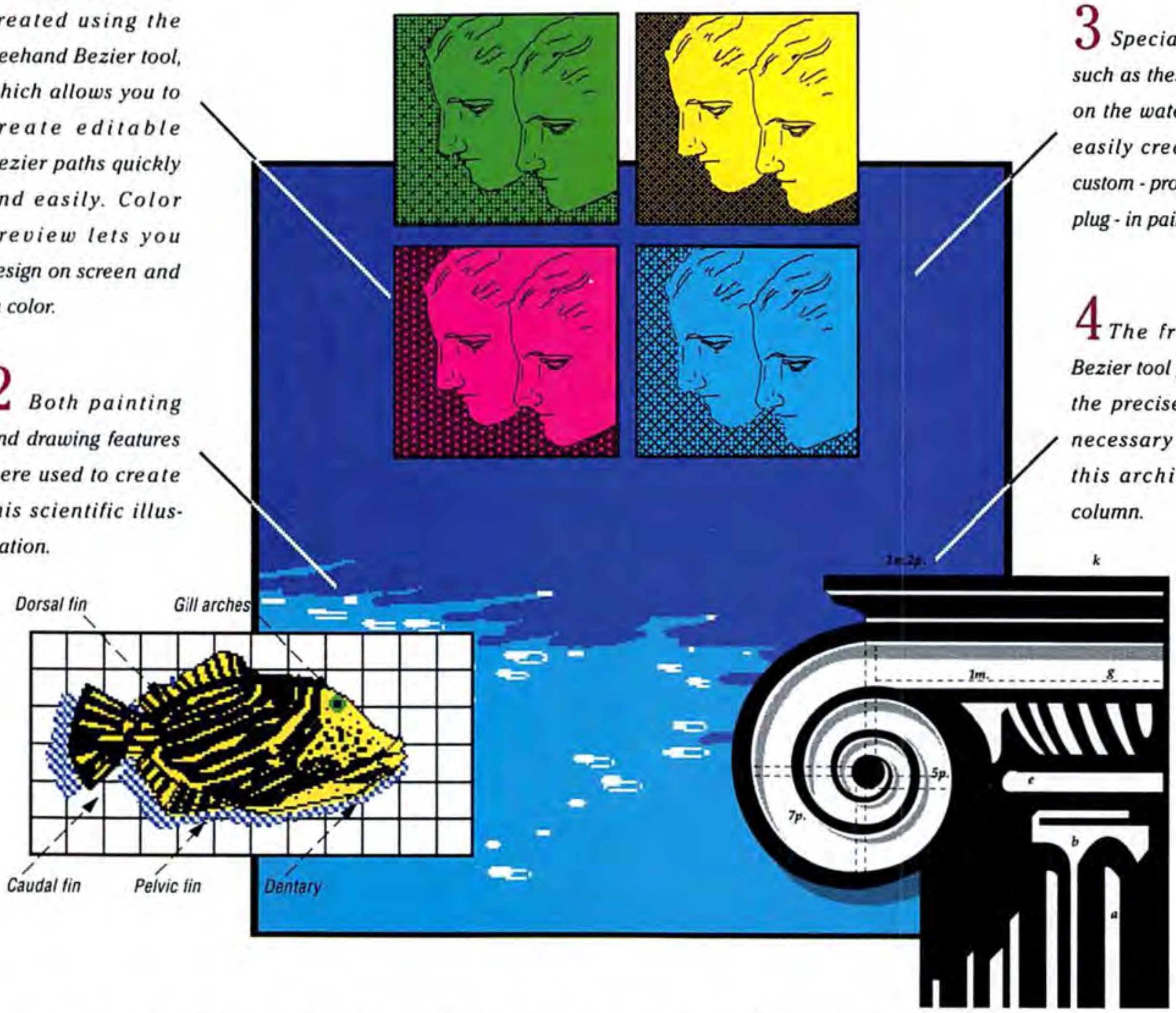
Both these products are complete development systems, enabling you to produce stand-alone applications and desk accessories. Both support 68020/68881 instructions and updated procedures (Cycle, Exit, and Leave, for example). The MPW editor and the Lightspeed editor are good enough to satisfy most programmers. LightsBug gives Lightspeed an edge over TML, but then TML's Rez and DeRez are more convenient for handling resource files than the RMaker provided with Lightspeed. Lightspeed's project manager is still great, and its compiler has been improved; TML's project-management facility is better than before, and its compiler is still tops in many contexts.

If you're interested in Pascal programming it makes sense to buy both programs. It's difficult to predict which compiler will produce better object code from your source, especially for large programs. If you can take a gamble that will cost you little money and only a day or so (porting the code is not trivial but not forbidding either), see if you can cadge significant optimization from another compiler. It's a pleasure to report that you can scarcely make a mistake choosing either one.
—*Charles Seiter*

See *Where to Buy* *for contact information.*

SuperPaint 2.0

Setting the Standard. Again.



1 These faces were created using the freehand Bezier tool, which allows you to create editable Bezier paths quickly and easily. Color preview lets you design on screen and in color.

2 Both painting and drawing features were used to create this scientific illustration.

3 Special effects, such as these bubbles on the water, can be easily created with custom-programmed, plug-in paint tools.

4 The freehand Bezier tool provided the precise control necessary to draw this architectural column.

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System requirements:
Macintosh Plus, SE or Macintosh II;
System 6.0 or later

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NETMODEM V2400

2400-Baud Modem with AppleTalk Support

Pros: *Allows multiple users to share modem; provides remote connection to AppleTalk networks; twofold increase in speed over former model.* ***Cons:*** *No easy way to control volume for NetModem's sounds; sensitive to line noise.* ***Company:*** *Shiva Corporation.* ***Requires:*** *LocalTalk connectors and cabling (or equivalent).* ***List price:*** *$599.*

As AppleTalk networks grow, users are becoming more accustomed to sharing resources on a network. Shiva's Hayes-compatible NetModem V2400 is designed specifically for network usage, combining normal telecommunications capabilities with AppleTalk support. In addition, remote Macintosh users can dial this modem and become part of an AppleTalk network.

My Modem, Your Modem?

At first glance the NetModem V2400 might look like just another 2400-baud modem. However, the AppleTalk connector at the rear of the modem makes all the difference in what would otherwise be just another Hayes-compatible modem. Because it supports AppleTalk, the NetModem can become part of an AppleTalk network and, therefore, can be used by any member of the network.

The NetModem works with just about any terminal-emulation program currently available for the Mac. The NM Prefs CDEV allows the NetModem to emulate either the modem port or the printer port, or to be turned off entirely to avoid conflicts with other peripherals (such as another modem). NM Prefs also allows you to set the NetModem to automatically answer or ignore incoming phone calls. A NetModem driver adds flexibility by letting you assign a password for dial-in users and allowing you to select which NetModem you wish to use, should your network connect to more than one NetModem. One caution, however—the NetModem must be emulating one of the serial ports before you can configure it through the Chooser.

Once you've selected a NetModem, you'll find a new menu bar display when you enter the terminal emulator. Because the NetModem is usually not located near a particular user's Macintosh, Shiva has chosen to provide the feedback normally associated with a modem by other means. The default menu display is a graphic of a mock modem front panel, complete with flashing LEDs (they flash red on a color monitor). In addition, when you're dialing, the NetModem encapsulates the phone line's sounds on AppleTalk and plays the sounds on the Mac's speaker.

I tested the NetModem with the following terminal emulators and generally had no problems in operation: AppleLink 4.0, Desktop Express 1.0, MacTerminal 2.2, Red Ryder 10.3, FreeTerm 2.0, MacNet 1.0, VersaTerm 3.0, and the DAs MockTerminal 4.3.4 and ASLTalk 1.23. On some occasions the NetModem seemed to be excessively sensitive to line noise, causing problems with connections to GEnie, Connect, and some local bulletin boards using VersaTerm and MacNet software. The precise cause of these difficulties was hard to pin down, but the NetModem seemed to cause problems about twice as often as my standard 2400-baud Practical Peripherals PM2400SA modem.

Distant (Network) Relatives

The NetModem can also provide AppleTalk network links for call-in users. You implement remote access to an AppleTalk network via the Dial-In Access CDEV, which uses a regular modem attached to the remote Mac. You can store a list of names and numbers for dialing within the CDEV. Double-clicking a network name on the Dial-In Network Access screen starts the dialing procedure. You can also add or remove a network. You can alter the phone number, serial port for the modem, baud rate, and similar parameters using the modify button. Once the remote modem connects to the NetModem, you can close the Control Panel and use any of the applications on the network that the NetModem is connected to, albeit more slowly than on LocalTalk.

MARK JOHANN

Fast Enough?

Initially, the NetModem appears to transmit data more slowly than a regular 2400-baud modem. Lines of text are written to the screen of any terminal emulator in a jerky fashion, rather than in a smooth flow of characters. The NetModem's performance is certainly better than its predecessor's, the 1200-baud version. Furthermore, file transfers using the Xmodem protocol, which have a well-defined packet size, proceeded much more smoothly than text displays and were essentially indistinguishable from file transfers using a regular modem.

Since the NetModem operates at a speed of 2400 baud, which is only about $^{1}/_{100}$ of AppleTalk's 230,000 baud speed, don't expect great things when remote linking a NetModem to an AppleTalk network. It might suffice for file transfers to a network server or for printing a report, but I wouldn't recommmend running any applications on it, and I certainly wouldn't try playing NetTrek or Falcon over such a link.

The network-sharable modem is a reasonable and useful concept, and implementing the concept in hardware makes good sense. However, with the cost of 2400-baud modems being so low, you would need more than two or three users to offset the cost of the NetModem—it would be a lot more appealing if it were 9600 baud.

Since the NetModem goes beyond simple modem sharing and provides remote access to AppleTalk networks, it should prove to be a more valuable resource for companies that have users with Macs in the field who wish to transfer files or print reports on the home office's LaserWriter.—*Dave Kosiur*

See Where to Buy ***for contact information.***

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WINDOW SHOPPING

by Lawrence Stevens

This month I look at five software packages, each of which employs a unique graphical user interface for quickly conveying information. For example, there's a disk-analyzing utility that displays a picture of the free space on a hard disk; a security program that changes the look of folders to denote access; and a labeling program that allows you to sort data by moving fields.

Empower 2.0

Put simply, Empower ($395 from Magna) keeps track of who is using a hard or floppy disk and limits access to individual folders. A user can be authorized full access or be limited to one or any combination of the following: viewing file icons within a folder (pass-through); opening documents but not making changes (read only); making changes at the Finder, such as duplicating or trashing files, but not opening documents (write only).

Once you install the Empower INIT, you designate users as being one of three ranks: System Administrator, Authorized User, or Guest. System Administrators can designate Authorized Users and other System Administrators and assign passwords. A System Administrator also can place users in groups and set the authorization privileges at the same time.

An Authorized User or System Administrator can claim ownership of any folder that is not already owned, an action that can be overridden only by a System Administrator. You claim ownership by selecting a folder and choosing Get Privileges from the Finder menu. Once you claim ownership of a folder, you can specify which privileges are available to everyone, which privileges are available only to a given group, and which are reserved for private use.

RON CHAN

The third type of user, Guest, is anyone who has not been assigned a password. Guests can access any folder whose owner has not locked out Everyone, unless a System Administrator disallows Guests from accessing all folders.

Users must register their names and passwords each time they turn on the Mac; System Administrators and Authorized Users must include their passwords when they log on. Users can log off by clicking the key icon in the Empower Control Panel window. This disables the Mac screen and displays a box that asks new users to register. There is also an optional automatic log-off facility that disables the screen if the Mac remains idle for a predetermined period of time.

Empower's primary mode of protection is encryption. Most Mac encryption programs require that you type in a password each time you encrypt or decrypt a file. The advantage of Empower is that you log on only once, and each time you open and close a file, the program automatically encrypts and decrypts the file.

The program has a wonderful user interface: Icons at the Finder let you know your exact privileges for each folder. Once you log on, all the folders you own have highlighted tabs; those that you have no access to are gray. And a line through a small icon—a folder, file, or pen—indicates restrictions on seeing folders, opening documents, or writing to files.

Empower takes only a couple of hours to learn and is easy to use. If you need folder protection, this product provides the most direct way to get it.

DiskExpress 1.5
MultiDisk 1.0

Instead of giving each user a password, an alternative approach to security is to password protect the files or disks themselves. If your security situation is relatively constant and simple—for example, only personnel-department staff have access to employee records—file or disk protection may be the most efficient way to authorize groups of users to specific files.

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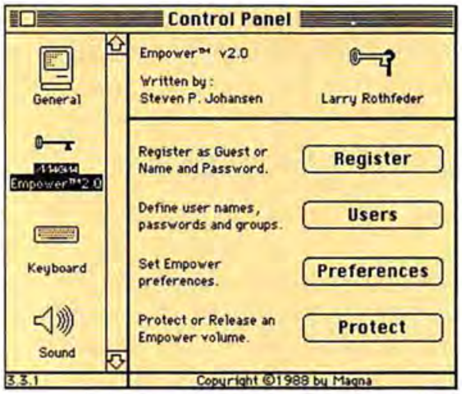

Empower™ v2.0

Written by :
Steven P. Johansen

Larry Rothfeder

Register as Guest or Name and Password.

Define user names, passwords and groups.

Set Empower preferences.

Protect or Release an Empower volume.

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Empower Control Panel

Most Empower functions are accessed through the Control Panel. Clicking on the key icon logs the user off. The Register button allows a new user to log on. The last three buttons are available only to the System Administrators.

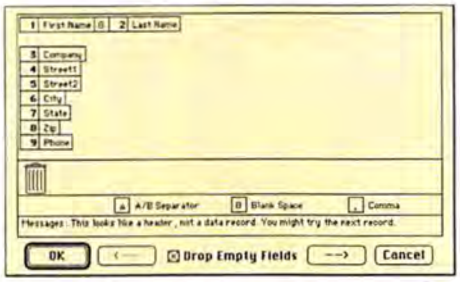
MultiDisk ($39.95 from ALSoft) partitions a hard disk into volumes that can be password protected or encrypted for even greater security. Once you create a volume, you treat it exactly as if it were a separate disk drive—you toggle between volumes using the Drive button in the Save or Open window of an application.

To secure files you close the volume using MultiDisk DA. The Mac treats a closed volume as if it were a disconnected drive. All files in that volume are now inaccessible until the volume is reopened, an action which optionally requires a password. Besides providing security, partitioning a disk allows you to place files and applications in different "drives," making them easier to find. If you regularly purge records, partitioning can simplify that task by letting you erase a volume of files and documents in one operation.

ALSoft has also updated DiskExpress ($49.95). DiskExpress 1.5 optimizes a hard disk by rejoining files, applications, documents, and free space that were fragmented on the disk because the Mac could not find enough contiguous space.

DiskExpress essentially works itself. You just select the icon of the disk you want to optimize and choose Express from the menu bar. Version 1.5 adds a Quick Optimize option that speeds up the process if you do not want to unfragment free space. This version also can display a graphical map of the free space on a disk, which allows you to see the degree of fragmentation.

The most popular alternative to both these ALSoft programs is Symantec Utilities for the Macintosh (SUM), which contains the two utilities described above plus about ten more. The ALSoft programs do have some minor advantages over SUM, the most notable being that with MultiDisk, once you create a volume, you can later enlarge it without erasing the data as you do in SUM. Basically, the choice is between shelling out $100 for SUM and getting some utilities that you can't use, or buying just what you need. If I were planning to buy both ALSoft products, I would be sorely tempted to pay a few dollars extra for SUM just in case I needed those extra utilities at some point.



Messages: This looks like a header, not a data record. You might try the next record.

FastLabel Formatter

If the file contains headers, one header appears in each box. If not, the first record appears on the screen, one field per box. You can use the arrows to step through your file. Each heading can be moved, along with the Blank Space, Comma, and A/B Separator indicators.

dCalc Programmer's Calculator 1.0

dCalc Programmer's Calculator from DelSoft Software is intended for programmers and engineers, but not, according to the brochure, "for the rest of us." This $34.99 desk accessory calculator has a full range of trigonometric keys; it works in decimal, binary, and hexadecimal format, and can display the ASCII equivalent of any character. For machine-language programmers and scientists, this is a viable alternative to those expensive Hewlett-Packard calculators. General users will find too much here that is beyond their scope, and high-powered business users will find too few accounting functions to meet their needs.

The dCalc calculator has a lot of convenient features. For example, it has three windows to store results, it displays any of 32 error messages that explain why incorrect data was disallowed, and it has ten separate memories.

The Programmer's Calculator is powerful, but first you have to figure out how it works; and unfortunately, this is no small task, because the disorganized manual is barely usable. Not only does it lack an index, but abbreviations are used idiosyncratically and inconsistently, and explanations of functions are scanty.

If you're comfortable with engineering formulas and trigonometry, this is a good product. But it's for the cognoscenti, not the rest of us.

FastLabel 1.2.1

I've looked at so many label- and envelope-printing packages recently that it was hard to find the energy to open another one. But in the case of FastLabel ($79.95 from Vertical Solutions), which can print any type of label from videocassette to mailing label to business envelope, it was worth the effort.

FastLabel is unique in a number of ways. First of all, the label is divided into three fields that contain text. The Text field, the only one of the three fields that is not optional, contains the basic text: name and address, or title of a cassette. The location of this field on the screen image represents its location on the labels. The Global field contains data that will not vary from label to label, such as a return address. And the Spine field, which is used primarily with cassette or disk labels, contains text printed upside down. Each field can be relocated on the label, resized, and given its own font size and style.

A fourth, nontext field, Icon, allows you to import icons to appear on your label. Unfortunately, FastLabel doesn't import MacPaint documents. If you want to include a logo on your label, you'll have to create an icon using Apple's ResEdit, Icon Factory (from Hyperpress), or another icon utility.

While most label programs require that you arrange the label list in a word processing or spreadsheet application, FastLabel gives you complete control of imported lists and does so in a fascinating way. Once you import any tab-delineated list and choose the Formatter screen, the headings—name, address, company, for example—appear in boxes along the left side of the screen. To rearrange the list for the labels, you drag the boxes, blank-space indicators, and comma indicators into the format you want. For any elements you do not want printed—say, phone numbers—just drag the element to the trash. When you're finished you can name and save your format for future use.

There are several other labeling programs, but none I have seen (and I think I've seen them all) give you as many formatting options as FastLabel. The tradeoff is that FastLabel requires some work to set up. If you are printing standard mailing labels, there are simpler (and cheaper) programs. But if you want special formatting, FastLabel is the best there is.

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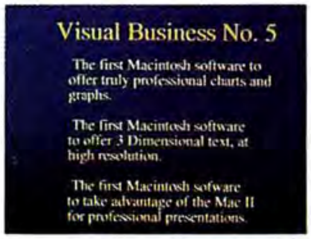

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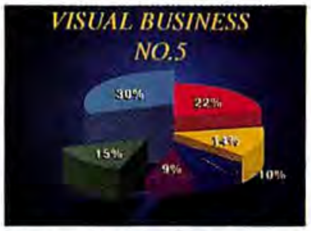

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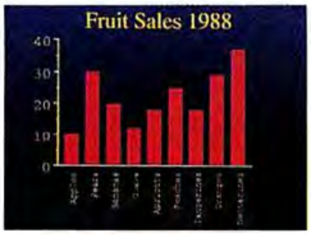

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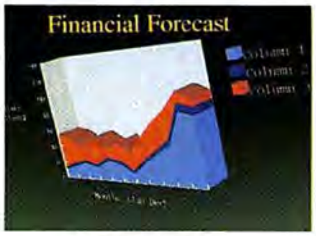

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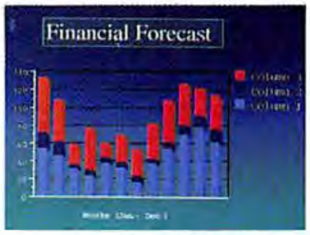

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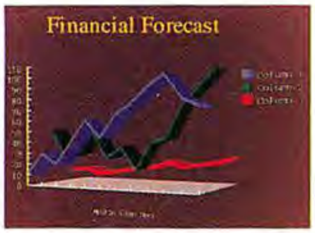

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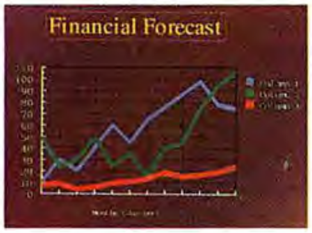

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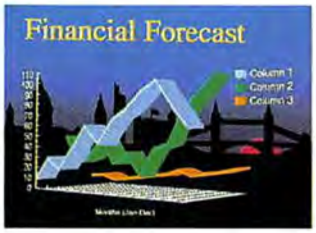

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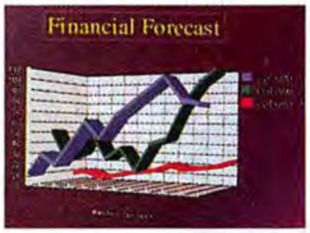

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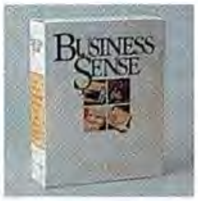

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Williams & Macias	
myDiskLabeler (ImageWriter)	30.
myDiskLabeler (LaserWriter)	33.
Sticky Business	95.
Disk Labels, 216 (ImageWriter)	16.
Disk Labels, 216 (LaserWriter)	20.

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Our phone lines are open for orders:

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Products ordered by EST 7:30pm/PST 4:30pm are shipped the same day.

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We accept VISA, MASTERCARD, AMERICAN EXPRESS & OPTIMA Card ***No surcharge added.***

- If we must ship a partial order, we never charge freight on the shipments that complete the order (U.S. only).
- 120 day limited warranty on all products.*
- Personal and company checks under $1,000 clear immediately.
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- Federal Express overnight service $3.00/order (software orders, Continental U.S. only). Oversize or heavy items incur additional shipping charges. All shipments insured at no extra cost.
- APO/FPO orders shipped 1st class mail, charged by weight.
- Overseas: We ship to any destination in the Free World. We use the quickest and least expensive methods possible. Second day air service is available to most of Europe, Australia, and Japan.
- Software and hardware is subject to manufacturer's warranty. Defective items will be replaced immediately with like item. All opened software sales are final. Hardware and unopened software ordered by mistake is subject to a 20% restocking fee. Defective hardware replaced or repaired at our discretion.

*All returns must have an authorization number, call **(206) 883-1975.**

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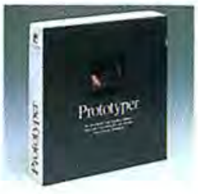

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MapMaker 3.X	218.
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Microphone II	221.
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Sentinel	154.
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SuperLaserSpool 2.0 - Single User	79.
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Hardware

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MSE1 (Board Only)	584.
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EMAC-20D	515.
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68882 Math Co-Processor 25MHz	425.
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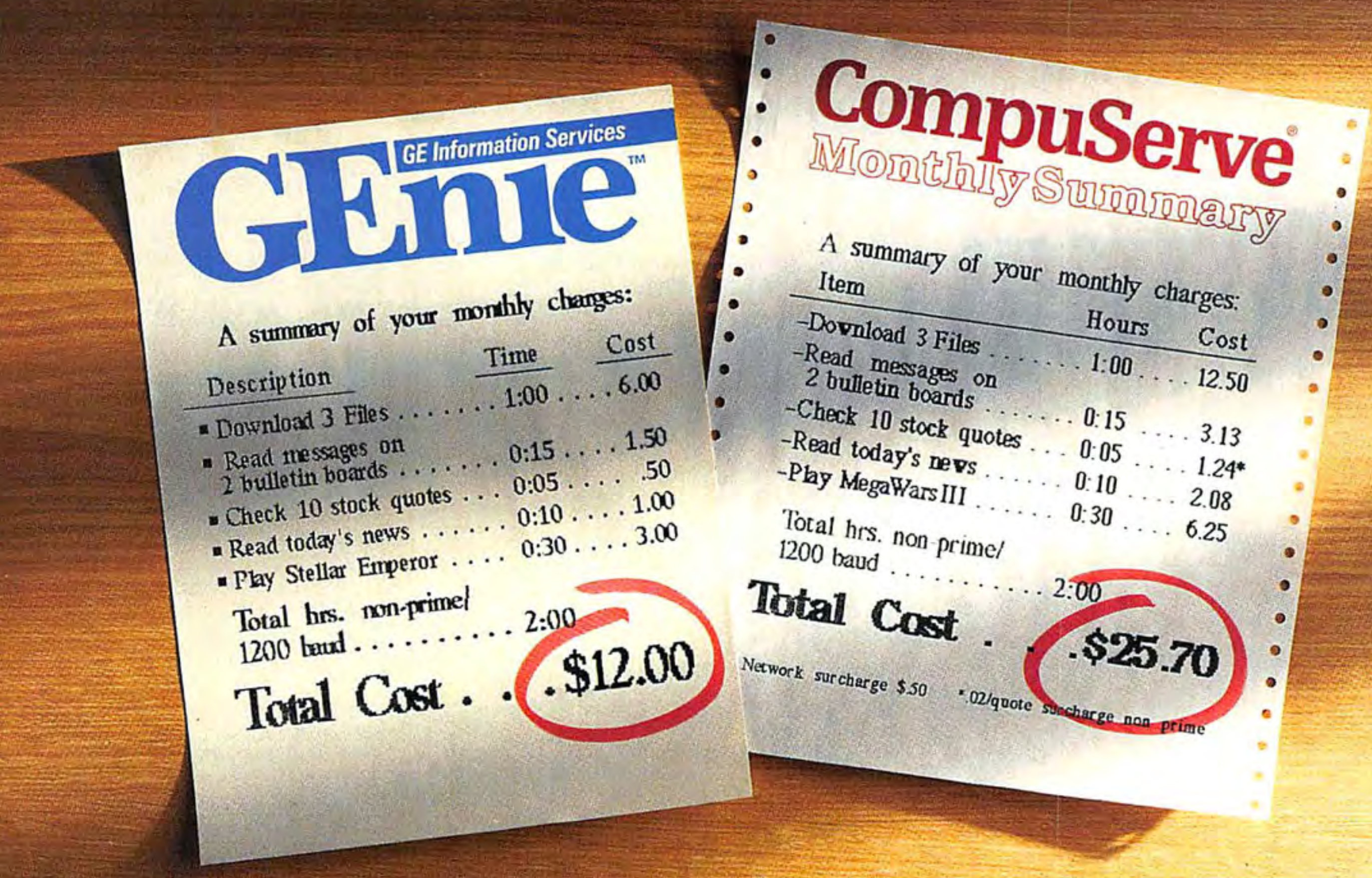

GE Information Services

GEnie™

A summary of your monthly charges:

Description	Time	Cost
Download 3 Files	1:00	6.00
Read messages on 2 bulletin boards	0:15	1.50
Check 10 stock quotes	0:05	.50
Read today's news	0:10	1.00
Play Stellar Emperor	0:30	3.00
Total hrs. non-prime/ 1200 baud	2:00	
Total Cost		**$12.00**

CompuServe®

Monthly Summary

A summary of your monthly charges:

Item	Hours	Cost
-Download 3 Files	1:00	12.50
-Read messages on 2 bulletin boards	0:15	3.13
-Check 10 stock quotes	0:05	1.24*
-Read today's news	0:10	2.08
-Play MegaWars III	0:30	6.25
Total hrs. non-prime/ 1200 baud	2:00	
Total Cost		**$25.70**

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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

AutoPrint Switch

Automatic A- and B-switch box that permits two Macs to share a single ImageWriter printer. Equipped with mini DIN-8 connectors and cabling. $149. Wayzata Technology, 612/472-4836.

ColorBoard 108 Plus

VLSI surface-mount 8-bit board that allows the user to upgrade with software for specific functions, such as pan, zoom, and virtual desktop. Complete system upgrade includes Aldus Persuasion. $1595. Pan and zoom $100; virtual desktop $200; pan and zoom, virtual desktop, and Aldus Persuasion $600. RasterOps, 408/446-4090.

ColorBoard 108 Plus

Color Space FX

Video board with flicker-free video and image-manipulation capabilities for the Mac II. Automatically converts standard NTSC, PAL, or SECAM composite video signals to standard frame rate or high frame rate RGB video signals. Decodes RGB signals and converts them to NTSC signals. $2995. Mass Microsystems, 408/522-1200.

Emac-150ID

A 5¹/4-inch internal hard disk for the Mac II. Provides 150MB of hard disk storage capacity without internal modifications to the computer. $2395. Emac, 415/683-2222.

Mac FileSafe 150

Streaming-tape backup system that stores 150MB of formatted data and incorporates a half-height, 5¹/4-inch form factor. Has image backup speed of 6MB per minute on the Mac II. Uses DC600XTD ¹/4-inch cartridge. $2195. Mountain Computer, 408/379-4300.

MacMainFrame SE/30

Internal board bundled with communications software for connecting a Mac SE/30 to an IBM 3270 network. Enables IBM 3278/79 terminal emulation and file transfer under IBM's CICS, TSO, and CMS operating environments. $995. Avatar, 508/435-3000.

MacMainFrame SE/30

MaraThon 120/96 Bus Adapter

Adapter board that enables expansion boards designed for the original Mac SE to operate in the Mac SE/30. Plugs into the 120-pin, vertical expansion-slot in the SE/30 without physical modifications to board or computer. $199. Dove Computer, 919/763-7918 or 800/622-7627.

MiroGraph Boards for the Mac II

MiroGraph Boards for the Mac II

MiroGraph Prisma produces 256 colors, MiroGraph GS produces 256 shades of gray, and MiroGraph Pencil has a monochrome display. All have a refresh rate of 75Hz, and resolution of 1024 by 768 pixels. You can switch variants from 1024 by 768 pixels to 512 by 384 pixels. $1895. Miro, 714/380-1120.

The Mousestick

Universal input device consisting of an optomechanical digital joystick, a Gravis Micro Processing Unit designed with 16K of ROM, and an LCD status indicator. Emulates keyboard commands. $169.95. Advanced Gravis Computer Technology, 604/434-7274.

PC Laser 6000/PS

PostScript laser printer that is both Macintosh and PC/AT/XT compatible. $4495. Ricoh, 408/432-8800.

Radius DirectColor Series

16- and 24-bit single-slot video interface boards designed to work with the Radius Color Display monitor. DirectColor/16 $4000; DirectColor/24 $5000. Radius, 408/434-1010.

SinglePage XL Display System

Single-page, 15-inch portrait display-system for Mac SE and Mac II. Radius-plug compatible. Mac SE compatible $1299; Mac II compatible $1399. Cornerstone Technology, 408/279-1600.

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Ultra Vision 1000

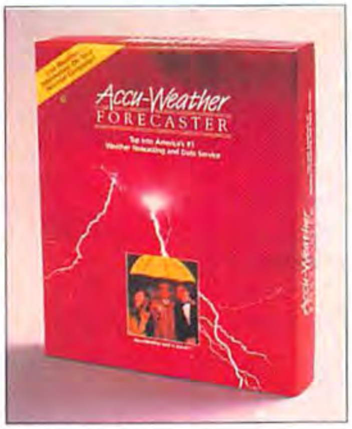
Ultra Vision 1000 and Gray Vision Display System

Ultra Vision 1000, a 20-inch color multifrequency monitor for the Mac II, works with boards that run at 30kHz to 78kHz and 50Hz to 80Hz. Gray Vision Display System is a 19-inch gray-scale monitor-and-board for the Mac II, with 74Hz vertical scan rate. Ultra Vision 1000 $3695; Gray Vision Display System $3190. Color board sold separately. Taxan, 408/946-3400.

SOFTWARE

Accu-Weather Forecaster

Uses telecommunications to access current weather information from Accu-Weather's private weather service. Covers 1000 locations in the United States and displays information in map, graph, and chart formats. 1MB min. memory. $89.95. Metacomet Software, 203/523-5661.



Accu-Weather Forecaster

AutoRead

OCR software that reads all languages and all typewritten fonts from 5 to 20 points in size. Recognizes different fonts on the same page and unlimited types of characters; reads more than 100 characters per second. Has text editor and zoom. 2MB min. memory. $795. Tutorland and Informatique Systemes TeleCom, 408/973-0472.

Bullet Proof

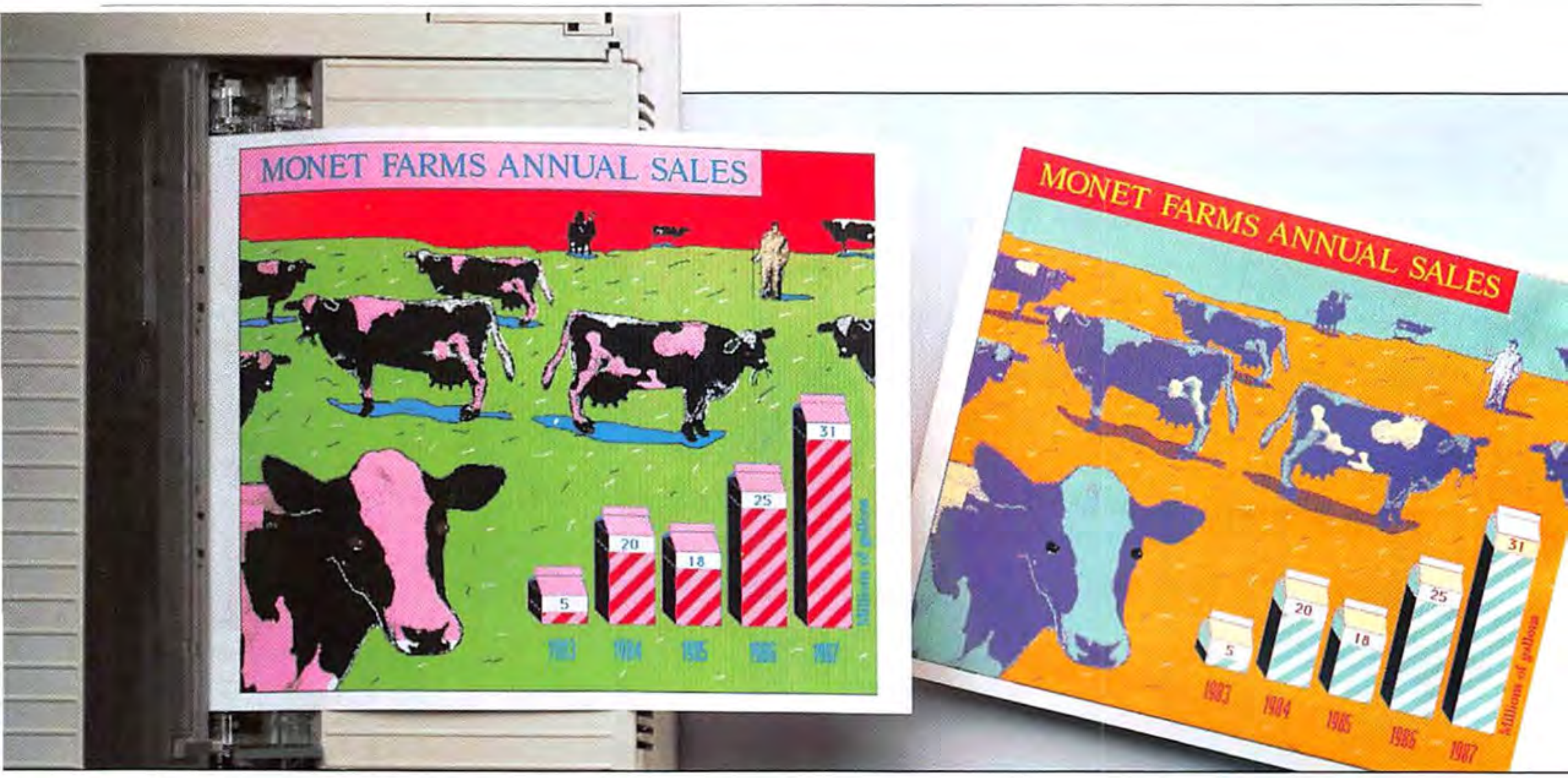
Hard disk and floppy disk file-protection utility. Can be used like Font/DA Mover. 128K min. memory. $99.95. Spectra, 602/884-7402.

Calendar Creator

Software for creating individual and group calendars. Can be used to create individual event lists and merge them into comprehensive master schedules. Lets you add unlimited number of events. Compatible with ImageWriter and LaserWriter. 1MB min. memory. $59.95. Power Up, 415/345-5900.

cc:Mail for Macintosh

Macintosh extension for cc:Mail application for MS-DOS PCs. Enables you to send any file, graphic, or scanned image produced on the Mac to another Mac, or to an MS-DOS– or OS/2–based personal computer. Requires system 6.0 or later. 1MB min. memory. $69.95 per work-station, plus $695 for basic LAN package with 25 mailboxes. cc:Mail, 415/321-0430.



With the new PaintJet color printer from Hewlett-Packard.

Look at the possibilities. Instead of basic black and a few dull shades of gray, look at the zip that color adds to your graphs and charts. Overheads will command attention. And reports will have sparkling visual surprises tucked inside.

The PaintJet printer brings so much

CompileIt
HyperTalk script compiler. Gives HyperCard stack developers access to the Macintosh ROM Toolbox directly from their scripts. Comes with the latest version of HyperCard. 1MB min. memory. $99. Heizer Software, 415/943-7667.

Culture

Culture
Set of HyperCard stacks that gives a cultural overview of western civilization. Contextual guide to famous artists, composers, and other historical figures. Consists of graphics, melodies, essays, and cultural grids. Covers ancient history to present century. 1MB min. memory. $175. Cultural Resources, 201/232-4333.

Datacopy AccuText
Artificial intelligence–based text- and character-recognition software. Captures all typefaces. Program automatically interprets text and formats; examines characters in context, and compensates for real-world conditions, such as dust or photocopy distortion. 4MB min. memory. $995. Xerox Imaging Systems, 415/965-7900.

The Dimensions Presenter
Imaging and animation software. Provides three-dimensional animation and imaging for MacDraw and PICT files, and image shading and animation for three-dimensional design programs. Outputs to slides, thermal printers, video, and a variety of presentation and paint packages. 512K min. memory. $495. Visual Information Development, 818/918-8834.

DocuComp
Document-comparison program that gives two-paned comparison window with split-screen displays of old and new file; prints composite document identifying changes in text; saves composite document with changes highlighted; and lists summary information about compared files. 512K min. memory. $159.95. Advanced Software, 408/733-0745.

Fastat
Statistical program with built-in text- and data-editors. Does summary statistics, one-way and multi-way tables, two- and three-dimensional color scatterplots, line plots, and bubble plots. 1MB min. memory. $195. Systat, 312/864-5670.

Gantt Maker
Produces Gantt charts with up to 256 tasks defined per project. Project duration can be set for days, weeks, months, or years. Charts are 1 to 255 cells long (each cell representing a unit of time) and can be up to 36 pages tiled. 512K min. memory. $95. Magic Software, 800/342-6243.

Global Data Manager
Research and educational software for analysis of world statistics on variables such as economics, food, energy, health, and education.

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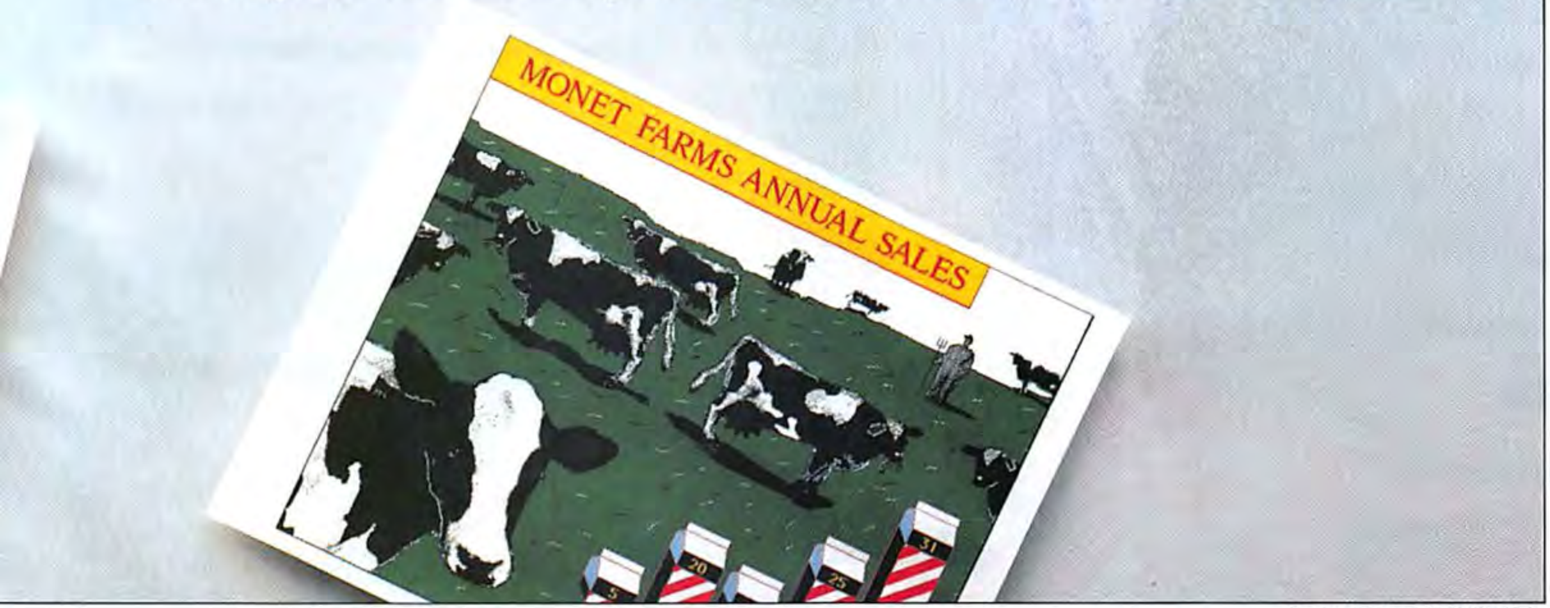

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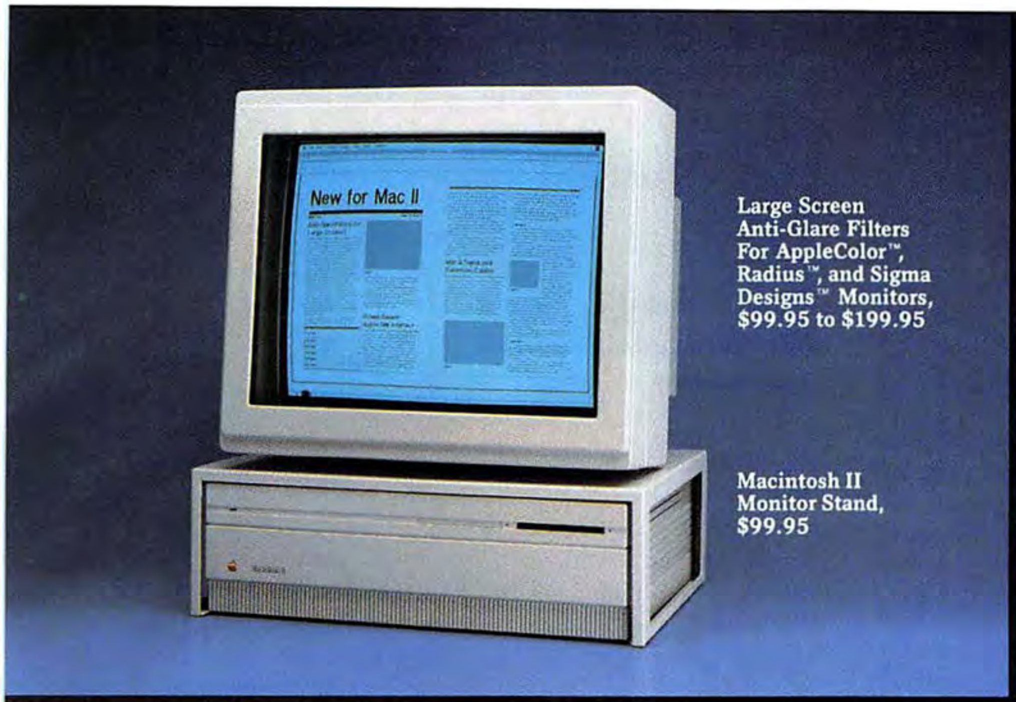
Maccessories Tilt/Swivel, $29.95

Macintosh II Stand and Extension Cables, Complete Kit $99.95, Separately $29.95 to $49.95

Master Piece® Mac II, $159.95

Power Backer™ UPS's, $399 to $1,399, Network Interface, $99.95

Turbo Mouse® ADB, Turbo Mouse Plus, $169.95 each



Large Screen Anti-Glare Filters For AppleColor™, Radius™, and Sigma Designs™ Monitors, $99.95 to $199.95

Macintosh II Monitor Stand, $99.95

Maccessories Anti-Glare Filter, $49.95

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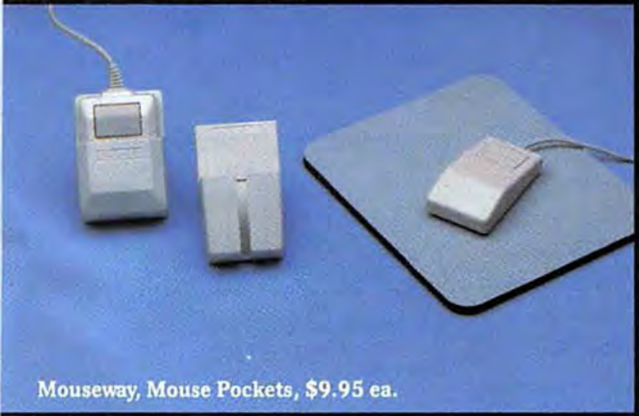
Keyboard Slideaway™, $49.95

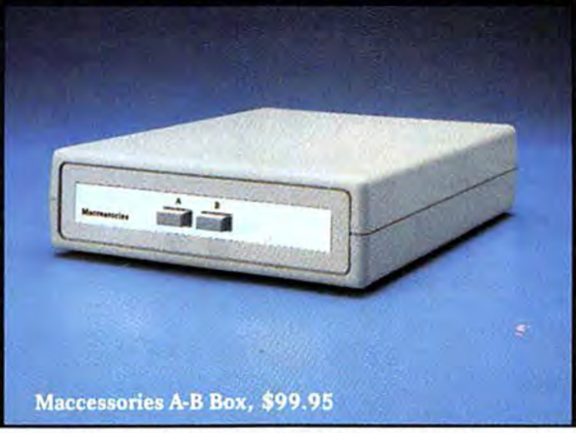
Universal Printer Stand, $24.95



Mouseway, Mouse Pockets, $9.95 ea.

Dust Covers, $9.95 to $24.95

Copy Stand, $29.95



Maccessories A-B Box, $99.95

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Two to one

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CompuNet is a local area network (LAN) system that conforms to AppleTalk LAN standards.

It has the convenience of using ordinary telephone wire and RJ 11 modular phone connectors. All of CompuNet's connections are positive locking and make it easy to create custom length cables by using simple materials and crimping tools found at most hardware and telephone accessory stores.

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FAX 212-645-8786
In Canada call DataSpace Corp.416-474-0113800-378-0492
*Based on suggested retail price of $59.95 effective October 1, 1987

Circle 26 on reader service card

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MacKablit System

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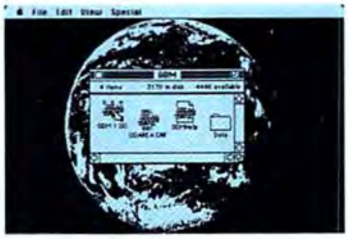
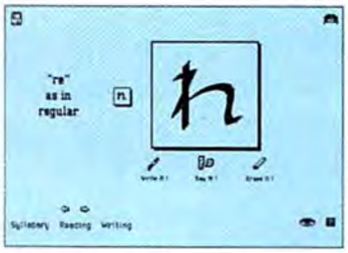


Global Data Manager

Provides statistics for countries, groups of countries, or continents in spreadsheet format using up to 200 variables. 512K min. memory. $95. World Game Institute, 215/387-0220.

HyperExternals I and II
External commands for HyperCard. Routines are written in MPW C and come in a stack with documentation. Increase functionality and speed of standard HyperCard scripts. 1MB min. memory. $25 each. Boojum Computer Systems, 15004 Donna Dr., Silver Spring, MD, 20904.

Japanese Language Instruction
HyperCard application that assists in reading, writing, and comprehension of Japanese language. Uses character generation and phonetic pronunciation; provides reading and writing exercises. 1MB min. memory. $45. Anonae Software, 415/845-8292.

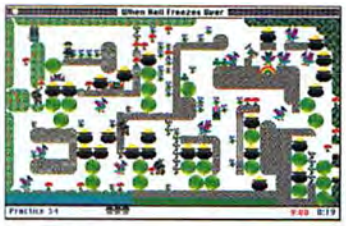


Japanese Language Instruction

JetLink Express
Printer driver for HP-compatible laser printers. Uses outline-print technology at up to 300 dots per inch. Comes with cable and 13 outline fonts. Optional Expressive Fonts package increases font compatibility to 35 fonts and is standard with LaserWriter Plus and IINT. 1MB min. memory. $149; with Expressive Font package $195. GDT Softworks, 604/291-9121.

Landware Designer
Landscape-design program for use with Pegasys CADD and HyperCard. Includes symbols that have been assigned attributes, macros that run under the Pegasys macro command language, and stackware that includes plant and landscape-product databases and a macro interface. 1MB min. memory. $495. Landware, 714/832-8046.

Lawman
An old west adventure game with three levels of play. 512K min. memory. $49.95. Raecreations Software, 317/823-1164.



Leprechaun

Leprechaun
Strategy game that uses various levels of play involving mazes. Main character is a leprechaun whose objective is to push a pot of gold onto a rainbow. Full-color graphics and sound. 1MB min. memory. $59. Shodan, 415/849-9475.

(continues)

Mac On-Call
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Word processor that includes catalog facility, thesaurus, glossary for storing both text and graphics, and ten editable clipboards. Spelling checker runs without interrupting editing. 1MB min. memory. $395. Paragon Concepts, 619/481-1477.

Nisus

PageMaster
Tutorial and reference guide for PageMaker 3.0. Includes audio tape, disk of files for importing into publications, reference charts, and DialogFlow charts. Explains items in PageMaker 3.0 menu dialog boxes. 1MB min. memory. $99.95. MacExperts Corporate Trainers, 800/446-6061.

Professional Time Billing
Accounts receivable/office management program for billing professional time and services. Comes with user-definable appointment scheduler; can produce separate schedules and multiple billing rates for each provider. 1MB min. memory. Single user $595; 2- to 4-user version $895. Professional Systems, 414/887-0388.

Profit Center
Investment software for small businesses that figures cash flow, profit, and break-even projections. Works as a modeling tool for start-up and existing businesses. Provides data for comparing similar companies within a given market. 512K min. memory. $695. Tronsoft, 805/564-3386.

Quarterstaff: The Tomb of Setmoth

Quarterstaff: The Tomb of Setmoth
Fantasy game with monsters, demons, magic, and a variety of solutions and sound effects—slamming doors, rattling chains, and human screams intermixed with sounds of sleeping, eating, and walking. Available to

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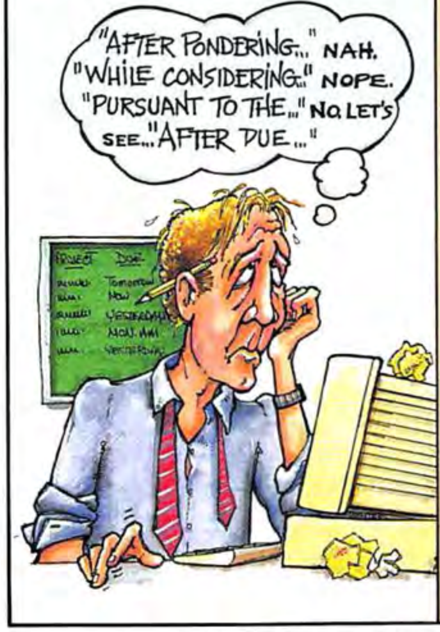
"AFTER PONDERING..." NAH.
"WHILE CONSIDERING..." NOPE.
"PURSUANT TO THE..." NO. LET'S SEE..."AFTER DUE..."

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■ For the capacity of a hard drive plus the convenience of a floppy drive, the MegaDrive removable media system lets you store 10 or 20MB of data on a single, removable MegaFloppy disk. Awarded the 1988 World Class Award by Macworld. *(20MB model shown at right.)* 10MB: $699. 20MB: $999.

■ We can't show you the InnerDrive, since it's already installed inside this Mac II. And since it's incredibly quiet and 33% cooler than most other drives, chances are you won't notice it even when it's running. *(Also available for the SE.)* 40/SE: $649, 40/II: $649. 80/SE: $949, 80/II: $949. 100/SE: $1099, 100/II: $1099. 140/II: $1499. *(Mac II only.)*

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Jasmine
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owners of the original Quarterstaff for $20. 1MB min. memory. $49.95. Infocom, 617/492-6000.

Relay Baton

File-transfer software for transmitting data between Macintosh and IBM mainframe computers. Works asynchronously over normal phone lines; no boards or cables needed. 1MB min. memory. $150 per unit; volume purchase agreements available. Relay Communications, 203/798-3800 or 800/847-3529.

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Single-user business accounting software with modules for sales, purchase, inventory, ledger, bidding, quoting, and job costing. Has two user-defined levels of costing, two levels of password protection, and three levels of pricing. Exports data to spreadsheets and outputs to printers, disks, or screen display. 1MB min. memory. $395. Brown Wagh, 408/395-3838.

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Smart Art

Graphics desk accessory consisting of a library of customizable text effects, graphics, and borders. Lets you access artwork from within an application. Files compatible with any application using encapsulated PostScript. 1MB min. memory. $149.95. Emerald City Software, 415/324-8080.

Strategic Craps

Software for learning and playing the game of craps. Divided into play and strategy modes. Simulates the environment of a casino with graphics, uses standard casino rules. Comes with study guide and bet explanations. 512K min. memory. $39.95. Applications Plus, 612/432-5560.

TableTools

Financial- and scientific-table editor for desktop publishing. Cell sizes are adjustable and may have multiple border styles and fill patterns. Lets you place and edit graphic, paint, and chart objects in table cells. Uses Microsoft Excel for numerical computation. 1MB min. memory. $395. Mansfield Systems, 800/872-3332; 800/367-3332 in California.

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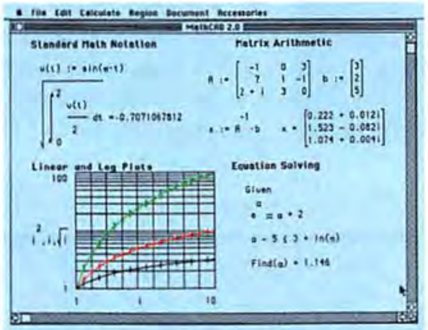

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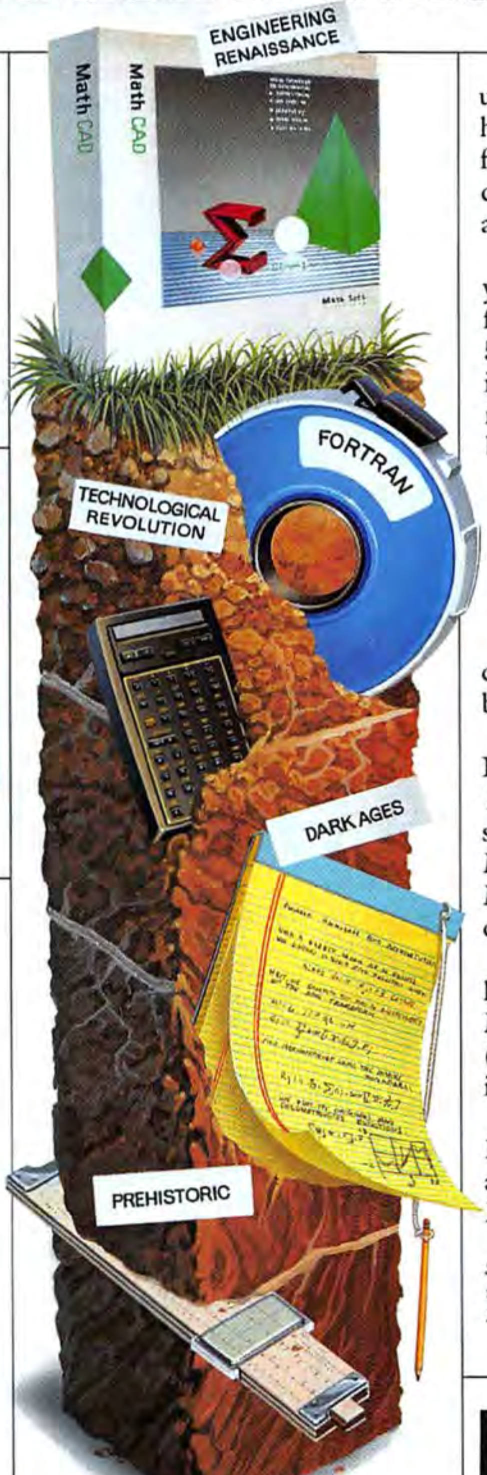

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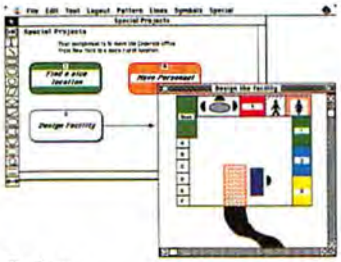

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publishable quality output. Compatible with all printers. Exports files to other page-layout programs. 1MB min. memory. $495. Sun Valley Software, 204/663-8004.

TopDown

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ACCESSORIES

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Large Screen Anti-Glare Filters

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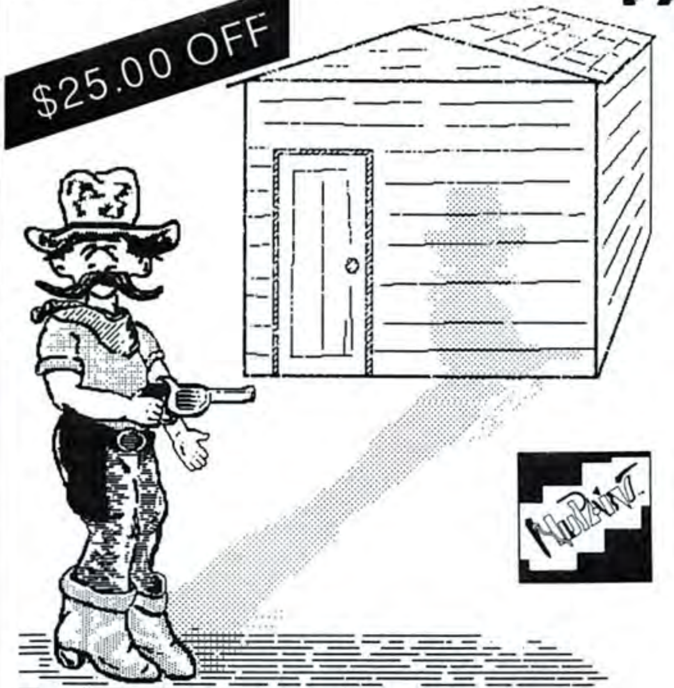

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TransMac

The Treatment

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WristMac

Seiko digital watch that downloads up to 80 screen pages from a Mac. Imports data from a variety of sources including HyperCard stacks, text files, and databases. Produces free-form text displays, alarms, and phone numbers. Executive model is water resistant. Requires HyperCard version 1.2 or higher. WristMac $225; Executive WristMac $295; Bidirectional adapter $45. Ex-Machina, 800/227-6900.

WristMac

BOOKS & VIDEOS

The Best Mac Deal, Edition II

Guide to shareware and public domain software for the Mac. Details more than 5000 applications in 15 categories such as desktop publishing, games, and personal productivity. $9.95 plus $2 s/h. The Public Domain Exchange, 408/496-0624, 800/331-8125.

The Macintosh Font Book

Guide to the fundamentals of Mac-based typography for beginners, as well as technical tips and product information for advanced users. Explains type terminology and steps for building, installing, and managing a font collection. $21.95. Peachpit Press, Publishers Group West, 415/658-3453; McGraw-Hill Ryerson, 416/293-1911 in Canada.

The Macintosh Font Book

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4			
5	Room	Office	246 Sq Ft
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		WC	150 Sq Ft

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7352	63	Siding Alum (Sky Bl)
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17628	1	Thermostats
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Quick Tips

Centering objects in PageMaker, using MultiFinder with 1MB RAM, and more

by Lon Poole

When trying to move a very small graphic object, you may inadvertently resize it by dragging one of its handles. A tip in last December's issue suggested you work around this difficulty by selecting a large object along with the small one, and then dragging the pair. Tony Armendariz of Gilroy, California, and others wrote to recommend a simpler method. Make sure the object you want to move is not selected. To deselect it, click in an empty area of the document. Then select the object and drag it all in one motion, without releasing the mouse button.

CENTERING MACPAINT

Q When I used MacPaint 1.5, I was able to center a drawing on a printed page. With MacPaint 2.0, I seem to have lost that capability. Is it me, or is it the update?
Maxwell J. Richards
Palm Bay, Florida

A I presume you centered by eye using MacPaint 1.5's Show Page command. MacPaint 2.0 has no Show Page command, although it does have a Zoom Out command that can show your document reduced by 50 percent. At that reduction, you can see an entire page on a Mac II or another Mac with a large screen, and you can edit the whole drawing without scrolling. To center the drawing, first select all of it—excluding extra white space around the edges—by tearing off the Tool menu and pressing ⌘-Shift while double-clicking the Selection Rectangle tool. Then drag the drawing until it looks centered on the page.

Centering a drawing on the standard 9-inch screen of a Mac Plus or an SE is not so easy, however. On a small screen you can see the whole width of the page but not the whole height. In that case you can center the drawing horizontally by eye and vertically by using the mouse position window. First select the whole drawing as described in the previous paragraph. Drag left or right until it looks centered horizontally. Then press the Shift key, constraining movement to one direction, and drag the drawing to the top of the page. Next choose Show Mouse Position from the Goodies menu to display the mouse position window. Measure the distance from the bottom of the drawing to the bottom of the page by watching the middle of the mouse position window while dragging a selection rectangle between those two locations. Select the whole drawing again, press the Shift key, and drag the drawing down the page half the distance you just measured.

CANCEL TEST PAGE

Q I am about to tear out what strands of hair I have left on my head, thanks to the LaserWriter IINT. It seems intent on spitting out a test page every single time I turn it on. I would be ever so grateful if you could show me how to tell my LaserWriter where it can put those test pages.
Alex Rodriguez
Hialeah, Florida

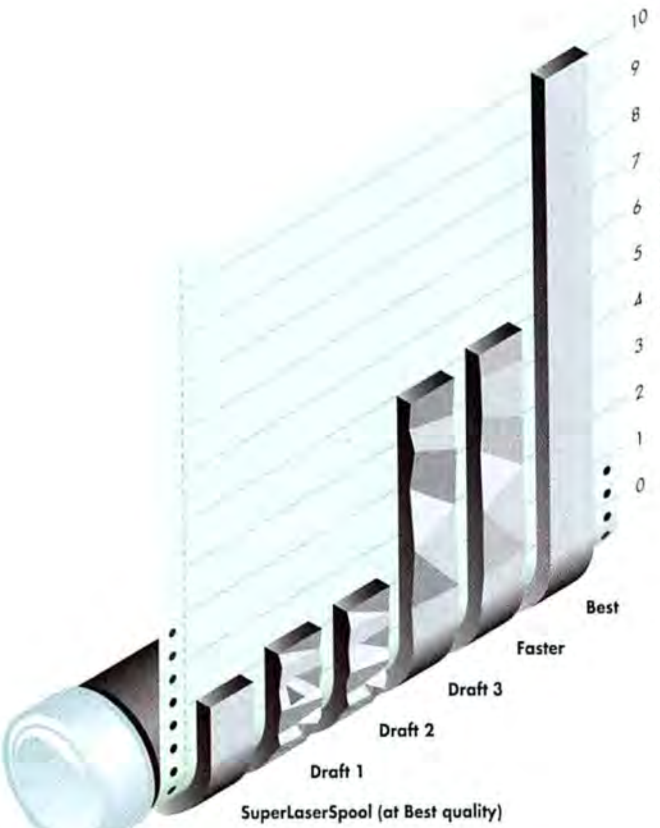
A You can disable the test page by pulling the paper tray partially out before switching on the LaserWriter. The application Widgets has menu commands for disabling and enabling the test page on any LaserWriter that uses PostScript. Widgets is included with DiskTop or MockPackage from CE Software (515/224-1995).

POKY LABELS

Q Microsoft Works takes at least six hours to print 5000 four-line mailing labels on an ImageWriter II. The labels are printed once a month on plain paper (not adhesive labels) for an automatic labeling machine at a commercial mailing house. The list needs constant updating, and Works is very convenient for this. Should I copy the records needed for labels to some other software for faster printing?
Don Herrmann
Clayton, Missouri

A You are waiting for the ImageWriter II, not for Microsoft Works. Works printed 100 labels for me as fast or faster

(continues)



ImageWriter II Time Trials
This chart compares the time Works kept the Mac busy printing 100 four-line labels two-up using Best, Faster, three variations of Draft qualities, and a print spooler (which frees up the Mac the most quickly).

than Claris's popular database manager FileMaker II.

You don't say which Quality option you're selecting in the Print Merge dialog box—there are Best, Faster, and three variations of Draft quality. (You pick a Draft variation using the Print Quality switch on the ImageWriter II, as described in the printer manual.) The Quality setting, along with the state of the printer's Print Quality switch and the use of print spooler software, affect how long the Mac is kept busy printing on an ImageWriter (see "ImageWriter II Time Trials"). You can regain use of the Mac quickly (after using it to print) if you use a spooler such as SuperSpool or SuperLaserSpool from SuperMac Technology (415/964-8884). However, the start-to-finish print time with a spooler can be significantly longer than without one, because the ImageWriter stops printing when you actively use the Mac.

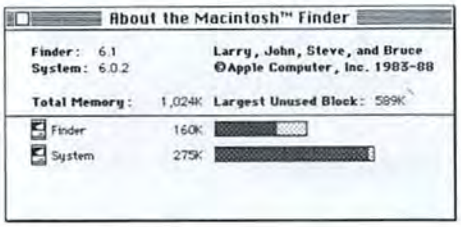
MULTIFINDER WITH ONE MEGABYTE

Q Can I expect to use MultiFinder or Switcher with the one megabyte of RAM in my SE? When I try to use any combination of Word, MacWrite, SuperPaint, or StatView 512+ with MultiFinder, a message tells me there isn't enough space. With Switcher, I get a system error. Am I doing something wrong?
Robert A. Levine
Philadelphia, Pennsylvania

A Very few applications can be open concurrently under MultiFinder on a 1MB Mac. The full megabyte is not available for applications because the Finder, which occupies 160K of memory, remains open when you open an application using MultiFinder (see "Who's Got Memory?"). In addition, system resources, such as fonts and system software modules, typically occupy at least 200K more. That leaves 640K available for applications—too little for two of today's average applications. In fact, you may not be able to open a complex application such as HyperCard or FullWrite Professional under MultiFinder at all, if you have less than 2MB of RAM.

MultiFinder does have its uses with 1MB. It speeds up switching from one application to another—even if you can't open both at once—by sharply reducing the time it takes to quit and return to the omnipresent Finder. And because the Finder is always open, you can use it to copy disks and files, create new folders, and so on, without quitting the application you're using. Of course, you can have all these advantages with less overhead by using a Finder replacement such as CE Software's DiskTop desk accessory.

Switcher leaves more room for applications than MultiFinder does, because it doesn't keep the Finder open. But as you've discovered, it isn't as reliable as MultiFinder.


About the Macintosh™ Finder

Finder: 6.1
System: 6.0.2

Larry, John, Steve, and Bruce
©Apple Computer, Inc. 1983-88

Total Memory: 1,024K Largest Unused Block: 589K

Finder	160K	
System	275K	

Who's Got Memory?
Choosing About the Finder from the Apple menu shows that if you're using MultiFinder on a 1MB Mac, you probably won't have enough memory to have two medium-size applications open simultaneously or one large one by itself.

COMPLICATED FILL

TIP: When making diagrams in Cricket Draw, you may want to fill an arc or some more-complicated curvy object. But Cricket Draw's fill control method doesn't work with straight lines, arcs, or bezier curves, even if they're connected to form a closed object. The solution: After constructing your object, magnify to the max, trace a closed polygon over it, and fill the polygon. If necessary, fine-tune the polygon by using the Edit Polygon command. Then delete the original object. If you prefer to use the polygon just for fill, then make its line intensity None, make the original object's fill None, and group the original object with the polygon.
Stan Wagon
Leverett, Massachusetts

Both MacDraw II from Claris (415/960-1500) and Drawing Table from Brøderbund (800/521-6263) let you fill shapes made of

(continues)

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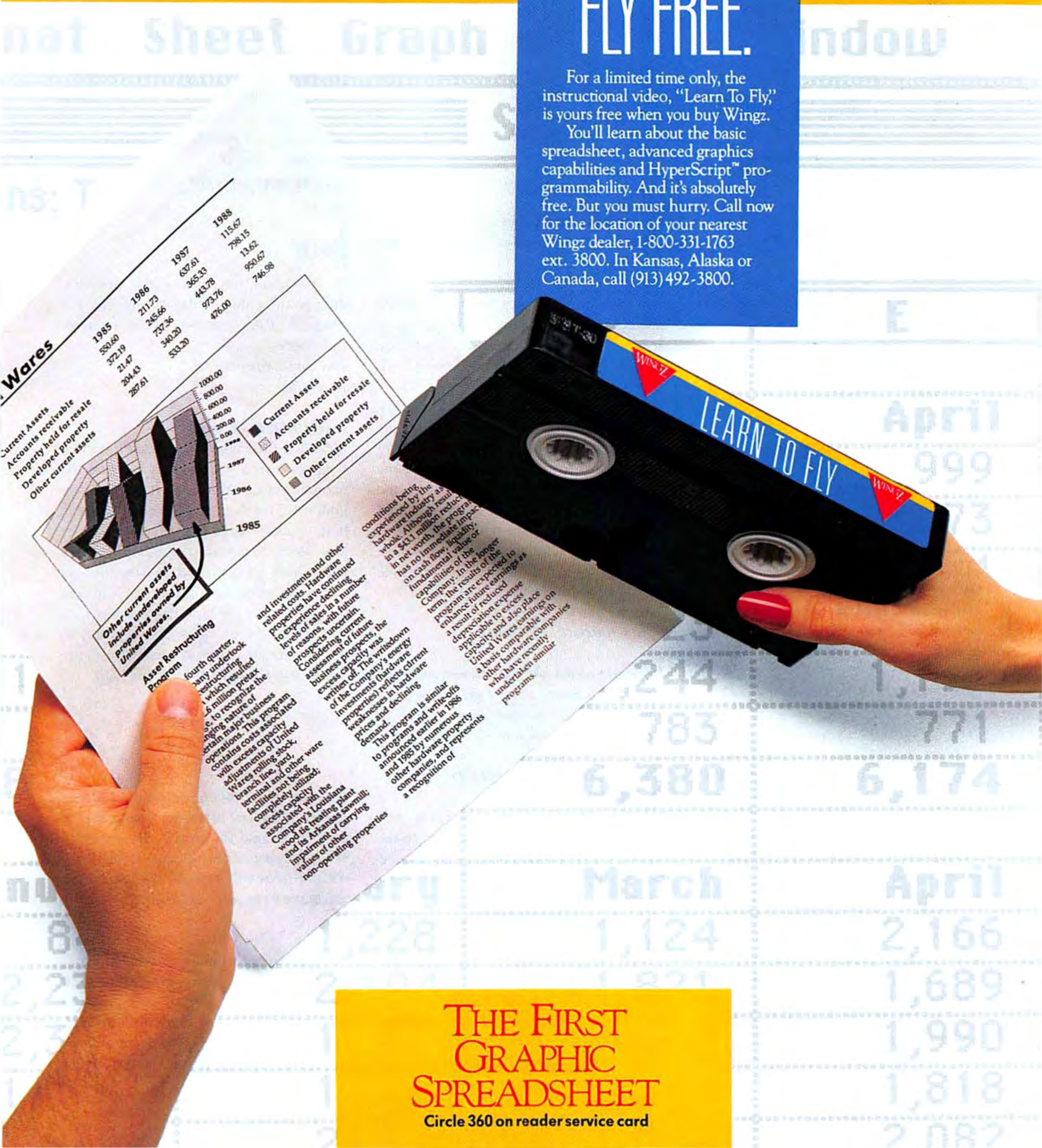

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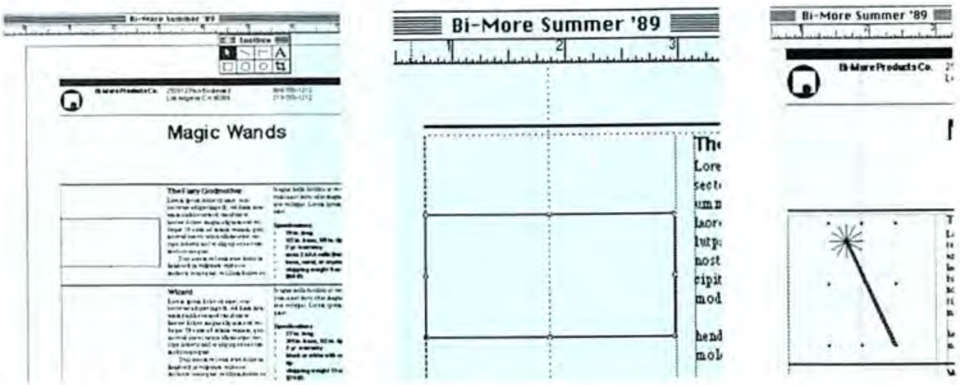

Centered in PageMaker

Establish the center of a PageMaker column or another space by drawing a rectangle across it (left). Then zoom in and drag a guideline to the rectangle's center handle (center). Delete the rectangle and use the guideline to center other objects (right).

arcs, straight lines, and curves (though each one lacks some of Cricket Draw's features).

A BLANK LINE'S POINT SIZE

TIP: You can't change the point size of a blank line when creating a sign with Brøderbund's Print Shop. To work around this limitation, put a single blank space on each blank line. Then you can adjust line spacing by changing the point size of the blank space on the blank line.
David Fiel
Clearfield, Kentucky

Similarly, you can adjust the height (leading) of a nonblank line by changing the size of a blank space on it. These tricks also work in word processors like MacWrite that don't let you adjust line height independent of font size.

CENTERING OBJECTS IN PAGEMAKER

TIP: In PageMaker, you align text blocks, graphics, or both along their left or right edges by dragging them to a guideline. You can use a similar method to center objects without measuring (see "Centered in PageMaker"). Start by drawing a rectangle that exactly spans the width of the page or column in which you want to center objects. Next drag a vertical guideline to the rectangle's center handle (zoom in for precise alignment). Select the rectangle and press the Delete or Backspace key to eliminate it. Now you can center any object that has center handles, including a text block, by moving it so that its center handles straddle the guideline. For precise positioning, use Easy Access. Be sure to remove excess white space around an imported graphic by cropping before trying to center it. Some asymmetrical images may need to be positioned off-center to appear centered.

You can also use the same vertical center guideline to set up an automatic centering ruler. Simply drag the horizontal ruler's zero point to the guideline. Now to center an object, move it until the dashed lines that indicate its left and right edges in the ruler are both on the same number. For example, edges of a 24-pica object will be at 12 and 12 on opposite sides of the horizontal zero point.
Jungle Payne
Santa Barbara, California

Easy Access has a feature called Mouse Keys, which enables you to move the mouse pointer 1 pixel at a time using the numeric keypad. It is described in the system software user's guide that comes with the Mac and in the March 1988 **Quick Tips.**

HANDLING SMALL OBJECTS IN SUPERPAINT

TIP: The mouse pointer gets in the way when you try to select, move, or resize small objects in SuperPaint. To get around this problem, work with small objects in a magnified view (select the magnifier tool and click on an area to magnify).
Joe Ligotti
Rochester, New York

WORD FORMULA CONTROL

TIP: One of Microsoft Word's formula commands, I( ), can create special operators such as integral ($\int$), summation ($\sum$), and product ($\prod$). The size of the operator depends on the height of the operand, which is normally the third argument of the I( ) command. As a result, you may end up with small, medium, and large operators on the same page of a document. To produce operators of uniform size, use a subscripted blank space as the third argument of the I( ) command and put the actual operand after the I( ) command. For example, entering

```
\I(a,b,.\S.\UP5( ))f(x) dx
```

yields

$$\int_a^b f(x)\,dx$$

To adjust the size of the operator, change the value of the superscript. For example, UP20 makes a larger operator than UP5.
Ted and Penny Smith
Iowa City, Iowa

THE ULTIMATE TIP

TIP: I am dismayed when I see a tip that I figured out a year ago by reading the manual. I always think, "Gee, I could have gotten $25 for that." So here's a tip that will help you with anything you do with your Mac. *Read the manuals.* You don't have to read all of a manual when you first get some software or hardware. Just leaf through it and see how it's organized, so you know where to look later. The key to using manuals is not to memorize them, but to know where to look for help.
Carl Aron
Ellicott City, Maryland

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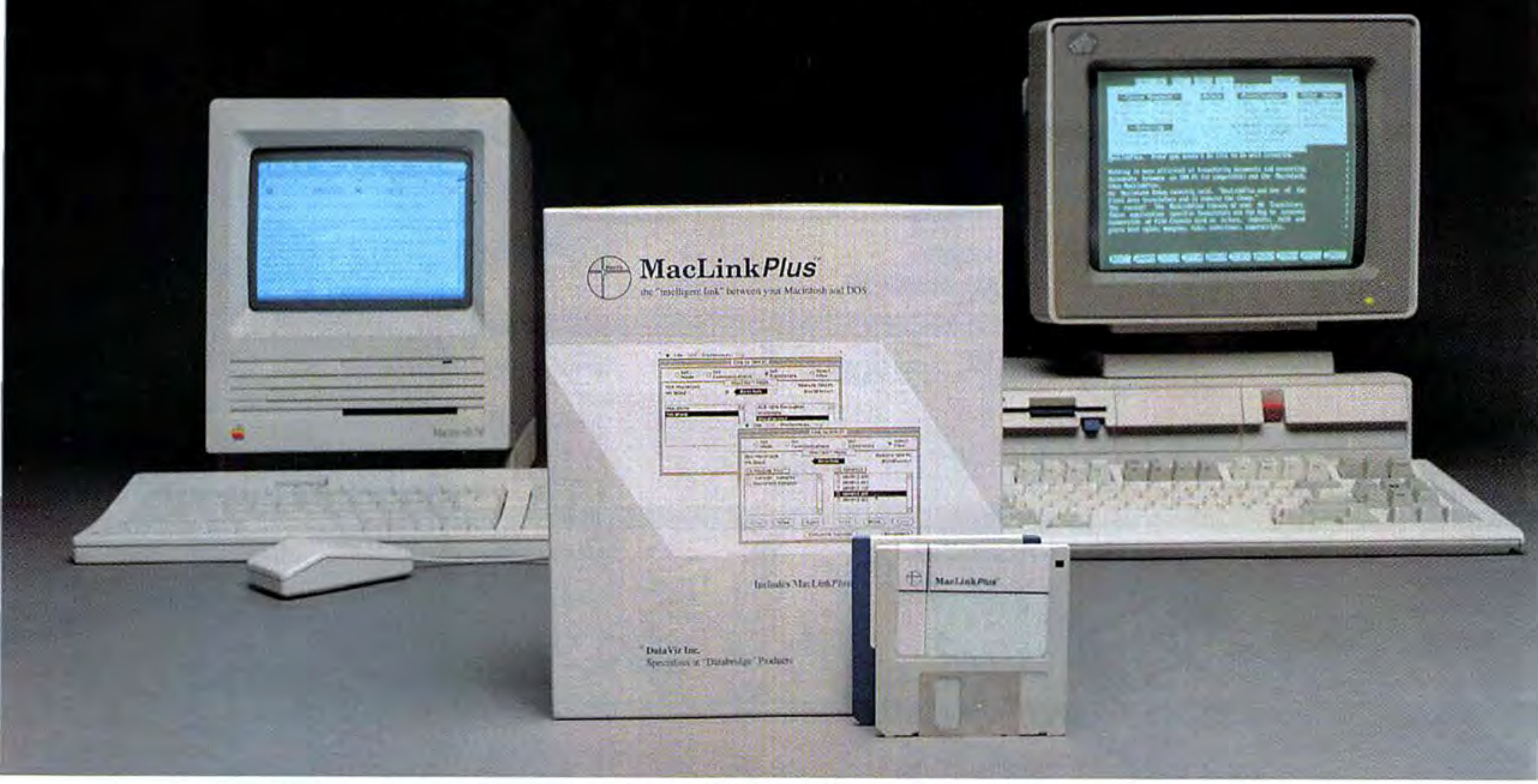
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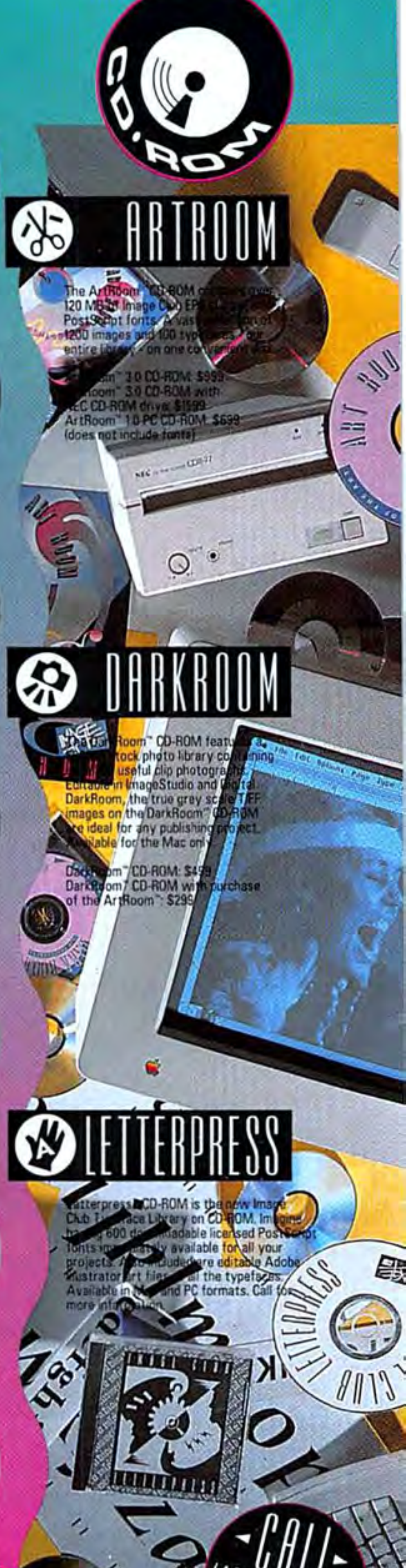

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This ad - color and all - was created with Image Club clip art and typefaces using a Mac II, PageMaker 3.0.1, Illustrator 88 and FreeHand 2.0. Color separations were output as negatives on a Linotronic.

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Getting Started with Typography

A not-just-for-publishers look at formatting text you can read

by Jim Heid

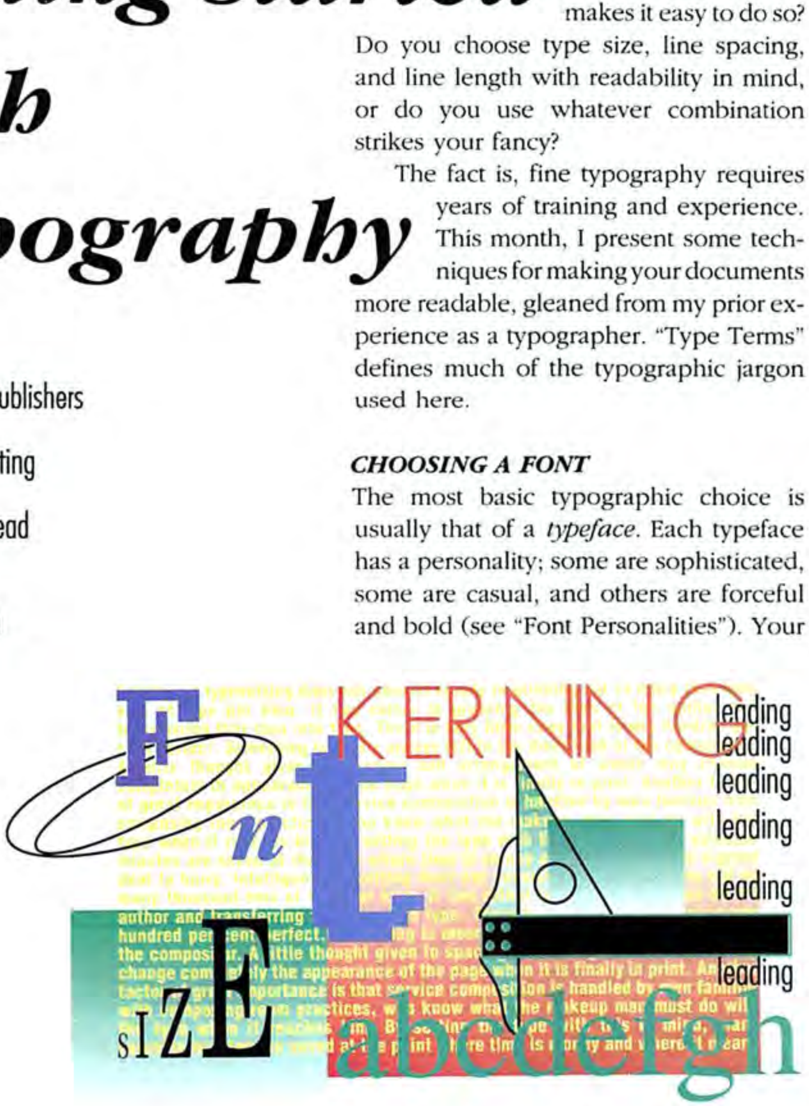
When you use the Mac, you're setting type. When you choose different fonts, sizes, or styles—be it in a publishing program, word processor, spreadsheet, or database—you're making the same decisions typographers have made for centuries. You're specifying the type characteristics that will convey your message clearly and attractively.

Or are you? Do you choose fonts that are appropriate to your message, or do you flit from font to font because the Mac makes it easy to do so? Do you choose type size, line spacing, and line length with readability in mind, or do you use whatever combination strikes your fancy?

The fact is, fine typography requires years of training and experience. This month, I present some techniques for making your documents more readable, gleaned from my prior experience as a typographer. "Type Terms" defines much of the typographic jargon used here.

CHOOSING A FONT

The most basic typographic choice is usually that of a *typeface*. Each typeface has a personality; some are sophisticated, some are casual, and others are forceful and bold (see "Font Personalities"). Your goal is to choose typefaces whose personality complements your message.



Although some studies show little difference in legibility between *serif* and *sans serif* fonts, it's generally believed that serif typefaces are more legible and therefore better suited to lengthy text passages. I recommend that typographic newcomers follow this rule of thumb: Better serif than sorry.

Another issue concerns whether to use the same font for all the elements of a document, or to use a different font for headings and subheadings. One way to get good results is to use different fonts within the same *family*. For example, you might use Garamond for *body type* (or *body text*), Garamond Bold for headlines, and Garamond Italic for captions. Or you could mix typefaces by using, for example, New Baskerville for body text and Helvetica Black for headlines. Just be consistent throughout a document, and don't mix with abandon.

The amount of copy you have may also influence your choice of typeface. To squeeze a lot of text into a small area, consider a space-efficient *condensed* typeface. Adobe Systems' library of over 300 *downloadable fonts* includes attractive condensed versions of Helvetica, Univers, and Futura.

LINE LENGTH AND TYPE SIZE

After choosing a font, you need to settle on the width of text columns and the type size. Both decisions are related and have one goal: putting a manageable number of words on each line.

Two rules of thumb exist for determining line length. One states that each line should have roughly from 8 to 11 words. Another says that a column should be just wide enough to accommodate 2½ lowercase alphabets in the typeface and size you plan to use (see "How Long a Line?"). Experimentation with both rules reveals that they often provide the same results. The bottom line: strive for lines containing between 50 and 70 characters.

Most people read groups of three or four words at a time rather than individual words. If there are too many words on each line, the eyes tire as they journey from left to right. Too few words on each line, and the flow of the text becomes disrupted by line breaks and excessive hyphenation.

Your choice of type size will be influenced by the amount of text you have and

(continues)

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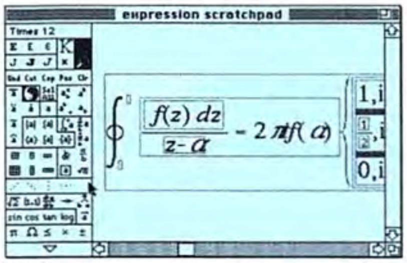

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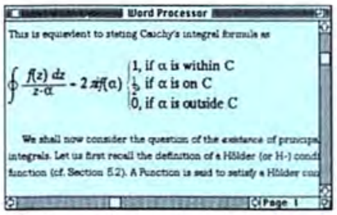

This is equivalent to stating Cauchy's integral formula as

$$\oint \frac{f(z)\,dz}{z-\alpha} = 2\pi i f(\alpha) \begin{cases} 1, \text{ if } \alpha \text{ is within C} \\ \frac{1}{2}, \text{ if } \alpha \text{ is on C} \\ 0, \text{ if } \alpha \text{ is outside C} \end{cases}$$

We shall now consider the question of the existence of principa
integrals. Let us first recall the definition of a Hölder (or H-) condi
function (cf. Section 5.2). A Function is said to satisfy a Hölder co

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$$\nabla^2 \mathbf{E} - \frac{\mu\varepsilon}{c^2}\frac{\partial^2 \mathbf{E}}{\partial t^2} = 0$$

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TYPE TERMS

Ascender The part of characters such as *f* or *d* that rises above the body of the letter.

Base line The imaginary line on which the body of a character sits. Leading is measured from base line to base line.

Body type, or body text The typeface used for the main text of a job.

Descender The portion of characters such as *j* or *g* that drops below the base line.

Dingbat A decorative graphic element.

Downloadable font A font stored on a floppy or hard disk and downloaded into a laser printer's memory before use.

Em space A fixed amount of space equal to the point size of the typeface you're using. In 12-point type, an em space is 12 points wide.

En space Also called a *nut* space, a fixed amount of space equal to half an em space.

Family A group of related typefaces. For example, Times Roman, Times Italic, Times Bold, and Times Bold Italic are all members of the Times family.

Font All the characters for one typeface, and historically, in one size. Today, *font* and *typeface* are often used interchangeably.

Leading The amount of space between two base lines (pronounced *led-ing*).

Ligature Two or more connected characters, such as *fi* or *fl*.

Pica A unit of measurement that is equal to 12 points.

Point A unit of measurement equal to .01384, or approximately $^{1}/_{72}$, inch. The point size of a given typeface is the distance between the top of the highest ascender and the bottom of the lowest descender.

Pull quote A key phrase extracted from the text and set in large type to attract the reader's attention.

Sans serif A typeface without serifs. Sans-serif typefaces include Helvetica, Futura, and the Mac's Geneva screen font.

Serif A line crossing the main strokes of a character. Serifs lead the eye across a line of type. Serif typefaces include Times, Palatino, Century Schoolbook, and the Mac's New York screen font.

Small caps Capital letters with the same height as the lowercase characters.

Subhead A heading within the text that's used to split up lengthy passages and draw the reader's attention.

Thin space A fixed amount of space equal to half an en space.

X-Height The height of a typeface's lowercase letters, excluding ascenders and descenders.

the space into which it must fit. For documents duplicated on a laser printer or photocopier, you probably won't have a preconceived number of pages, or a *page count,* in mind. If that's the case, simply choose a type size that works with your column width to provide from 8 to 11 words per line.

For a document that will be commercially printed, however, you must determine the page count in advance—and make sure your text fits within it. Before WYSIWYG (what-you-see-is-what-you-get) screen displays, designers and typographers endured a complex *copyfitting* routine that involved crunching through formulas to calculate character widths. Today's WYSIWYG programs and displays let you adjust the type size as you work.

Of course, on-the-fly tweaking is effective only to a point. In a newsletter, for instance, you wouldn't adjust each article's type size to accommodate its text. That would destroy the publication's uniformity, and uniformity is a cornerstone of good typography and design. When an article is a tad long, try hyphenating more lines (this works best with text that's set ragged right). If it's still too long, consider cutting some text.

When an article is too short, try removing hyphenations, breaking long para-

(continues)

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Friz Quadrata is contemporary and calligraphic.

ITC Franklin Gothic is legible and honest.

ITC Franklin Gothic Heavy carries weight.

Futura is geometric and "moderne," no?

Helvetica Condensed is space-efficient, yet legible.

ITC New Century Schoolbook is easy to read.

Helvetica Condensed Black Oblique is progressive.

ITC Lubalin Graph is sturdy and distinctive.

Font Personalities *A sampling of eight Adobe Systems PostScript typefaces. The shape and thickness, or weight, of each character contributes to a typeface's overall appearance. So do special flourishes such as Futura's flashy question mark, and Friz Quadrata's lowercase* p *and* g*, whose strokes don't completely close.*

graphs into shorter ones, or narrowing the width of the columns. If these techniques fail, consider filling the leftover space with a graphic element such as a straight line (or *rule*) or an ornamental *dingbat*. Other possibilities include lengthening the article by using *subheads* or *pull quotes*. Or you can leave the space blank. Just as silence plays a role in music, white space plays a role in graphic design.

LEADING GUIDELINES

Another way to do your readers a favor is through appropriate use of line spacing, or *leading*. For body text, the general rule is to lead at 20 percent of the type size. For 10-point type, for example, use 2 points of lead for a total of 12 points from one *base line* to the next. The Mac's fonts contain built-in autoleading specifications that use this 20 percent rule. When you specify "auto" in your word processor or desktop publishing program, the program uses the font's autoleading value.

The 20 percent rule is a good starting place, but many other factors should influence your choice of leading. Line length is one. With long lines, too little leading causes readers to occasionally read the same line twice, a phenomenon known as doubling. Longer lines benefit from more leading.

Type size should also influence how much leading you use. Headline type (14-point or larger) generally needs more leading than body type (8- to 12-point). Type that's smaller than 8-point sometimes needs more than 20 percent leading to make the tiny type appear less dense.

The rule, "Large type requires more leading," doesn't always apply to headlines. Headlines often look better when set *solid*—with no extra space. (For example, a 24-point headline set solid has 24 points of space between base lines.) With some fonts, you might even consider *minus line spacing*, such as 22-point leading with 24-point type. Just watch that one

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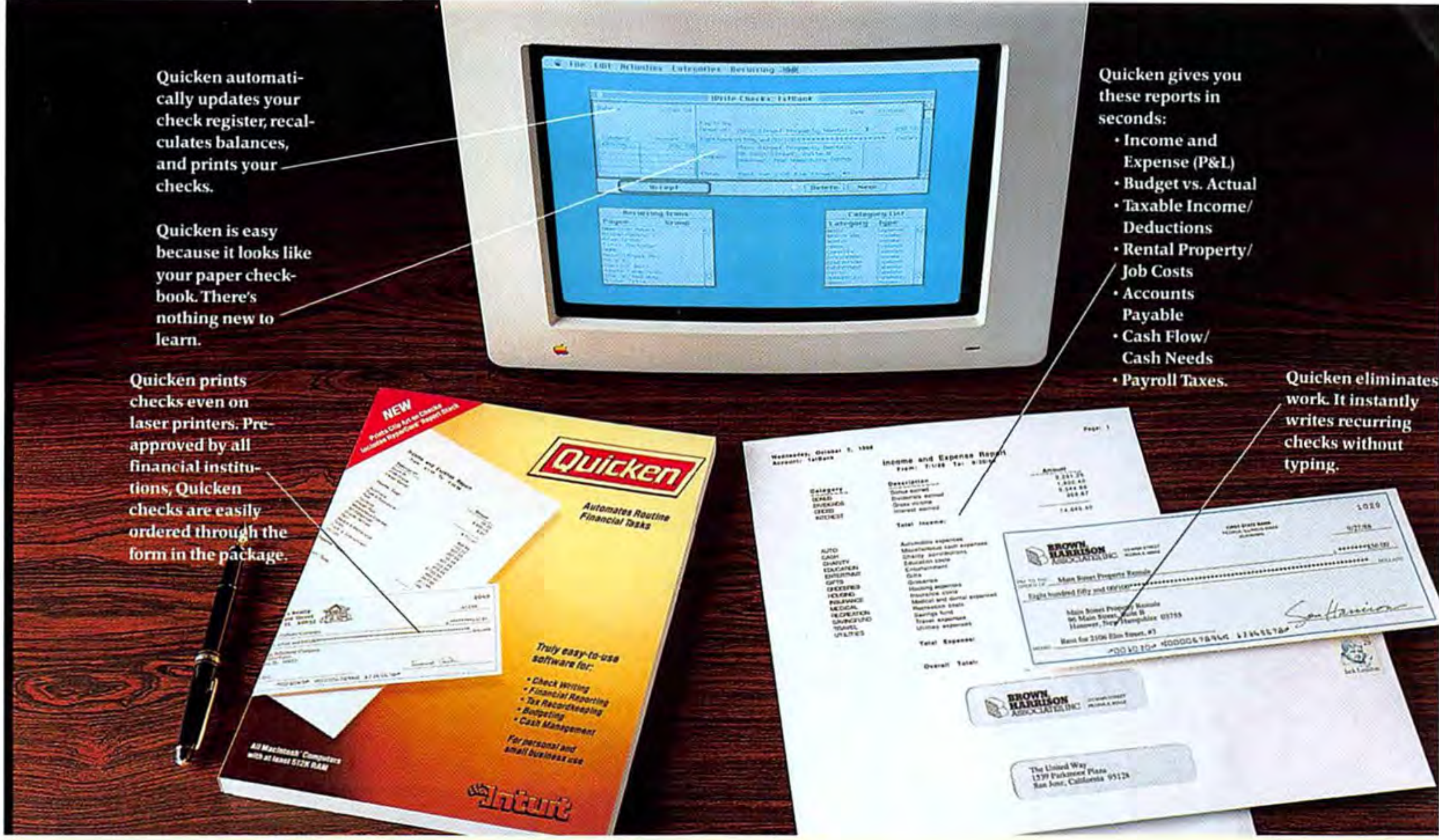
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One rule of thumb for determining line length states that a line should be wide enough to accommodate 2.5 lowercase alphabets in the typeface and size you plan to use. This works out to roughly 8 to 11 words per line—not so many that the eye gets lost, but enough to retain the smooth flow of the text.

How Long a Line?
One way to determine the ideal line length for a given font and size is to type $2^1/_2$ lowercase alphabets, as demonstrated here in 10-point Optima.

line's *descenders* don't touch the next line's *ascenders*.

When specifying type size and leading, designers write a kind of fraction in which the type size is the numerator and the leading is the denominator. For example, 10-point type and 12 points of leading from base line to base line is specified as 10/12, and pronounced *ten on twelve* or *ten over twelve*.

ALIGNMENT ISSUES

Another major aspect of type formatting concerns the alignment of the left and right margins. You're probably familiar with the three most common forms of alignment: *flush left, ragged right; justified;* and *flush right, ragged left*. But which to use, and when?

Traditionally, large passages of text have been set justified. Many designers believe that neatly aligned left and right margins are best suited to sustained reading because they give pages a quiet look that lets readers concentrate on content.

To justify text, word processors add space between each word. Some desktop publishing programs, including Aldus PageMaker and QuarkXpress, can also add space between each character, a process called *letterspacing*. Letterspacing helps eliminate the large word spaces and the *rivers* of white space that can occur (see "Justifying Your Actions"). Hyphenation also helps, although you should never hyphenate more than two or three consecutive lines.

These days, ragged-right margins have become more popular, even in such bastions of justification as textbooks and magazines. Ragged-right text requires fewer hyphenations, and its consistent word and letterspacing give it a clean, even texture (see "Running Ragged"). And because the eyes stop at a different point in each line, it can actually be less fatiguing to read than justified text.

As for the other alignment options—

(continues)

Justified text, long preferred for its smooth appearance, is less readable when there's too much space between words. Distracting "rivers" of white space can appear. This problem is especially common with narrow column measures. Letter spacing and hyphenation can help eliminate the problem.

Justified text, long preferred for its smooth appearance, is less readable when there's too much space between words. Distracting "rivers" of white space can appear. This problem is especially common with narrow column measures. Letter spacing and hyphenation can help eliminate the problem.

Justifying Your Actions
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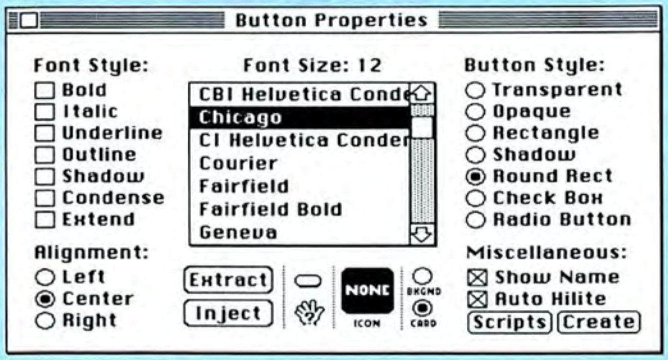

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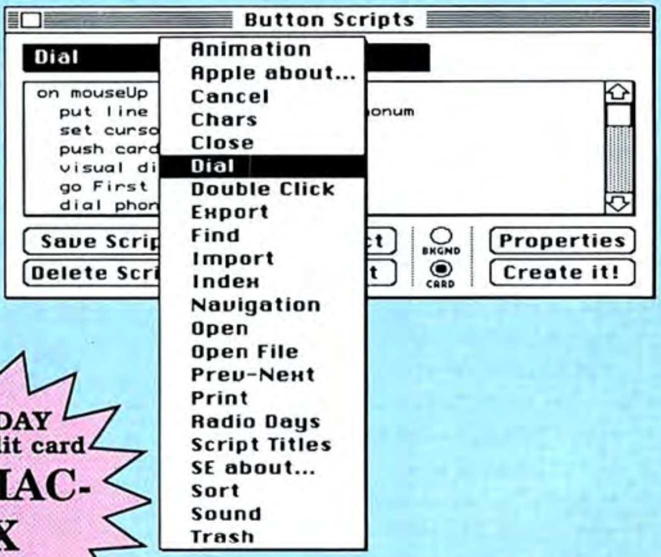

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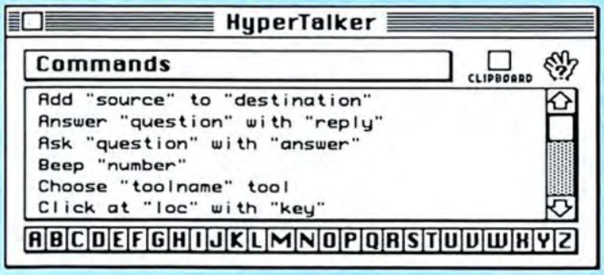

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Whether a ragged-right margin is more
readable depends in part on the contour, or *rag*,
of the right margin. A good rag has a rhythm, with
text alternating between longer lines and shorter
ones. The best typographers ensure that each line
ending contributes to the margin's profile, even if
they have to break certain lines by hand.

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by hand.

Running Ragged
In the top paragraph, notice how most lines hover around the same width, making the right margin look poorly justified, not ragged. When the word with is brought down to the next line (bottom), the right margin assumes a more ragged contour.

centered and flush-right, ragged left—both can be effective in small doses. Centering, for example, is ideal for short passages such as headlines. But because centered and ragged-left text force you to hunt for the start of each line, they can be hard to read in large doses.

TYPE ON DISPLAY

Headlines and other large, attention-getting blocks of type are called display type. Showing attention to detail in display type is an important step in making documents look professionally typeset.

With display type intended to grab the reader's interest, you might be tempted to use all capital letters for added oomph. Resist the urge. A mix of upper- and lowercase characters gives words an overall shape that aids in recognition; text set in *all caps* lacks these patterns. It's generally better to capitalize only the first letter of important words, leaving conjunctions and articles such as *and, in,* and *the* lowercase. That way you won't put undue emphasis on less important words.

Once you've settled on case, concentrate on the space between characters and words. In large type sizes, most fonts produce too much space between certain character pairs. You can improve the look by tightening those spaced-out pairs, a process called *kerning*.

In smaller type sizes, kerning usually involves tightening only certain letter pairs, such as *To* or *Av*. But in large sizes, almost every combination of characters is a candidate (see "Kerned versus Unkerned"). Use the manual-kerning features in your desktop publishing program or word processor to remove space between characters until they are tight, but not touching. Also decrease the spaces between words. Just be sure to apply the same degree of kerning and word spacing throughout a document. Inconsistent spacing is worse than none at all.

A variation on the letter spacing theme in headlines involves adding space between each character to obtain an airy, elegant effect. This letterspacing technique can be effective when used spar-

(continues)

You'll say, "wow."

You'll say, "wow."

Kerned versus Unkerned
In display type, nearly every character is a candidate for kerning. Here, space was removed between the* Y *and the* o*, around the apostrophe, between the* y *and the comma, between each* w*, and between the period and the closing quotes. A little less space was removed between the* a *and the* y*. Notice how the kerned headline uses less space. This headline was created with Letraset's LetraStudio display-type program, which provides a high-quality screen display and lets you position individual characters by dragging them.

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ELEGANT AND SPACIOUS

TOUGH AS STEEL

TOUGH AS STEEL.

Headline Spacing

Top: Letterspaced headlines can create an airy, dignified effect, especially if you use a typeface with such elegant capitals as ITC Benguiat's. Extra space between words keeps them from running together. Bottom: Heavy, condensed faces such as ITC Machine don't letterspace well and are best set tight. Note the kissing T and O, A and S, and S and T. In the bottom headline, the word spaces were tightened slightly, too. A period gives the slogan added authority.

ingly. Be sure to also add more space between words so they don't run together, and avoid letterspacing heavy, condensed typefaces such as Adobe's ITC Machine. Type set in Machine actually looks better when certain characters touch slightly, or *kiss* (see "Headline Spacing").

With body text, you usually let your word processor or publishing program end each line for you. With display type, however, you should take a more active role in determining line breaks. Good typographers end lines at logical stopping points, such as after a comma or a key phrase (see "Breaking for Sense"). The best advertising typographers will also apply this technique to body text.

In headlines containing trademark or copyright symbols, the symbols are usually much too large and obtrusive. Use a smaller type size for the symbol itself, and then move the symbol so that its top aligns with the top of the text (also see "Breaking for Sense").

THE FORM FACTOR

One document that imposes some unique typographic requirements is the form. Forms range in size and style from reply

(continues)

Breaking for Sense
Readability of display type (here 18-point Futura Extra Bold) is improved by breaking each line at a logical stopping point. Extra leading before the final sentence adds emphasis. This example also shows how to deal with a large, distracting register mark: select it and choose a smaller type size (in this case, 8-point). Then move it until its top aligns with the top of the text.

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cards, with their blank lines for name and address, to tax forms, with their dozens of cubbyholes and instructions. If you use a database manager, you probably use on-screen forms to enter and view data.

A form's primary purpose is to obtain and present information in a structured format. The first step in creating that sense of order is to select clean, readable typefaces. Sans serif fonts such as Helvetica and News Gothic are particularly well suited to forms (just ask the IRS). Univers is another sans serif font that works well in forms.

When designing forms, group related information together. If the form will be filled out by hand, leave enough space for people to write comfortably. Put 18 to 24 points of space between each line, and make lines enough to accommodate long names and addresses.

Creating on-screen forms for data entry requires similar considerations, with an added twist: most laser printer fonts don't have particularly readable screen fonts. The Mac's screen resolution is roughly one-fourth that of a laser printer's, and that's insufficient to render the subtleties of most fonts accurately.

One solution is to use fonts designed for the Mac's screen, such as New York and Geneva. On laser printers, however, these fonts print poorly. The best method is to use separate forms for data entry and report printing. Use readable screen fonts such as New York, Geneva, and Courier for data-entry forms, and laser-printer fonts for report-printing forms.

CHARACTER CAUTIONS

One of the easiest ways to make documents look typeset is to replace the Mac's typewriter-like punctuation characters with ones typesetters use. (See "Getting Started with Desktop Publishing," page 260, February 1988, for a complete list of these characters plus other type tips.)

A few more cautions: Avoid gimmicky font styles such as shadow and outline. Also think twice about using the *small-caps* option that many programs provide. To create small caps, typesetting systems provide special fonts in which the small capitals are drawn to match the texture and line thickness of the large capitals. On the Mac, programs with small-caps options simply use a smaller type size for the small capitals. The resulting small caps don't match the large ones, giving the text an uneven appearance.

Finally, avoid superimposing type over a gray-shaded background. Type is most legible when it's easily distinguished from the background; black-on-gray isn't exactly a high-contrast combination.

BIBLIOGRAPHY

I've run out of space, but I doubt that *Macworld*'s art director is willing to shrink the point size of this column to give me more room. To learn more about typography, read the following books: *Designing with Type,* by James Craig (Watson-Guptill Publications, 1971); *Graphic Design for the Electronic Age,* by Jan White (Watson-Guptill Publications, 1988); *Basic Typography,* by John R. Biggs (Watson-Guptill Publications, 1968); and *Design Principles for Desktop Publishers,* by Tom Lichty (Scott, Foresman and Company, 1989).

You'll find more information on basic text formatting in last October's "Getting Started with Word Processing." And when you're ready to start modifying typefaces and creating special effects, see "Enhancing PostScript Fonts," *Macworld,* May 1989.

Two more excellent sources of type tips are Adobe's *Font & Function* and the quarterly *U&lc* catalogs.

As you create and format documents, remember that the best type is the one that's appropriate to the message it conveys. Every formatting command you issue should be aimed at improving your document's readability. Aaron Burns, chairman of the International Typeface Corporation, summed it up when he said, "In typography, function is of major importance; form is secondary; and fashion, almost meaningless." ▣

See *Where to Buy* for contact information.

Macworld *contributing editor Jim Heid is a former typographer and former member of the International Typographer's Union. He is currently writing an advanced user's guide to the Mac, to be published this year by Brady Books.*

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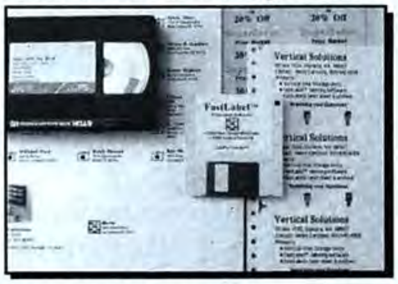

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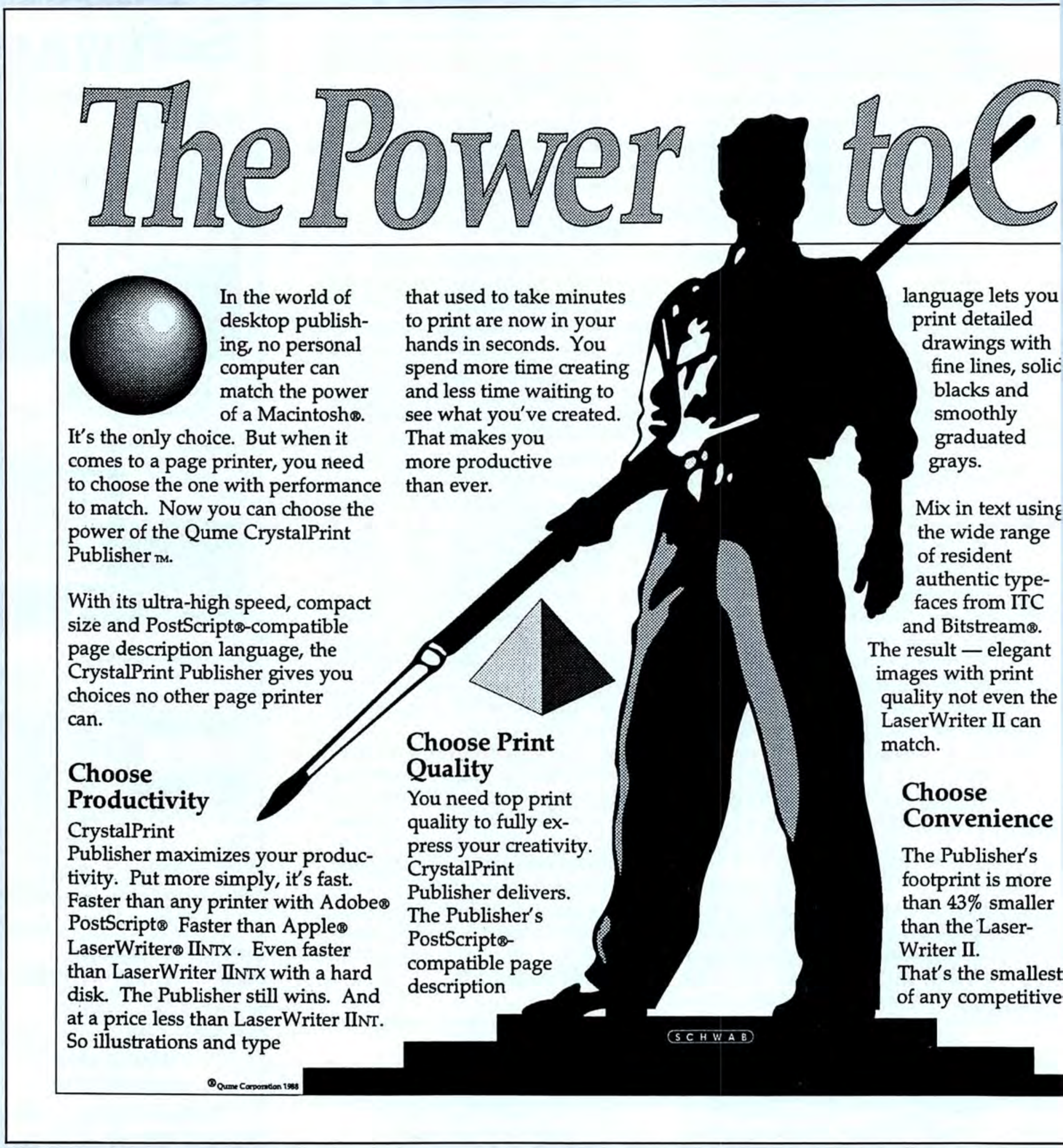

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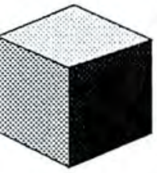

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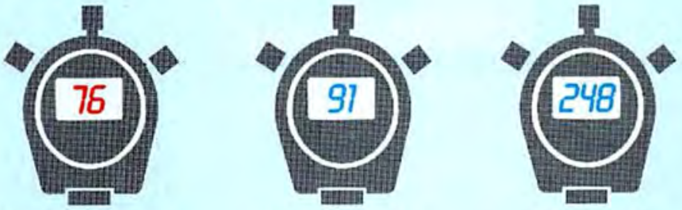

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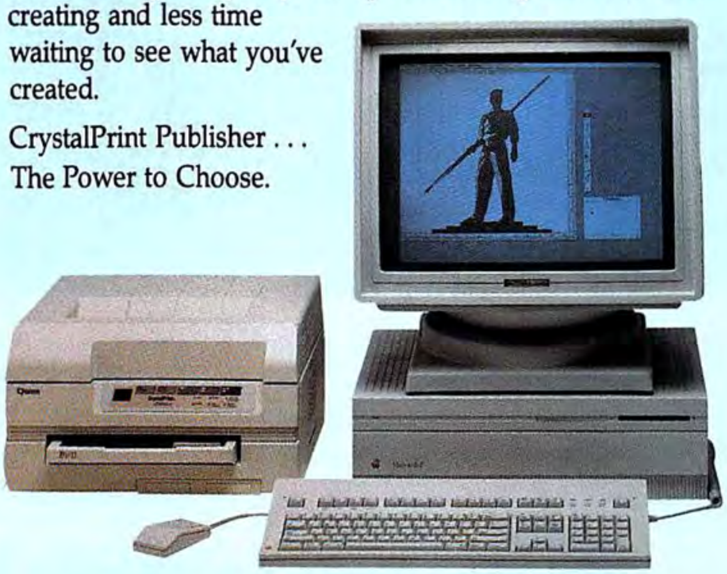

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Insights on Microsoft Word 4.0

Tips on using Word's new features

by Michael Sloan

Microsoft Word 4.0 is here. It's full of new features: big ones like Page View, which shows multicolumn formatting while allowing you to edit; small ones like a word counter that counts characters, words, lines, and paragraphs. Word 4.0's look—windows, menus, dialog boxes—has changed too. The commands are grouped more logically (compared to Word 3.0), and current Word users should adapt quickly to the new arrangement.

YOUR WISH IS WORD'S COMMAND

Like most programs, Word 4.0 has many more commands (273 at last count) than will fit within its pull-down menus. These commands are normally accessed through dialog boxes. Some commands have keyboard equivalents such as ⌘-S for Save. Word 4.0 lets you assign your own keyboard equivalents to any command. Here's how.

If you're in Full Menus mode, pull down the Edit menu, and you'll see Commands at the bottom of the menu. Notice that it doesn't have a keyboard equivalent. Let's add one. Select Commands. "At Your Command" shows the resulting dialog box. Scroll through the command list, find Blue, and select it. Next, click the Add button in the Keys section of the dialog box, and Word prompts you for a keystroke equivalent. For example, press Shift-→. (If you try to assign a keystroke already in use, Word warns you and asks if you really want to reassign the keystroke.) The keystroke appears in the Keys list box. Close the dialog box.

MARK ULRICH

Pull down the Edit menu and look at Commands. A keystroke equivalent is now listed. Release the menu without selecting Blue and try the new keystroke.

Assigning (or removing) keystroke equivalents is one of the two functions of the Commands dialog box. The other lets you add or remove any command in any menu, giving you complete control over the contents of Word's menus. You can even create a menu in the menu bar, and fill it with your choice of commands.

If you have a color monitor and printer, for example, you might want to place Word's eight color commands (Red, Green, Blue, Yellow, Magenta, Cyan, Black, and White) in the Work menu. Just select a color from the list in the Commands dialog box, choose Work from the drop-down Menu list, and click the Add button. If you haven't yet placed any commands in the Work menu, Word creates the menu and then inserts the command. If you select a command that is currently in a menu, the Add button changes to a Remove button. Click Remove, and the command disappears from the menu. You can use Remove and Add to switch commands from one menu to another if Word's initial arrangement doesn't suit you.

STATE YOUR PREFERENCES

You can customize Word with any or all of the features listed under Preferences in the Edit menu. Desktop publishers should go for Picture Placeholders, which replaces any picture you've inserted into text with a blank hole of the same size. This really improves the scrolling speed; redrawing pictures is time consuming.

You can activate the Keep Program in Memory and Keep File in Memory options for the current session by checking the options' Now boxes. If you want an option to be permanently activated, click the Always box. The options increase

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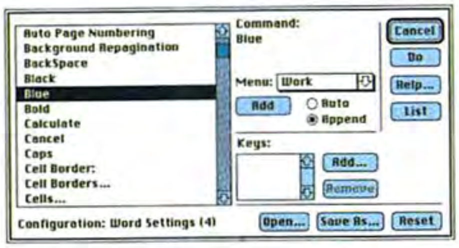


Command: Blue

Menu: Work

Configuration: Word Settings (4)

At Your Command
The Command dialog box lets you assign your own keyboard equivalents. Command configurations are stored in Word Settings files. You can append command changes to Word's standard Settings file, or you can create one or more personalized settings files.

Word's performance when activated, but to use both of them, you need more than 1 megabyte of memory.

My personal favorite among the Preferences is "Smart" Quotes. This option automatically converts the standard quote symbol (") into the more attractive, curvy symbols (“ and ”) as you type.

A VIEW TO FORMATTING

One of the criticisms leveled at Word 3.0 was that while you could display multicolumn text using Page Preview, you couldn't edit in this view. Word 4.0 has solved that problem nicely with Page View, a fully interactive, dynamic view under the Document menu. (You can toggle between Galley View, the default, and Page View by pressing ⌘-B.) Aside from displaying multiple columns as they will print, Page View shows all margins, including headers and footers.

Formatting text is quite easy. Suppose you want a single headline over two columns of text. Simply place your cursor below the headline and insert a section mark by pressing ⌘-Enter. Select Section from the Format menu and in the resulting dialog box type **2** for columns and **.25** for spacing between the columns. Choose No Break from the Start drop-down menu. Click on Okay and the text reformats itself.

TURNING THE TABLES

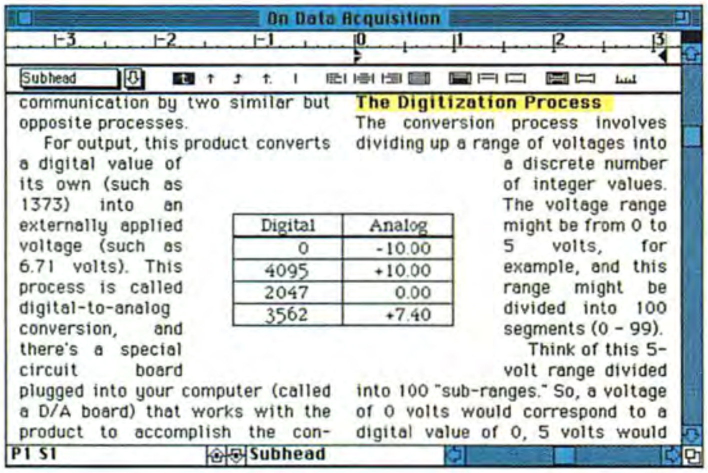
Microsoft has added some much-needed table-generation commands to Word. Suppose you want to create a table similar to the one shown in "A New View." Start by choosing Insert Table from the Document menu. Select Show Table Gridlines in the Preferences dialog box. Specify two columns and five rows, and change the default column spacing to 1 inch (see "Table Hopping"). Click on OK. Word creates a table with two columns and five rows. Because you selected Show Table Gridlines, thin lines separate the ten sections, or cells, of the table. The lines don't print; they're just there to outline the cells.

Entering table data is easy. Place the cursor in the upper left cell and type in an entry. Press the Tab key to move the cursor over one cell to the right. When you reach the end of a row, pressing Tab moves the cursor to the beginning of the next row. Enter the data shown in "A New View," and don't worry about alignment.

If you click the scale icon in the Ruler, T-shape markers appear at the right edge of each column—moving a marker changes the width of selected cells. Let's center the

(continues)

A New View
You can view and edit multiple columns in Word's new Page View. The ruler has some useful additions, including a drop-down style-sheet menu in the lower left corner. Click on the down arrow and you can see and apply any style sheet to any paragraph in the current document.



communication by two similar but opposite processes.

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The Digitization Process

The conversion process involves dividing up a range of voltages into a discrete number of integer values. The voltage range might be from 0 to 5 volts, for example, and this range might be divided into 100 segments (0 - 99).

Think of this 5-volt range divided into 100 "sub-ranges." So, a voltage of 0 volts would correspond to a digital value of 0, 5 volts would

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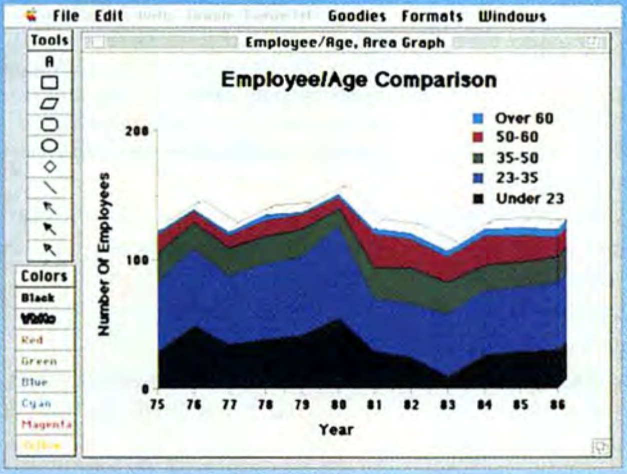

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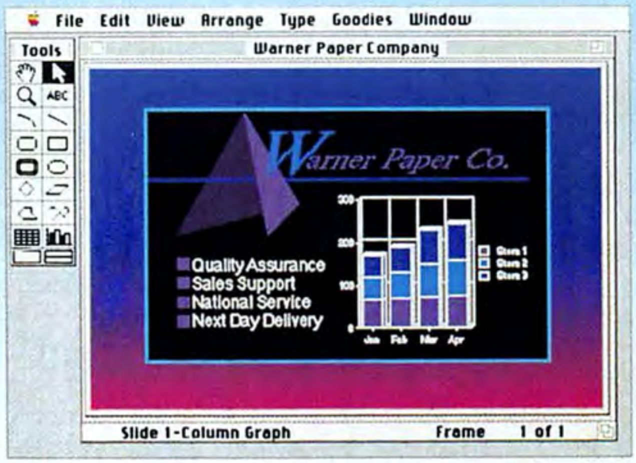

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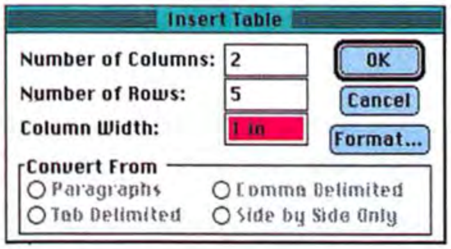


Number of Columns: 2
Number of Rows: 5
Column Width: 1 in
Convert From
○ Paragraphs ○ Comma Delimited
○ Tab Delimited ○ Side by Side Only

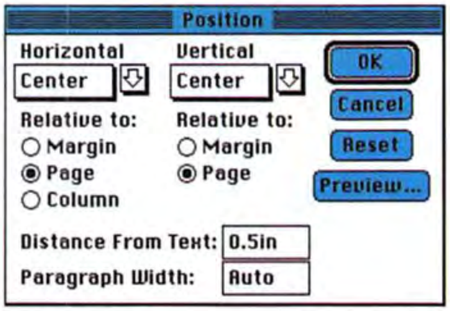
Table Hopping
The Insert Table dialog box allows you to create tables from text in any of the four formats listed as Convert From options. Clicking the Format button creates a table and displays the Cell dialog box.

entries in the first row. Select the top two cells, then click on the centering alignment icon in the Ruler. (Press ⌘-R to display the ruler.)

Now let's align the numbers. Click on the Ruler's decimal tab icon to select it. Then highlight the four cells under the word *Digital,* and insert a decimal tab at the ⅝-inch mark. Do the same thing with the four cells under *Analog.*

As a finishing touch, let's surround each cell with a border and draw a thick line between the first and second rows. Highlight the entire table and choose Cells from the Format menu. Click on the Borders button in the Cells dialog box to display the Cell Borders dialog box. Choose the Every Cell in Selection option; accept the default thin border line; and click at the left, right, top, and bottom of the displayed cell. Click OK in the Cell Borders dialog box, and in the Cells dialog box. (You might want to add the Cell Borders command to the Format menu if you do a lot of tabular work.)

To place a thick line between the first and second rows, highlight the cells in the top row, and display the Cell Borders dialog box. Again choose Every Cell in Selection. Choose the thick line. Then click at the bottom of the displayed cell to apply the thick line to the bottom border. Close the dialog box and you'll see that a thick line now separates the first two rows of the table. Border lines come in five styles: single, thick, double, dotted, and hairline. Hairline borders appear the same as single-line borders on screen, but then print as hairlines on a laser printer.



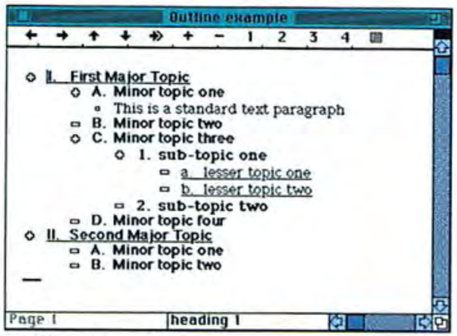
Horizontal: Center
Relative to:
○ Margin
● Page
○ Column

Vertical: Center
Relative to:
○ Margin
● Page

Distance From Text: 0.5in
Paragraph Width: Auto

Prime Position
The Position dialog box lets you easily place a graphic or table within text. Click the Preview button to see Word's Print Preview display showing a reduced view of two complete pages.

You can convert existing text into a table, too. Suppose you have a list of names and addresses with each entry on its own line. Just highlight the entire list and choose Insert Table. Use the number of entries per record as the Number of Columns value, and choose Paragraphs as



- I. First Major Topic
  - A. Minor topic one
    - This is a standard text paragraph
  - B. Minor topic two
  - C. Minor topic three
    - 1. sub-topic one
      - a. lesser topic one
      - b. lesser topic two
    - 2. sub-topic two
  - D. Minor topic four
- II. Second Major Topic
  - A. Minor topic one
  - B. Minor topic two

Outline Example
The Outline View displays its own specialized ruler with icons for promoting, demoting, and moving headings. Other icons allow you to determine what levels of heading to display. (For example, clicking on the number 2 displays level 1 and level 2 headings only.)

the Convert From option. Word 4.0 does the rest. (You can also convert tables back to text.) If entries are separated by Tabs instead of being on separate lines, choose the Tab Delimited option. This is a very flexible table generator. And you can sort the table by the data in any column. Just highlight the column and choose Sort from the Utilities menu.

HOLD THAT POSITION

How do you get text to flow around a picture? Let's use the table we just created as a graphic and insert it into the middle of a two-column page.

First, convert the table into a graphic. Select the entire table, then use the Copy as Picture command (press ⌘-Shift-D). This places a picture of the selected text in the Clipboard. Next, create a two-column document by selecting Section from the Format menu and typing **2** in the Number box and **.5 in** for spacing between columns. With an extended keyboard you can press F14 for Page View (or press ⌘-B or simply choose it from the Document menu), and then place the cursor anywhere you want the table to appear. Paste the table into the page, select the table, and choose Position from the Format menu.

Choose the Center option in the Horizontal and Vertical menus and make both of them relative to the page (see "Prime Position"). The Distance From Text value controls the gap between the graphic and the surrounding text. I used 0.5 inch in this example. Click OK, and Word places the table in the middle of the page.

Word 4.0 is designed to let you use graphics easily—so easily, in fact, that drawings created with MacPaint or SuperPaint can be opened directly into Word 4.0. You use the same Open command that you would for opening a text file. (By the way, SuperPaint is included in the Word 4.0 package.)

WHO'S COUNTING?

Each time you save a document, Word shows you the total number of characters. But if you want more information about the document, select Word Count from the Utilities menu to display a dialog box that shows the number of characters, words, lines, and paragraphs in a document. If you've entered footnotes, Word shows the same four statistics for footnotes separately.

(continues)

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EASIER FIND AND CHANGE

Microsoft has included many small improvements in this version of Word. The Find and Change commands are one example. You can now paste text from the Clipboard into the Find What and Change To text boxes to avoid retyping.

AN OUTLINE FOR SUCCESS

Outlines help you to focus your thoughts so that you can write clearly and logically. Word 4.0 has a separate Outline View in which you can create an outline and then add text under the various headings and subheadings. "Outline Example" shows Word 4.0's outline view, its special ruler, and a sample outline.

To create an outline, open a new document and select Outlining from the Document menu. You'll probably want to list several minor topics under a major heading. Type the name of the first major topic and press Return. Don't number or letter outline topics; Word numbers them for you. Now click on the right arrow on the Outline ruler and type in an item that is subordinate to the first major topic. Word automatically indents this item ½ inch relative to the level above. Or create the item first, then indent it by selecting the right arrow. You click the left arrow to create a major heading. (Word supports up to nine levels of outline headings; major headings appear in boldface.)

Now number the headings by selecting Renumber from the Utilities menu. Type **I.A.1.a.** into the Format box of the Renumber dialog to duplicate the numbering used in "Outline Example."

To type ordinary text under any heading, place the cursor at the end of the heading line, press Return, and click the double arrow icon on the outline ruler. This sets the paragraph to Normal style text. When numbering an outline, Word ignores text paragraphs.

Notice that all the lines in "Outline Example" begin with a symbol. The plus symbol denotes a heading with one or more subordinate headings or text paragraphs under it. If you click on this symbol, the heading and everything subordinate to it will be highlighted. If you click the right arrow on the ruler, all the highlighted headings will move down one level in the outline's hierarchy. If you click the up or down arrow on the ruler, highlighted headings move up or down one line, respectively. You can use the Renumber command to renumber headings after you rearrange them.

FORMULATING FRACTIONS

Word's formula generator is actually a feature carried over from the earlier version. For those of us who need to type equations, or just fractions, this feature is a godsend. Suppose, for example, you wanted to type a stock's closing price, 36 $^5/_8$. You could type the fraction as **5/8**, but try this instead. First, choose the Show Paragraph command in the Edit menu. Type **36** and then press ⌘-Option-backslash (\). This character (.\) alerts the formula generator to interpret the text that follows it as a formula. Now type, with no spaces, **F(5,8)**. Word displays the fraction when you select the hide paragraph command from the Edit menu. If you're feeling adventuresome, type the following expression and see how Word displays it: .\F(–B±R(B^2–4AC),2A)

(Note: The plus-or-minus [±] symbol is produced by pressing Option-Shift-equal sign [=]. To superscript the 2, highlight it and press ⌘-Shift-equal sign [=].)

All in all, Word 4.0 is a significant improvement over its predecessor. Microsoft has apparently listened to its customers' suggestions (and complaints) and has released a product that addresses most, if not all, of them.

SHARING THE WEALTH

If you've found a shortcut or undocumented trick not mentioned here, spread the word to other readers by sending it to *Quick Tips, Macworld,* 501 Second St., San Francisco, CA 94107.

See Where to Buy *for contact information.*

Michael Sloan is the author of Word Power: The Complete Guide to Microsoft Word 3.0 for the Macintosh *(Scott, Foresman & Company, 1989). He is currently updating his book for Word 4.0. Formerly a senior engineer with Apple Computer, he is on the staff of the Illinois Mathematics and Science Academy.*

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

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

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

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

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

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

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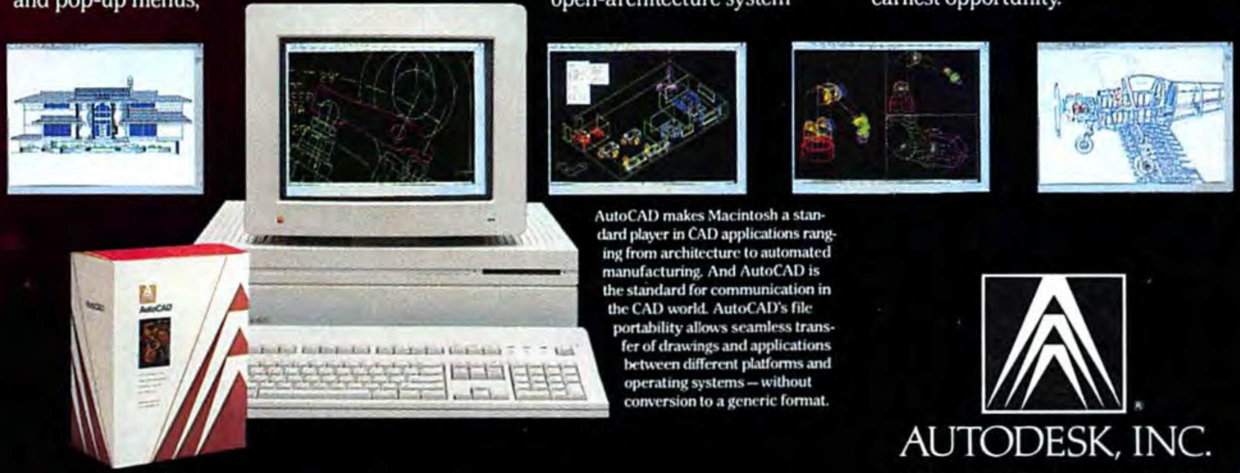

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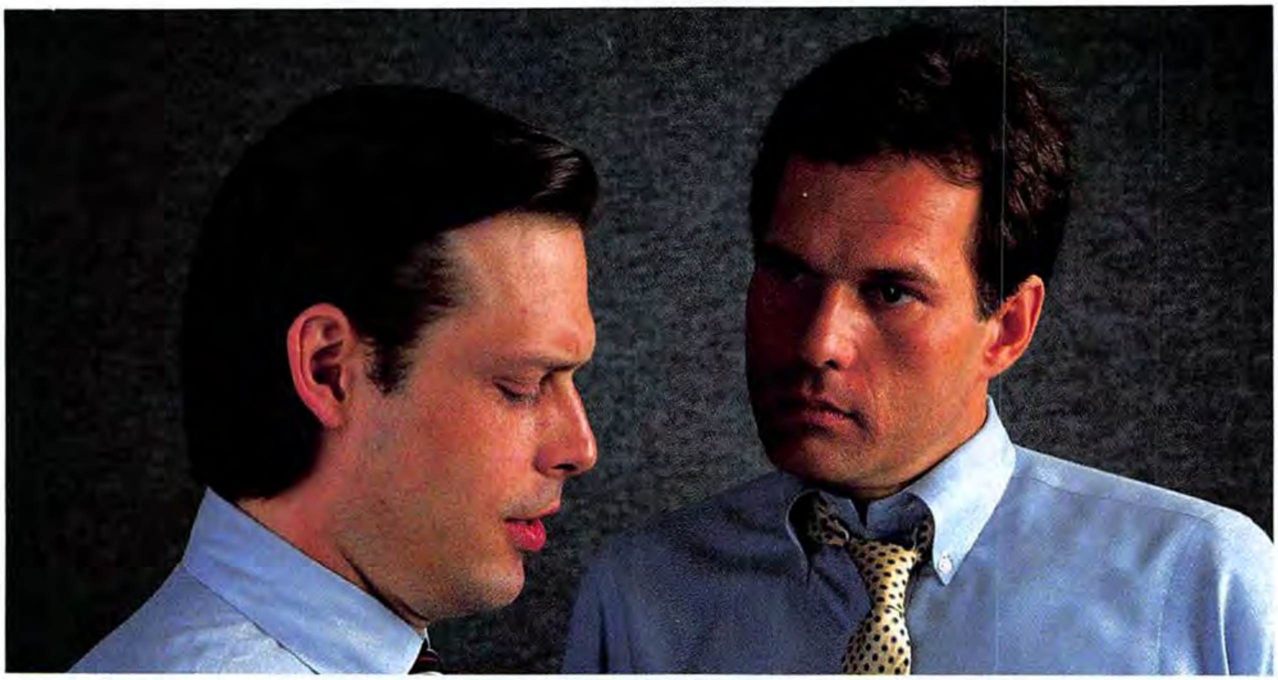

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"You *do* have a right to make a back-up, that's true. But when you start copying programs for your friends and co-workers, that's breaking the law."

"What law? Any copying I do is in the privacy of my own home."

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"You're missing the point. The issue isn't "What can I get away with?"—it's "who am I hurting?" Remember, lots of people worked hard to produce every program you use: designers, programmers, distributors, retailers, not to mention all the people who support users. They have a *right* to be compensated for their efforts, and their major compensation is through software sales."

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UPDATES

This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade cost for registered owners; the second is the current list price.

Aatrix TimeCard version 2.0 interfaces with bar-code readers and employee-ID-card slot readers. Combines with a variety of hardware to allow automated punch-in and punch-out of company-issued time cards, provides employee time calculations, and includes audio greeting and warning of improper ID-card users. Aatrix Software, 405 Bruce Ave., Grand Forks, ND 58206; 701/746-7202. Free; $199 new.

APL.68000 version 7.0 supports the Mac SE and Mac II. Provides APL multitasking. Mac II version also supports MC68881. Spencer Organization, 366 Kinderkamack Rd., Westwood, NJ 07675; 201/666-6011. Mac II version $279; $399 new. Other models $49; $149 new.

ArtRoom version 3.0 contains three additional volumes of clip art that include images of recreation, occasions, and holiday themes. Compatible with both IBM PC and Mac for network users. Supports EPS and PICT formats. Image Club Graphics, 1902 11th St. SE, Calgary, Alberta, Canada T2G 3G2; 403/262-8008. $199 on a subscription basis; $999 new.

Business Sense version 1.2 runs faster than earlier versions and is compatible with laser printers and with the ImageWriter LQ. Monogram Software, 531 Van Ness Ave., Torrance, CA 90501; 714/240-8985. Free to owners with subscription support, $89 for others; $495 new.

CADD Level 1 version 1.1 includes PC/Macintosh translator and additional snaps, including snap midpoint, object, and intersection. Saves as PICT or EPS files and opens as PICT files. Also contains a select all feature. Performs multiline text placement and backward redraw, and adds two new fonts for engineers and architects. Includes sample drawing and symbols. Generic Software, 11911 North Creek Pkwy. S, Bothell, WA 98011; 206/487-2233. Free; $149.95 new.

Cricket Presents version 2.0 comes with AutoPresents feature that can be used with templating tool to automatically create presentations from outlines. Program performs color blending and automatic kerning; imports data saved in SYLK file format; and has an expanded Template Library. Includes a 220,000-word spelling checker and a thesaurus. Cricket Software, Great Valley Corporate Center, 40 Valley Stream Pkwy., Malvern, PA 19355; 215/251-9890. Free; $495 new.

DiskTop version 3.0.4 contains new command features. In the international versions, when the Find command or a folder has too many items to display, DiskTop alerts and advises you. When ejecting a floppy disk under UniFinder, you no longer receive an error. CE Software, 1854 Fuller

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EndNote version 1.1 supports WordPerfect; WriteNow 2.0; and EndLink, which gives you the ability to import data from online bibliographic database services such as dialog and BRS Colleague. Niles and Associates, 2200 Powell, #765, Emeryville, CA 94608-1809; 415/655-6666. Free; $129 new.

HyperCard version 1.2.2 is a maintenance release with additional support for international users. Offers improved display and prints Japanese, Arabic, and other non-Roman alphabets. Also provides international users with support for CD ROM drives. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010. $10; $49 new.

HyperPort Chess version 2.0 allows two people to play chess via modem or over an AppleTalk network. Can also be used as a chess database on a single Mac to store, replay, and analyze games. Checks for legality of moves and includes a comments field. Computer Ingenuity Consulting Associates, Star Rte. 1, Mailbox 110A, McDaniels, KY 40152; 502/257-8065. $10; $49.95 one copy new, $79.95 two copies new.

Laserpaint (Monochrome) version 1.9 adds configurable lasso, freehand PostScript drawing tool, and import and export capability for a variety of file formats including TIFF, PICT, and EPS. Rewritten manual includes tutorials on some of the basic functions. Compatible with all versions of System and Finder. LaserWare, P.O. Box 668, San Rafael, CA 94915; 415/453-9500. Free; $495 new.

MacDraw II version 1.1 contains a slide manager to design, preview, sort, store, and print slides, and a spelling checker with a 100,000-word dictionary. Also has extended metric ruler and a notes feature that lets you add multiple notes to a document. This version exports files via PICT2 and via customizable formats that can be saved to create new defaults for any MacDraw II 1.1 options. Claris, 440 Clyde Ave., Mountain View, CA 94043; 415/960-1500. $30 for MacDraw II 1.0 owners; $200 for original MacDraw owners; $399 new.

MacProject II version 2.0 has automatic and interactive resource leveler, and does cross-project resource analysis. Gathers data from multiple projects and consolidates it through subproject hierarchies. Imports or exports files from a variety of applications running on Macs, MS-DOS machines, and mainframe computers. Creates multiple charts for layering or tiling. Uses HyperCard-based online help system, has spelling checker, and has ability to import graphic objects or pictures. Claris, 440 Clyde Ave., Mountain View, CA 94043; 415/960-1500. $65 if you own version 1.0; $199 if you own original version; $499 new.

McMax version 2.0 supports large screen displays, colors, and fonts. This version introduces user-defined READS feature, which lets developers do object-oriented programming and create modeless applications. Includes serial support for communicating with external devices such as printers, modems, or other computers via Mac modem port. Supports HyperCard's XCMDs. Nantucket, 12555 W. Jefferson Blvd., #300, Los Angeles, CA 90066; 213/390-7923. $39 if originally purchased before

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MACazine
March 1989 / page 52

"I don't know of any other Mac accounting software which contains so many features and modules for the price. . . . This program **[MultiLedger]** is packed with features."
Computers in Accounting
January 1989 / page 21

"My favorite all-around accounting program is CheckMark Software's **MultiLedger/Payroll** set. It was the simplest and most logical program I examined that provided a reasonably full set of accounting capabilities. Its price/performance ratio represents an excellent value."
Macworld
September 1988 / page 169

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Ft. Collins, Colorado USA 80524
303-484-3541 In Canada 416-731-0744

800-444-9922 ext 82

August 1, 1988; free if purchased after; $295 new.

MockPackage Plus Utilities version 4.4 includes five new programs. Ask feature selectively turns on and off start-up utilities. Control-1 enables you to specify which CDEV is active when the Control Panel is opened. FolderShare changes the privileged default setting when creating new folders in AppleShare. LaserStatus is a DA that monitors the use of LaserWriter and PostScript printers, and Widgets is a set of utility functions. Ez-Menu has been rewritten as a CDEV that includes keyboard control of menus. CE Software, 1854 Fuller Rd., West Des Moines, IA 50265; 515/224-1995. $15; $49.95 new.

Navigate version 2.0 adds color for the Mac II. Program displays depth contour lines. Lets you point and click for route planning. Comes bundled with HyperCard chart catalog and supports three additional lorans. Fair Tide Technologies, 18 Ray Ave., Burlington, MA 01803; 617/229-6409, 800/332-3426. Free; monochrome $395 new; color $695 new.

Pegasys II version 3.2 supports large-format digitizing tables for inputting drawings. Journalizing feature automatically creates macros that can be edited and played back to simulate the operator's actions in real time. Replays recorded drawings at three different speeds, automatically saves drawings at predetermined intervals, and lets you retain settings of command options from one work session to the next. Runs on Mac II. IGC Technology, 305 Lennon Ln., Walnut Creek, CA 94598; 415/945-7300. Free; $1795 new.

PropsForms version 2.0 does not require SuperPaint. Can be used with any graphics, word processing, page-layout, or presentation application that can read PICT files. JLA Computer Services, P.O. Box 444, Kulpsville, PA 19443; 215/855-5159. Free; $79 new.

SuperPaint version 2.0 contains AutoTrace, a freehand tool for drawing editable bezier paths, and an airbrush feature to control paint flow. Supports plug-in modules for custom-programmed paint tools. Bitmapped objects in the draw layer can be edited at a user-specified resolution. Transformation functions allow scaling, free rotating, flipping, or slanting of text and objects. Prints and previews in color. Silicon Beach Software, 9770 Carroll Center Rd., Ste. J, San Diego, CA 92126; 619/695-6956. $50; $199 new.

Timeslips III for the Macintosh version 1.1 lets you print bills using various fonts, and includes rates and details of client funds on bills. International money, date, and time formats can be used, based on the System installed. North Edge Software, 239 Western Ave., Essex, MA 01929; 508/768-6100. $50; $299.95 new.

Wall Street Investor version 3.0 includes multiaccount management capabilities, point and figure charts, and online trading with Fidelity Discount Brokerage; allows for file transfer of historical data from other programs. Pro Plus Software, 2150 E. Brown Rd., Mesa, AZ 85203; 602/461-3296. $150; $695 new.

To have products listed in this section, send upgraded software, an outline of major changes since the previous release, upgrade price, suggested retail price, company name, mailing address, and phone number to **Updates, Macworld, 501 Second St., San Francisco, CA 94107.**

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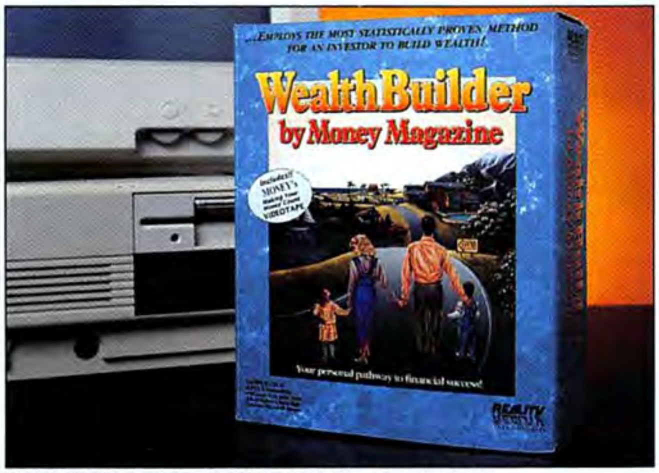
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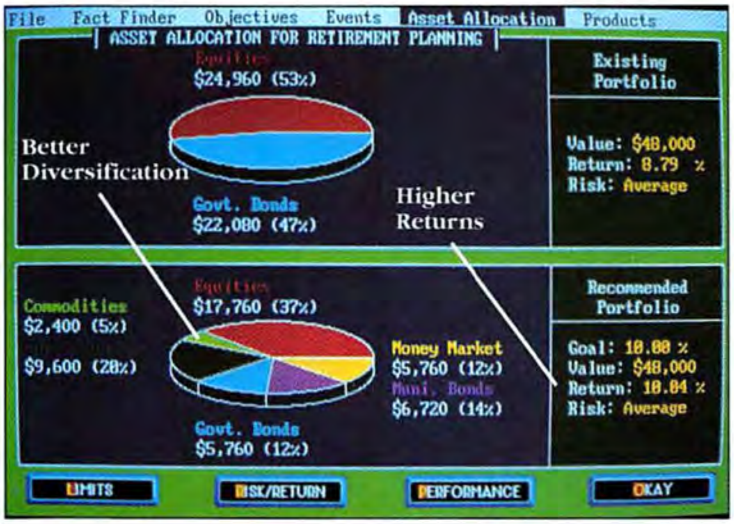

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WHERE TO BUY

This listing provides company addresses and phone numbers for products mentioned in this issue. Allow several weeks for responses to Reader Service Card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

Reader Service

A

750 **Action** Abvent, Inc., 23331 El Toro Rd., #209, El Toro, CA 92630; 714/380-0333.

751 **Aldus FreeHand** Aldus Corp., 411 First Ave. S, Seattle, WA 98104; 206/622-5500.

752 **Aldus Persuasion** Aldus Corp., 411 First Ave. S, Seattle, WA 98104; 206/622-5500.

753 **AppleLine** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

754 **AppleScanner** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

B

755 **BodyElectric** VPL Research, Inc., 656 Bair Island Rd., #304, Redwood City, CA 94063; 415/361-1710.

756 **Business FileVision** Marvelin Corp., 3420 Ocean Park Blvd., #3020, Santa Monica, CA 90405; 213/450-6813.

C

757 **CL/1** Network Innovations Corp., 20863 Stevens Creek Blvd., Cupertino, CA 95014; 408/257-6800.

Reader Service

758 **CLR HyperArrays** Clear Lake Research, 5615 Morningside, #127, Houston, TX 77005; 713/523-7842.

759 **ColorCard** Drexel University/Software Development Group, Office of Computer Services, Philadelphia, PA 19104; 215/895-2667.

760 **CompileIt** Heizer Software, 1941 Oak Park Blvd., #30, Pleasant Hill, CA 94523; 415/943-7667.

761 **Course Builder** Telerobotics International, Inc., 8410 Oak Ridge Hwy., Knoxville, TN 37931; 615/690-5600.

D

762 **Dac-Easy Light** Dac Software, Inc., 17950 Preston Rd., #800, Dallas, TX 75252; 214/248-0205, 800/992-7779.

763 **DAtabase** Preferred Publishers, Inc., 5100 Poplar Ave., #617, Memphis, TN 38137; 901/683-3383.

764 **DataGlove** VPL Research, Inc., 656 Bair Island Rd., #304, Redwood City, CA 94063; 415/361-1710.

765 **dBase Mac** Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319; 213/329-8000.

766 **dCalc Programmer's Calculator** DelSoft Software, P.O. Box 1577, Carlsbad, CA 92008; 619/945-2353.

767 **Digital Darkroom** Silicon Beach Software, Inc., P.O. Box 261430, San Diego, CA 92126; 619/695-6956.

Reader Service

768 **Dimensions** Visual Information Development, Inc., 16309 Doublegrove St., La Puente, CA 91744; 818/918-8834.

769 **DiskExpress** ALSoft, Inc., P.O. Box 927, Spring, TX 77383-0927; 713/353-4090.

770 **DynaPerspective** Dynaware, 1163 Chess Dr., Ste. J, Foster City, CA 94404; 415/349-5700, 800/444-3962.

E

771 **EdgeWriter** EdgeWriter Film/Video Systems, 30 Berry St., San Francisco, CA 94107; 415/957-1744.

772 **Empower** Magna, 2540 N. First St., #302, San Jose, CA 95151; 408/433-5467.

F

773 **FastLabel** Vertical Solutions, P.O. Box 7535, Olympia, WA 98507; 206/352-2097, 800/942-4008.

774 **FileMaker II** Claris Corp., 440 Clyde Ave., Mountain View, CA 94043; 415/960-1500, 800/334-3535.

775 **Focal Point II** Mediagenic, 3885 Bohannon Dr., Menlo Park, CA 94025; 415/329-0800.

H

776 **HyperAnimator** Bright Star Technology, Inc., 14450 N.E. 29th Pl., #220, Bellevue, WA 98007; 206/885-5446.

Reader Service

777 **HyperCard** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

778 **HyperCard VideoDisc Toolkit** APDA/Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

779 **HyperComposer** Addison-Wesley Publishing Co., Rte. 128/Jacob Way, Reading, MA 01867; 617/944-3700.

780 **HyperEngine** Symmetry Corp., 761 E. University Dr., Ste. C, Mesa, AZ 85203; 602/844-2199, 800/624-2485.

781 **HyperScan** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

782 **HyperTMON** Icom Simulations, Inc., 648 S. Wheeling Rd., Wheeling, IL 60090; 312/520-4440.

I

783 **Intelligent Communications Processor** AST Research, Inc., 2121 Alton Ave., Irvine, CA 92714-4992; 714/863-1333.

784 **Interfax 12/48** Abaton, 48431 Milmont Dr., Fremont, CA 94538; 415/683-2226, 800/444-5321.

785 **Interpreter Dimensions** Visual Information Development, Inc., 16309 Doublegrove St., La Puente, CA 91744; 818/918-8834.

(continues)

L

786 **LetraStudio** Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653; 201/845-6100, 800/526-9703.

787 **Lightspeed Pascal** Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 408/253-9600.

M

788 **MacAPPC** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

789 **MacBlast** Communications Research Group, 5615 Corporate Blvd., Baton Rouge, LA 70808; 504/923-0888.

790 **MacIrma SE** Digital Communications Associates, Inc., 1000 Alderman Dr., Alpharetta, GA 30201; 404/442-4000, 800/241-4762.

791 **MacIrma II** Digital Communications Associates, Inc., 1000 Alderman Dr., Alpharetta, GA 30201; 404/442-4000, 800/241-4762.

792 **MacMainFrame DX** Avatar Corp., 99 South St., Hopkinton, MA 01748; 508/435-6872, 800/289-2526.

793 **MacMainFrame SE** Avatar Corp., 99 South St., Hopkinton, MA 01748; 508/435-6872, 800/289-2526.

794 **MacMainFrame II** Avatar Corp., 99 South St., Hopkinton, MA 01748; 508/435-6872, 800/289-2526.

795 **MacMainFrame II/DFT** Avatar Corp., 99 South St., Hopkinton, MA 01748; 508/435-6872, 800/289-2526.

796 **MacMovies** Beck-Tech, 41 Tunnel Rd., Berkeley, CA 94705; 415/548-4054.

797 **MacRecorder** Farallon Computing, 2150 Kittredge St., Berkeley, CA 95709; 415/849-2331.

798 **MacroMind Director** MacroMind, Inc., 410 Townsend St. #408, San Francisco, CA 94107; 415/442-0200.

799 **MacTerminal** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

800 **Mac3270** Simware, Inc., 20 Colonnade Road, Ottawa, Ontario, Canada K2E 7M6; 613/727-1779.

801 **MacWorkStation** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

802 **MacWrite II** Claris Corp., 440 Clyde Ave., Mountain View, CA 94043; 415/960-1500, 800/334-3535.

803 **Matrix TT200** Matrix Instruments, Inc., 1 Ramland Rd., Orangeburg, NY 10962; 914/365-0190, 800/852-8533.

804 **Mean 18 Ultimate Golf** Accolade, Inc., 550 S. Winchester Blvd., #200, San Jose, CA 95128; 408/985-1700.

• **Microsoft File** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.

• **Microsoft Word** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.

805 **Milo** Paracomp, 123 Townsend St., #310, San Francisco, CA 94107; 415/543-3848.

806 **More II** Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 408/253-9600.

807 **Movie Magic Budgeting** Screenplay Systems, 150 E. Olive, #305, Burbank, CA 91501; 818/843-6557.

808 **Movie Magic Budgeting/Breakdown** Screenplay Systems, 150 E. Olive, #305, Burbank, CA 91501; 818/843-6557.

809 **MultiDisk** ALSoft, Inc., P.O. Box 927, Spring, TX 77383-0927; 713/353-4090.

N

810 **Nemesis Go Master** Toyogo, Inc., 76 Bedford St., #34-C, Lexington, MA 02173; 617/861-0488.

811 **NetModem V2400** Shiva Corp., 155 Second St., Cambridge, MA 02141; 617/864-8500, 800/458-3550.

812 **Netway 1000A** Tri-Data Systems, 1450 Kifer Rd., Santa Clara, CA 94086; 408/746-2900, 800/874-3282.

O

813 **Oracle** Oracle Corp., 20 Davis Dr., Belmont, CA 94002; 415/598-8000.

814 **Oracle for Macintosh** Oracle Corp., 20 Davis Dr., Belmont, CA 94002; 415/598-8000.

P

815 **PageMaker** Aldus Corp., 411 First Ave. S, Seattle, WA 98104; 206/622-5500.

816 **Panorama** ProVue Development Corp., 15180 Transistor Ln., Huntington Beach, CA 92649; 714/892-8199.

817 **PCOX/Coax-M** Novell, Inc., 1157 San Antonio Rd., Mountain View, CA 94043-1069; 415/969-1999.

818 **PCOX/Multi-M** Novell, Inc., 1157 San Antonio Rd., Mountain View, CA 94043-1069; 415/969-1999.

819 **PC Tools Deluxe** Central Point Software, Inc., 15220 Greenbrier Pkwy., #200, Beaverton, OR 97006; 503/690-8090.

820 **PhotoShop** Adobe Systems, Inc., P.O. Box 7900, Mountain View, CA 94039-7900; 415/961-4400, 800/833-6687.

• **Plus** Format Software GmbH, Widdersdorferstrasse 236-240, 5000 Cologne 30, West Germany; 49-221-4972075.

821 **PostScript typefaces** Adobe Systems, Inc., P.O. Box 7900, Mountain View, CA 94039-7900; 415/961-4400, 800/833-6687.

Q

822 **QuarkXPress** Quark, Inc., 300 S. Jackson, #100, Denver, CO 80209; 303/934-2211, 800/356-9363.

R

823 **RayTrace Dimensions** Visual Information Development, Inc., 16309 Doublegrove St., La Puente, CA 91744; 818/918-8834.

824 **Record Holder Plus** Software Discoveries, Inc., 137 Krawski Dr., S. Windsor, CT 06074; 203/872-1024, 800/437-5200.

825 **Reflex Plus** Borland International, P.O. Box 660005, Scotts Valley, CA 95066-0005; 408/438-8400, 800/255-8008.

826 **RenderMan for the Mac** Pixar, 3240 Kerner Blvd., San Rafael, CA 94901; 415/258-8100.

827 **RenderMan Interface** Pixar, 3240 Kerner Blvd., San Rafael, CA 94901; 415/258-8100.

828 **RenderMan Shading Language** Pixar, 3240 Kerner Blvd., San Rafael, CA 94901; 415/258-8100.

S

829 **Screen Recorder** Farallon Computing, 2150 Kittredge St., Berkeley, CA 95709; 415/849-2331.

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830 **Scriptor** Screenplay Systems, 150 E. Olive, #305, Burbank, CA 91501; 818/843-6557.

831 **SMPTE Calculator** EdgeWriter Film/Video Systems, 30 Berry St., San Francisco, CA 94107; 415/957-1744.

832 **SpaceEdit** Abvent, Inc., 23331 El Toro Rd., #209, El Toro, CA 92630; 714/380-0333.

833 **StoryCard** FiniteArts/Shareware, P.O. Box 1739, San Anselmo, CA 94960.

834 **Studio/1** Electronic Arts, P.O. Box 7530, San Mateo, CA 94403; 415/571-7171, 800/245-4525.

835 **SuperCard** Silicon Beach Software, Inc., PO Box 261430, San Diego, CA 92126; 619/695-6956.

836 **Super 3D** Silicon Beach Software, Inc., P.O. Box 261430, San Diego, CA 92126; 619/695-6956.

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837 **Swivel 3D** Paracomp, 123 Townsend St., #310, San Francisco, CA 94107; 415/543-3848.

T

838 **3DWorks/RenderWorks** MacroMind, Inc., 410 Townsend St., #408, San Francisco, CA 94107; 415/442-0200.

839 **TapeOp** Master Digital, 1749 14th St., Santa Monica, CA 90404; 213/452-1511.

V

840 **Vantage** Preferred Publishers, Inc., 5100 Poplar Ave., #617, Memphis, TN 38137; 901/683-3383.

841 **VideoWorks II** MacroMind, Inc., 410 Townsend St., #408, San Francisco, CA 94107; 415/442-0200.

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842 **VideoWorks II Accelerator** MacroMind, Inc., 410 Townsend St., #408, San Francisco, CA 94107; 415/442-0200.

843 **VideoWorks HyperCard Driver** MacroMind, Inc., 410 Townsend St., #408, San Francisco, CA 94107; 415/442-0200.

W

844 **Wingz** Informix Software, Inc., 16011 College Blvd., Lenexa, KS 66219; 913/492-3800.

845 **World Builder** Silicon Beach Software, Inc., P.O. Box 261430, San Diego, CA 92126; 619-695-6956.

846 **World Class Leader Board** Access Software, Inc., 545 W. 500 St., Bountiful, UT 84010; 801/298-9077, 800/824-2549.

Reader Service

Z

847 **Zoom** Abvent, Inc., 23331 El Toro Rd., #209, El Toro, CA 92630; 714/380-0333. M

Public domain software 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 Budgetbytes (800/356-3551 for orders, 913/271-6022 in Kansas), Educomp (800/843-9497, 619/259-0255 in California), or the Public Domain Exchange (800/331-8125, 408/496-0624 in California).

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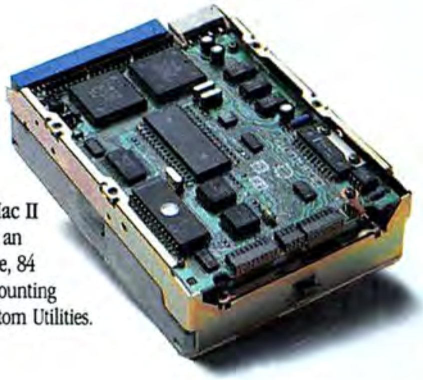

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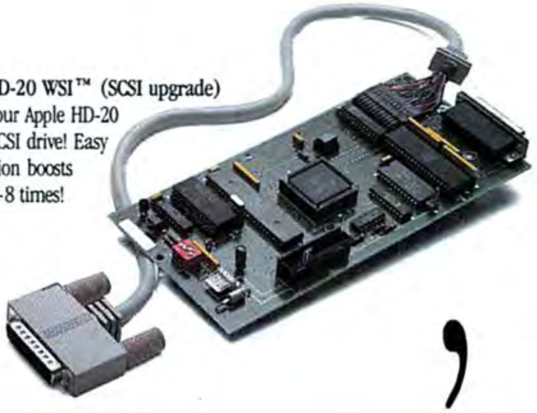

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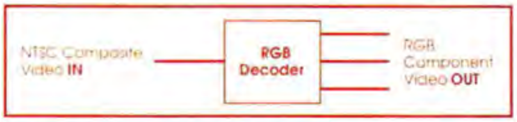

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MicroNet 30 *38ms*	$579.	**$569.**
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Conner 40 *28ms*	$669.	**$639.**
MacBest 45 *28ms*	$599.	**$579.**
MicroNet 46 *40ms*	$649.	**$569.**
Quantum 40* *19ms*	$699.	**$649.**
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MacBest 60 *28ms*	$729.	**$649.**
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MacBest 80 *28ms*	$849.	**$779.**
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CDC 150 *17ms*	$1,579.	**$1,475.**
MicroNet (CDC) 173 *18ms*	$1,649.	**$1,599.**
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40 Megabyte		
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MacBest 45 *28ms*	$499.	**$479.**
Quantum 40* *19ms*	$599.	**$569.**
80 Megabyte		
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MacBest 80 *28ms*	$749.	**$679.**
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90-100 Megabyte		
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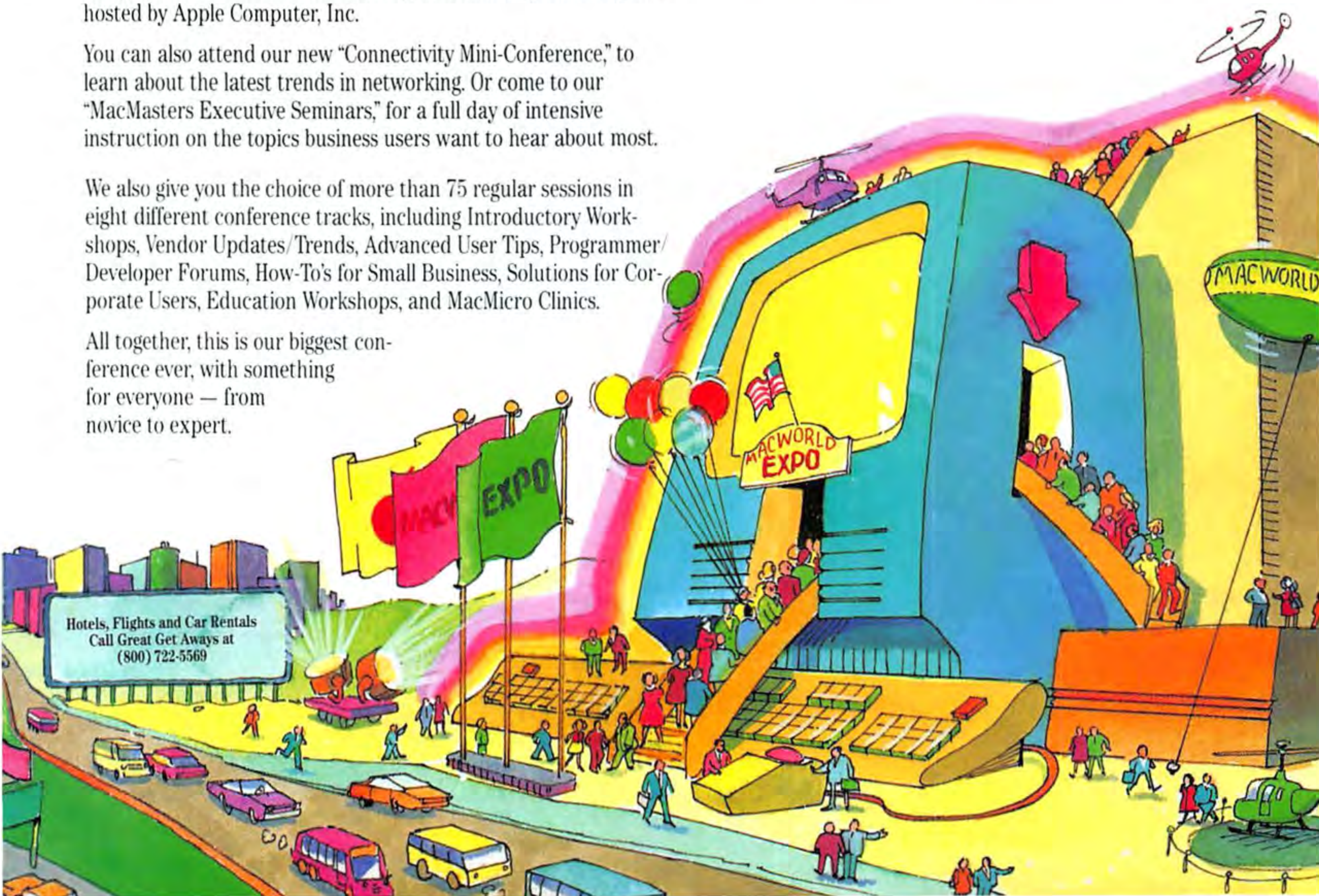

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Boston, August 10, 11 and 12

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Boston, August 10, 11 and 12

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- l. ☐ Other (specify) ____

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Size of your organization (number of employees national/international)
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Which personal computer(s) do you own/or use?
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- ff. ☐ Macintosh Plus
- gg. ☐ Macintosh SE
- hh. ☐ Macintosh II
- ii. ☐ Apple II Series
- jj. ☐ IBM PC (or compatible)
- kk. ☐ None
- ll. ☐ Other (specify) ____

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mm. ☐	Approve purchase	☐	☐	☐
nn. ☐	Develop/manufacture	☐	☐	☐
oo. ☐	Evaluate/select vendor	☐	☐	☐
pp. ☐	Own	☐	☐	☐
qq. ☐	Purchase or acquire	☐	☐	☐
rr. ☐	Recommend to others	☐	☐	☐
ss. ☐	Sell	☐	☐	☐
tt. ☐	Train people to use	☐	☐	☐
uu. ☐	Other (specify) ____	☐	☐	☐

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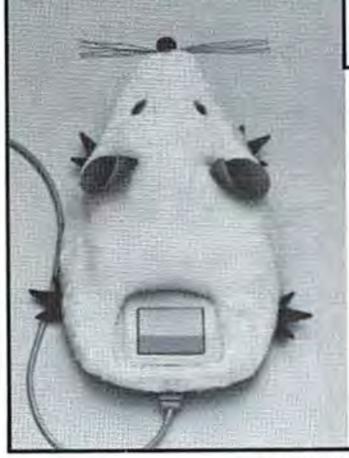

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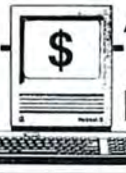

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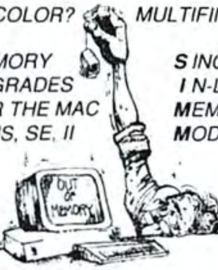

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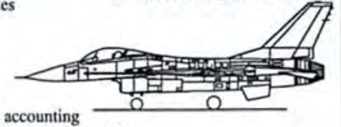

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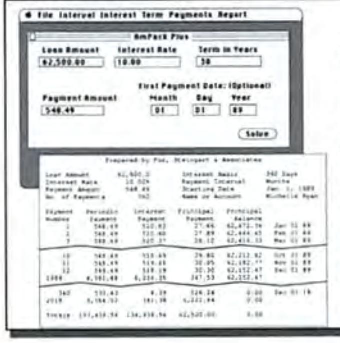

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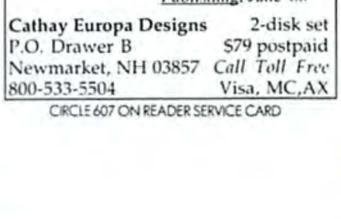

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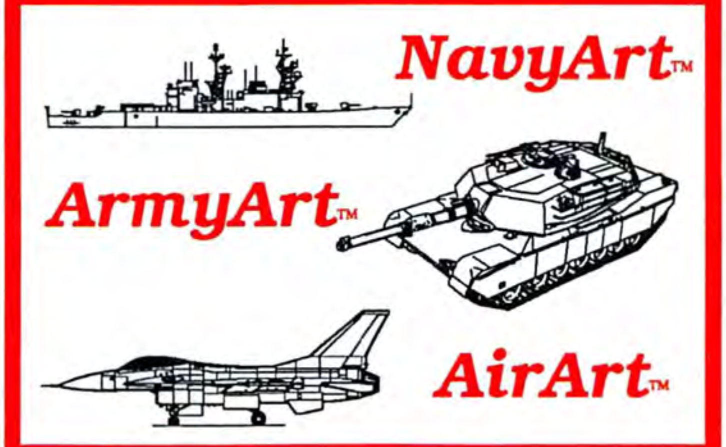

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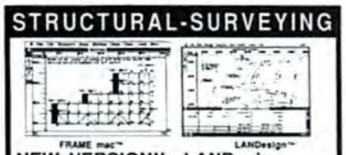

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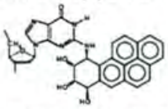

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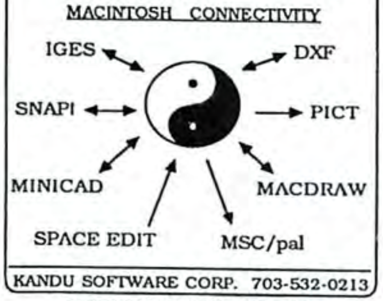

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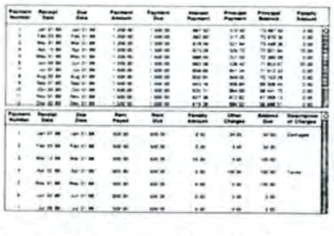

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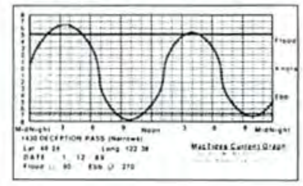

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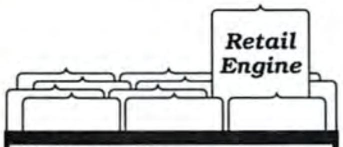

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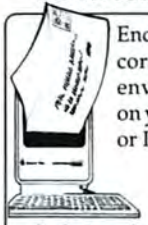

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BEST-SELLERS

Months on chart	Last month	This month	BUSINESS SOFTWARE
28	1	1	**Microsoft Works** *Microsoft*
40	3	2	**Microsoft Excel** *Microsoft*
49	2	3	**Microsoft Word** *Microsoft*
36	4	4	**PageMaker** *Aldus*
38	9	5	**MacDraw** *Claris*
9	6	6	**WordPerfect for the Macintosh** *WordPerfect*
8	—	7	**FileMaker II** *Claris*
25	8	8	**MacWrite** *Claris*
8	—	9	**Adobe Illustrator/Illustrator 88** *Adobe*
3	—	10	**FreeHand** *Aldus*

▼	▼	▼	EDUCATION SOFTWARE
3	1	1	**Where in the World Is Carmen Sandiego?** *Brøderbund*
32	2	2	**Math Blaster** *Davidson & Associates*
16	3	3	**Reader Rabbit** *The Learning Company*
29	4	4	**Typing Tutor** *Simon & Schuster Computer Software*
29	5	5	**KidsTime** *Great Wave Software*

▼	▼	▼	ENTERTAINMENT SOFTWARE
31	1	1	**Flight Simulator** *Microsoft*
28	3	2	**Dark Castle** *Silicon Beach Software*
32	2	3	**MacGolf** *PCAI*
13	4	4	**Falcon** *Spectrum HoloByte*
12	5	5	**Beyond Dark Castle** *Silicon Beach Software*

▼	▼	▼	NETWORKING/DATA COMMUNICATIONS
28	1	1	**TOPS** *TOPS*
24	2	2	**AppleShare** *Apple Computer*
31	—	3	**LocalTalk** *Apple Computer*
4	4	4	**MacLink Plus** *DataViz*
19	3	5	**PhoneNet** *Farallon Computing*

Months on chart	Last month	This month	HARD DISKS*
6	3	1	**EMAC 20 External** *Everex*
9	1	2	**MacStack SD20** *CMS Enhancements*
15	—	3	**FX20** *General Computer*
16	5	4	**Rodime 20 Plus External** *Rodime*
5	—	5	**Rodime 45 Plus External** *Rodime*

▼	▼	▼	ADD-IN BOARDS
19	1	1	**Radius Accelerator** *Radius*
6	2	2	**Radius Interface Display** *Radius*
18	5	3	**Apple 2MB Memory Expansion Kit** *Apple Computer*
11	3	4	**Macintosh II Video Card** *Apple Computer*
17	4	5	**Apple 1MB Memory Expansion Kit** *Apple Computer*

PRODUCT WATCH

Editors' choice of other recent or forthcoming products of particular interest.

MicroPhone II *Software Ventures* communications software

SimCity *Maxis Software* simulates process of city development

SlideWriter *Matrix* film recorder

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during February 1989.

**Does not include hard disks installed at the factory.*

The WriteNow difference:
Ease, Performance, and...

	WriteNow 2.0	MacWrite 5.0	MS Write	MS Word 3.01
Spelling checker size	**100,000 words**	100,000 words	80,000 words	80,000 words
Font size range	**4-127 pts.**	7-24 pts.	7-72 pts.	2-127 pts.
Maximum recommended document size (in pages)	**Over 2,000**	240	50	500
Number of open documents	**Unlimited ***	1	30	30
Mail merge	**Yes**	No	No	Yes
Number of editable, on-screen columns (WYSIWYG)	**4**	1	1	1
On-screen auto-numbering footnotes	**Yes**	No	No	No
Automatic repagination	**Yes**	Yes	No	No
Graphics in same line as text	**Yes**	No	Yes	Yes
Multiple headers and footers	**Yes**	No	No	Yes
Extensive Undo	**Yes**	No	No	No
Variable line spacing (in points)	**Yes**	No	No	Yes
Selective font, size, style, and ruler changes	**Yes**	No	No	Yes
MacUser Magazine's Best New Word Processor	**Yes**	No	No	No
Search for a word	**2.4** *sec*	7.6 *sec*	9.5 *sec*	9.7 *sec*
Spell Check document	**6.3** *sec*	2 *min* 34.0 *sec*	2 *min* 2.3 *sec*	1 *min* 48.0 *sec*
Copy & Paste large area	**6.8** *sec*	1 *min* 0.9 *sec*	12.4 *sec*	12.3 *sec*
Change font size of document	**10.7** *sec*	50.2 *sec*	17.6 *sec*	16.2 *sec*
Change font of document	**10.8** *sec*	37.1 *sec*	14.1 *sec*	15.2 *sec*
'Save As' a 12-page document	**3.6** *sec*	9.4 *sec*	20.3 *sec*	19.6 *sec*
Retail Price	**$195**	$125	$175	$395
Happy Users	***Yes***	?	?	?

* Number determined by Macintosh system constraints.

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Case Change • Hide Pictures Option • "Smart Quotes"
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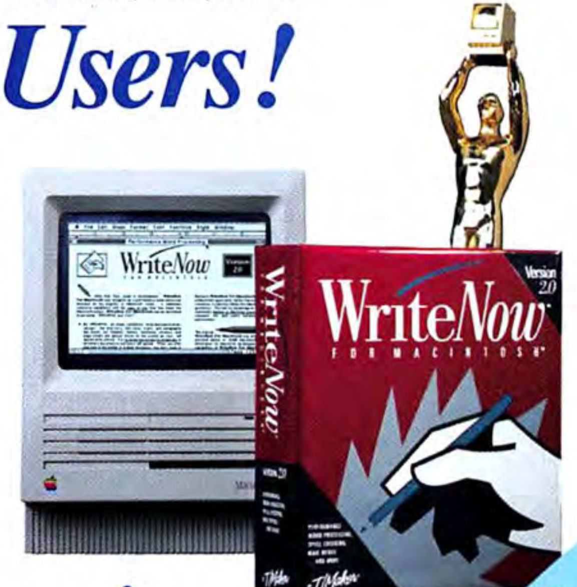

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