The Virus Threat

How to protect your Mac

Word, WordPerfect, and FullWrite: How They Compare

Best HyperCard Stacks of 1988

Backup: Four Easy Solutions

Buying Your First Mac: What You Need to Know
We have yet to meet the word processor that’s perfect for everyone right out of the box.
Which is why we’ve built into Microsoft Word version 3 the unique ability to be customized to fit the way you work.

From modifying menus to filing away frequently used formats to designing your own dictionary, Word gives you more ways to turn our word processor into your word processor.

Don’t like what’s on the menu? Change it.

Menus should list the fonts and formats you use all the time. Not the ones you hardly ever use.

So you’ll appreciate how easy it is in Word to add the formats you want. And remove the ones you don’t.

Want quick access to your LaserWriter fonts, paragraph borders, or some other favorite format? Just add them to your menus.
Want to take Monaco off the frequent font list? Simply delete it. You can still use it whenever you want to; it’s just not cluttering up your menu.

And Word’s menus are so easy to customize, you can make a change in less time than it takes to read this sentence.

You might say they’re your passport to easier writing.

Microsoft Word makes it easy to create custom menus that list as many fonts as you want to work with.
Add a menu.
Subtract steps.

Microsoft Word lets you add a special menu that saves so much work it's called the Work Menu.

Add a Work Menu to the typical office and you may just see some very atypical productivity increases.

That's because the Work Menu saves steps by putting your favorite formats, boilerplate text entries, and even document names a quick mouse click away.

More changes for the better.

There are lots of other ways you can make Word yours and yours alone.

Create your own custom styles—like that tricky boxed paragraph with the 13-point line spacing, tight letterspacing, and boldfaced, italicized text. And re-use it instantly for consistency in one document or across several.

You can also have your own glossary for storing text that you'd rather not retype every time you need it. Part 1 (b) of the standard agreement, for instance.

And, of course, you can even customize Word's 80,000-word dictionary by adding your own unique terms.

Make our Word your Word.

Ask your local Microsoft dealer to show you all of the ways Word is designed to fit you better than any other Macintosh word processor. Call (800) 541-1261, Dept. F76 for the names of dealers near you.

In no time at all you'll be sailing through customs.

Free writing help.

Get Microsoft Word 3.02 now and you'll also get a free thesaurus, free macro program, and free upgrade to the next version of Word. Ask your Microsoft dealer for details.

Microsoft Word
On the Cover
Computer viruses have infected Macintosh systems and applications. See tips for safeguarding your Mac on p. 92. (Photo by Fred Stimson.)

Departments
13 Mac Bulletin
   Late-breaking news.
19 David Bunnell
25 Letters
37 Commentary/Jerry Borrell
53 Steven Levy
193 New Products
   A quick look at new Macintosh software, hardware, and accessories.
215 How To/Quick Tips
   Creating math worksheets, scrolling linked HyperCard fields, multicolumn mailing labels in Word, and more.
235 How To/Getting Started with Scanners
   An introduction to the world of image processing and halftoning.
263 How To/Insights on Cricket Graph
   Tips for making your point more efficiently.
279 How To/Printer Tools
   Hitching your Mac to a non-Apple dot matrix or daisy wheel printer—is it worth the hassle?
293 Updates
   The latest software upgrade news.
323 Where to Buy
   Contact information for products in this issue.
328 Best-Sellers

Check out the computers behind Michael Dukakis. They're Macintoshes (p. 71).

69 Macworld News

- Apple Connects with New Scanner
  Innovative software makes scanning easier.
- Color Images Find Their Avalon
  Complete color pages without leaving your Mac.
- Max Headroom, Move Over
  Interactive talking heads enliven your applications.

Plus, ray tracing comes to the Mac, communicating with HyperCard, Macs at the Demo Convention, and more.
Features

92 Mad Macs
Macintosh viruses exposed. How to protect your system against infection.

102 How to Buy a Macintosh
Find out which Mac hardware fits your personal-computer profile.

112 SuperStacks
Fifteen hot HyperCard stacks walk away with the prizes in Macworld's first stackware contest.

122 The Great Write-Off
Word, FullWrite, and WordPerfect compete in a word processing marathon.

136 Why Say No to Backup?
It's the perfect peripheral—until it crashes. Choose from 50 of the best backup devices.

Reviews

148 FileMaker II
The original

150 MacDraw II
Remake of a

152 AppleCD SC
Apple's first CD ROM drive.

154 Super 3D 1.0
Three-dimensional drawing.

158 PC Viewer Model PCV 6448C+2
Projecting portable presentations.

158 Extend 1.05
Simulation construction set.

160 MacTell 3.4
Telecommunications with a French accent.

164 TeleNode 1.0
Remote access to LocalTalk.

166 SupraModem 2400
Fast, inexpensive, and reliable.

168 Kurta IS/ADB, Penworks 1.0
Kurta's mouse alternative.

170 Lunar Rescue 1.0
Arcade-style strategy game.

172 Retriever 1.0
A convenient DA database.

174 Where in the World Is Carmen Sandiego? 1.0
Learning geography the fun way.

176 40MB Tape Backups
Units from Tecmar and Tallgrass.

180 Symantec Utilities for Macintosh 1.0
Great disk-recovery utilities.

182 Color Monitors for the Mac II
MegaTrend/2 and Auto-Sync 1019/SP monitors.

186 Window Shopping
Products for securing your Mac.
Reaching For the Right Balance

Software to Balance Your Macintosh™ (512Ke, Plus, SE, II) Skills

DISKWORLD is one 3½" disk full of quality software for your Macintosh, delivered to your door every month for only $6.65 an issue. DISKWORLD gives you just the right balance of useful applications for home or work as well as entertaining games and features. Each month you’ll receive from five to ten quality, original programs (not public domain) depending on the size of each program.

Get the Most from Your Macintosh

Every month, you can rely on the vast experience of our editors and programmers to provide you with carefully selected software you can use. Each monthly issue contains valuable features such as: ready-to-run applications, games, utilities, new clip art, new fonts, tutorials, desk accessories, HyperCard™ stacks, FKeys, INIT’s, product reviews and much more. With our easy-to-follow documentation on disk and our standard Macintosh menu system, you’ll master each new application with confidence and ease.

Your Best Software Value

Without investing a fortune, DISKWORLD will convince you that your Macintosh is the most versatile and powerful tool you own. You’ll learn more about your Macintosh, its capabilities, and available software, than you now believe possible. At $6.65 an issue—you just can’t find a better software value for your Macintosh than DISKWORLD.

FREE SOFTWARE—With a 3-Month Trial Subscription

DISKWORLD is sent to you each month on an 800K 3½” disk. Try DISKWORLD for three months for only $19.95 (that’s only $6.65 an issue) and receive “The DISKWORLD Sampler” absolutely free. This bonus disk contains more new games, fonts, and clip art for your Macintosh.

Guaranteed Satisfaction or Your Money Back

As software publishers since 1981, we at SOFTDISK INC. guarantee the quality of all our software products. If you are not fully satisfied with DISKWORLD return your first issue for a full refund. “The Sampler Disk” is yours to keep. You can’t lose. Order today with the attached coupon or call toll free 1-800-831-2694.

Call Toll Free 1-800-831-2694

Macintosh and HyperCard are trademarks of Apple Computer Inc.

Circle 300 on reader service card
Now you can buy your Macintosh II with a powerful tool which will dramatically increase your productivity with every use.

A Radius Display.

Radius offers displays for every type of Macintosh user and every Macintosh software application.

If you're involved primarily in intensive word processing and database management, we heartily recommend our FPD.

The Radius Full Page Display™ shows you an entire 8½” x 11” paper-like page. With a refresh rate of 69 Hz, it is virtually flicker-free.

Our display is perfectly suited for working with software like Microsoft Word and 4th Dimension.

If you're incorporating your word processing into page layout and design, we suggest that the Radius Two Page Display™ is clearly the choice for you.

You have the same flicker-free resolution of the FPD with a full two-page horizontal layout. Ideal for viewing a magazine spread. Essential for creating architectural plans.

Or, if you're putting photographs into your Macintosh, our Radius Gray Scale Display™ lets you create and manipulate life-like images in 256 shades of gray across the same expansive TPD.

Scan your photographs, then do your own retouching using Image Studio or Digital Darkroom.

When you're ready, just print out on a LaserWriter or download to a Linotronic. You'll get startlingly beautiful and gratifying results.
REASONS WHY
UR MACINTOSH II AT
ORIZED DEALER.

For professional publishers and engineering designers, the Radius Color Display offers you the latest in digital design, Radius innovation and Trinitron color technology.

You can work with 256 brilliant colors at one time from the Macintosh palette of 16.7 million hues.

Create dazzling layouts with color photos. Draw dynamic 3D color illustrations. Design a new circuit board. Or, simplify a complicated catalogue. All in vivid, living color.

And should you need it, our Color Display is more than willing to work instantly in gray scale. With sharp, crystal clear resolution.

Best of all, no matter which Radius display you do choose, you get the classic Radius firmware.

All of our displays offer you Tear-off Menus which can be positioned anywhere on the screen. And built-in screen savers, control panel access, as well as adjustable menu and menu bar type size.

Our Full Page and Two Page Displays allow you to create bitmap screen dumps. And our Gray Scale and Color Displays let you save any part of your screen in a PICT file.

So before you buy your Macintosh II anywhere else, call 1-408-434-1010 for a brochure and the name of your nearest Radius Authorized Dealer.

It's clearly the thing to do.

Circle 46 on reader service card
Right, it’s efficient. 
Right, it’s great looking. 
Costs an arm and a leg, right?

Wrong.

If you think you can’t afford computer workstation furniture as up-to-date as your Macintosh, think again.

Breakthrough prices. The basic workstation (drawing A) costs less than $275. For under $580, you can set up the intermediate workstation (drawing B). And the full featured workstation (drawing C and photo) is less than $1195. Since the WorkManager™ System is modular, you can start small and add on as your needs—and resources—grow.

Breakthrough design. The WorkManager™ System has the ergonomics of high-priced designer furniture systems. The work surface is the perfect typing height for Mac keyboards, and features a comfortable beveled leading edge. A covered, recessed channel holds cables and surge protectors. Built-in sockets handle WorkManager™ accessories.

Breakthrough construction. Strong, lightweight structural components are molded of steel reinforced Resinite® composite. Molded-in color makes surfaces highly scratch resistant.

The WorkManager™ System. For people who need workstations as advanced as their computers—from the people at MicroComputer Accessories, Inc.

WORKMANAGER™ SYSTEM

USA: 5405 Sandy Place, P.O. Box 66911 • Los Angeles, CA 90066-0911 • Fax 213/306-8379
CANADA: Call 416/259-5031 • In Canada call 800/387-1780 • Telex 0060766 FABCAN • Fax 416/259-5137
EUROPE: Call 32.2.538.6173 • Telex 24088 CETREL • Fax 32.2.537.3777
© Copyright 1988 MicroComputer Accessories, Inc.

Circle 276 on reader service card
Built to

Removable sock liner
Padded collar lining
Velcro ankle strap
Offset eyestay and lacing
Oversized counterpocket
Coarse grain leather forefoot
Air cushion
Toe and heel bumpers
Channel outsole
EVA midsole
All-terrain outsole

Silver View
If you design on a Mac II, a screen that's too small will cramp your style.

That's why you should be looking into a SilverView from Sigma Designs.

At 21", this landscape monitor offers the biggest viewing area anywhere. A full 16" x 12" 2-page spread including rulers and margins.

Which means you can finally work in actual size. A fact that's also made possible by SilverView's 72 dots per inch typesetting standard.

Something else should weigh in our favor.

The gray scale.

Besides black and white, there are SilverView models offering 16 or all 256 different shades of gray. So what you used to leave up to the imagination can now be in all your work. Like subtle halftones or delicate shadings.

SilverView's also remarkably comfortable to work with. Its high contrast flat-screen virtually eliminates glare and distortion. And its unusually high refresh rate delivers rock solid images that never flicker.

To find out just how much better your work can look, call Sigma Designs at (415) 770-0100 today.

Then never scale down your ideas.
WHEN YOU'RE MORE PRODUCTIVE, IT SHOWS.

MORE II: PLANNING, WRITING AND DESKTOP PRESENTATIONS.

Being MORE productive means everything you plan, write, or present is MORE organized. And it shows in everything you do. MORE II's advanced outlining makes it easy to capture, plan, and organize ideas into clear, action-oriented information. Simply type in "To-Do" lists, project schedules, proposals, plans... everything. MORE II automatically creates the outline for you.

The outline makes the show.

Once you have an outline, your art work is done. Because with a double-click of the mouse, any outline becomes a perfectly spaced bullet or organization-type chart instantly. Complete with company logos or art pulled in from other programs. Print the charts and get overheads fast. Or turn them into 35mm slides overnight. For even more graphics, click again and get every art tool imaginable. And because of MORE II's outline, when you change the master slide, the rest change automatically. So making 1000 slides is as easy as making one.

Click on another outline, add a few paragraphs using MORE II's full-power word processing and bingo. You've got a memo. Or a letter. Or a proposal. Add pages, pull in some charts and there's a full-scale report or a board-room quality presentation...totally spell-checked, with text, graphics, fonts and styles to rival anything created on any other program.

Now go live. MORE II includes advanced, live-action meeting technology for slide shows (complete with video effects like dissolves, builds, wipes, and fades) on any MAC connected to virtually any projection device.

BE MORE PRODUCTIVE TODAY.

For planning, writing, and presentations, MORE II shows results. It's the only software that helps you master all three stages in the art of persuasion. Without becoming an artist.

For MORE II product and upgrade* information, call (800)-888-0886 Ext. 747G.

WHEN YOU'RE MORE PRODUCTIVE, IT SHOWS™

SYMANTEC. "MORE owners, upgrade to MORE II now, send an S&H check or money order along with the first page of your manual to MORE II Upgrade, Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014 or call 415-964-4440. Suggested retail price $395. MORE and MORE II are trademarks of Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014. For S&H list or order information, call (800)-888-0886 Ext. 747G.

Circle 215 on reader service card

See Us At Comdex, West Hall Booth #W640
Here It Is: 68030

- It's here at last: a Mac II with the Motorola 68030 CPU, running at 16 MHz, and the 68882 floating-point coprocessor. Although the 030 CPU runs at the same clock speed as the current 68020 CPU, the 030-equipped Mac II is expected to run from 10 to 15 percent faster than the 020-equipped Mac II because of the 030 chip's superior architecture. The CPU itself contains caches (separate areas of very fast memory) for both data and instructions, and runs with one less wait state than the 020. The 68882 floating-point coprocessor will double the floating-point math performance of Mac IIs using the 68881.

The 030 contains a Paged Memory Management Unit (PMMU) on the chip, so the new systems will support virtual memory and true multitasking—as soon as the new Macintosh operating system software is released. Until then, only the A/UX operating system will be able to take advantage of the 68030's memory management functions.

Apple is also offering an equally important new 1.4MB floppy disk drive that can read both 720K and 1.4MB MS-DOS—formatted floppies as well as 400K, 800K, or 1.4MB Mac disks. With version 1.1 of Apple File Exchange software, it can read, write, and format either MS-DOS or Macintosh operating system floppies.

The new Mac II is offered with the 68030 and 68882, 4MB of RAM, and the 1.4MB floppy drive. An internal 80MB hard disk is optional. If you already have a Mac II, there are three ways to upgrade: purchase the new 1.4MB floppy drive and the associated controller chip; buy the new logic board; or add the Motorola 68851 PMMU chip.

GraphistPaintB&W

- The sophisticated image-manipulation of Aba Software's GraphistPaint II Color will soon be available in a black-and-white version for a 1MB Mac Plus, SE, or II. The program, GraphistPaint B&W, replicates every feature of its color counterpart except for the color, gray-scale imaging, and digitization. Both programs offer rapid multiplication, movement, and distortion of images, and the ability to wrap flat images around spheres.

GraphistPaint B&W has all the standard painting tools, and it supports most of the standard file formats for import and export: Paint, PICT, and TIFF. Its new features include Stencil—for sizing, constructing lines, and erasing—and Pixel Brush, which allows you to create a paintbrush from a drawing.

GraphistPaint II Color and GraphistPaint B&W can exchange files, so users of GraphistPaint B&W can colorize their black-and-white creations later on a Mac II. For further information, contact

80MB Tape Backup

- Irwin Magnetics is now shipping the highest-capacity minicartridge tape backup system for the Mac. The Irwin Model 5080 can back up as much as 80MB of hard-disk data on a single, standard DC 2000 minicartridge. When used in conjunction with Irwin's other tape backup systems, it permits data transfer between Macs, IBM PS/2s, and PCs through the simple exchange of pop-in minicartridges.

The self-powered, SCSI-interface Model 5080 features easy-to-use EzTape Iconographic software and error-correction technology. It supports backup functions across all popular local area networks, including AppleShare and TOPS. Any file made available on the network can be backed up remotely by any networked station.

EzTape Iconographic software is compatible with MultiFinder, and a version for Apple's A/UX on the Mac II will soon be available.

The list price of $1695 includes EzTape software, SCSI interface, 256K RAM, and self-contained power supply.

CL/1 Language

Specs Published

- Network Innovations Corporation, an independent subsidiary of Apple, has published the CL/1 Connectivity Language Description, a set of specifications that provides uniform access to shared data from within desktop applications, masking the differences among host operating systems, DBMS brands, and network protocols. CL/1 is the first step toward making transparent access to shared data a standard feature of packaged software. The first CL/1 connection will provide access from within Macintosh applications to host data on Digital VAX systems.

The CL/1 is a key part of Apple's strategy for connecting Macs to corporate information beyond the desktop. Publication of the CL/1 Connectivity Language Description kicks off CL/1 development efforts in earnest. For further information, call Network Innovations, 408/257-6800.

A New Toolbox for Communicators

- Apple has announced the Communications Toolbox, an extension of the current Macintosh Toolbox routines that will allow applications to easily manage communications functions. The Communications Toolbox supports multiple communications channels and provides tools to manage serial ports and the Apple Data Stream protocol. Third-party products are expected to provide tools for SNA, TCP/IP, and DECnet communications. The Communications Toolbox also provides stan
dard interfaces for terminal emulators, and a standard set of file-transfer tools including routines for data encryption and file-format conversion.

Cost-Cutting FaxScan

MDideas is now offering FaxScan for the Mac, a product designed for desktop publishers and people with small businesses who are unable to afford a scanner. FaxScan can transform a stand-alone facsimile machine into a 150- to 300-dpi scanner to import pictures and documents from hard copy. It can also turn a computer into a facsimile receiver, providing half a fax for one-third the cost.

FaxScan connects to a standard stand-alone facsimile machine and to a personal computer via an RS-232C serial interface. By simulating another fax, FaxScan establishes communication with a facsimile machine directly through its phone line. After establishing communication, FaxScan receives data from the facsimile machine and transfers it to the computer in a TIFF or PICT format.

FaxScan is compatible with all stand-alone facsimile machines using Group 2. It works with any Mac, is compatible with MultiFinder, and has an external power supply for use in other countries. It lists for $299.95 and is available through dealers or direct from MDideas. For further information, call MDideas, 1163 Triton Dr., Foster City, CA 94494, 415/573-0580.

ResEditWrap-Up

Apple recently released interim version 1.2b2 of its resource editor, ResEdit, and plans to ship finished version 1.2 in November or December. The interim version reflects eight months of bug-fixing by a five-person team at Apple with an ongoing mandate to improve ResEdit. It also includes some new resource templates for international localization, and a 45-page manual. The finished version will have more bug-fixes, new international resource editors, and a 100-page manual.

The interim version is available from online information services and from many user groups that maintain software libraries. Members of APDA (Apple Programmer's and Developer's Association) can order it from APDA for $10. For APDA membership information, write to 290 S.W. 43rd St., Renton, WA 98055, or phone 206/251-6548. —Lon Poole

Cloning the Mac

Cloning the Macintosh. Many companies think about it. Some have even tried—for example, the Brazilian company Unitron. But Apple's threats of legal action have always put a damper on the idea.

Now, Taiwan-based Happy Joiner Company has shown two Mac-compatible gate-array chip sets at the Compu- text trade show in Taiwan. The gate arrays include a real-time clock chip and a floppy disk controller that's capable of managing two 800K floppy drives. The company, an uninterruptible-power-supply (UPS) vendor, hasn't cloned the Mac ROM yet. But according to Asiatriends, a newsletter on Asian sources of computer products that is published by Trade Media in Hong Kong, Happy Joiner also exhibited a prototype Mac-compatible computer at the show.

Since Happy Joiner maintains that the chip sets don't violate any existing Apple copyrights, the company apparently isn't worried about Apple lawsuits. Happy Joiner doesn't plan on selling Mac-compatible computers itself, but it will sell its chip sets to anyone who wants to design legal Mac ROM and legal software to run it.

Group Editing Online

Mainstay is now offering MarkUp, a multiuser application for online group editing of any type of Mac document. You can edit any document, without the application that created it, by placing transparent overlays on original documents. Each group member can edit and mark up a separate layer and view layers edited and marked up by others. The master reviewer can then use all layers to produce the final document.

MarkUp's editing tools include a text tool for free-standing text; a note tool for pop-up notes; tools for lines, arrows, and rectangles; and a lasso. They can be used to edit documents containing text, drawings, art, scanned photos, spreadsheets, and other types of information.

MarkUp supports networks like AppleShare, and workgroups composed of dispersed members sending files via disk or telecommunications. For further information, contact Mainstay, 1531-B Derry Ave., Agoura Hills, CA 91301, 818/991-6540.

Fast Color Printing

Sharp Electronics now offers the JX-730, a B-size, plain-paper, high-resolution, color ink-jet printer. The JX-730 has twice the speed of Sharp's JX-720, and 225 percent more resolution. It also features a larger printing area, a larger print buffer, the capability to act as a monochrome text printer, and separate ink reservoirs (which reduce printing-cost-per-page because ink-packs do not have to be discarded before they are fully exhausted).

The JX-730's print speed is one minute per page. It offers wide-carrige printing and, depending on the software, can produce unlimited colors. There are three paper-feed options: roll paper, tractor, and cut sheets.

For further information, contact the Systems Division at Sharp Electronics Corp., Sharp Plaza, Mahwah, NJ 07430, 201/529-9500.

Improving Mainframe Communications

Digital Communications Associates (DCA) has announced an applications programming interface (API) for its MacIRMA boards that allows applications developers to easily create Macintosh interfaces to mainframe-based applications. Applications written in languages like C or HyperTalk, or in a procedural language from a database like 4th Dimension, can access any of the 32 API calls. DCA's API provides a consistent, high-level interface between an application and the MacIRMA hardware and is compatible with DCA's IRMA API for MS-DOS personal computers.
PRESENTING THE WRITEMOVE PORTABLE PRINTER.

Most printers are sentenced by their own sheer bulk to lifelong confinement on a desktop. But now GCC Technologies* has created a printer for the Macintosh® with considerably more freedom than that. It's called WriteMove®: the "biggest" printer ever to come in an incredibly small package.

WriteMove weighs a scant three pounds. It measures just 2" x 6½" x 10¾". (Any smaller and you couldn't get the paper in.)

But it's the only ink jet printer of any size that gives you almost unlimited freedom to reduce and enlarge type and documents. Because it's the only one with outline fonts — imaging software that provides functionality otherwise available only with laser printers.

As a result, you can use WriteMove to compose documents with word processing software like Microsoft® Word, or desktop publishing programs like PageMaker®. And then silently print them out at 192-DPI resolution. In other words, you get much higher print quality than the ImageWriter® II, for not much more money.

Which could bring a whole new meaning to the phrase "freedom of the press."

To exercise that freedom, see your authorized GCC Technologies dealer for a WriteMove demonstration. For the one nearest you, call (617) 890-0880*.

*In Canada, (800) 263-1405 ©1988 GCC Technologies, Inc. GCC Technologies and WriteMove are trademarks and the GCC Technologies logo is a registered trademark of GCC Technologies, Inc. Macintosh and ImageWriter are registered trademarks of Apple Computer, Inc. PageMaker is a registered trademark of Aldus Corp. Microsoft is a registered trademark of Microsoft Corp. Suggested manufacturer's retail price $699.

INTRODUCING
THE MOST INGENIOUS
PORTABLE PRINTER
SINCE THE PENCIL.

WriteMove Portable Printer

Circle 177 on reader service card
Now Macintosh And Wang Can Communicate And Nothing Gets Lost In The Translation

Transferring files from one system to another is somewhat pointless if you spend most of your time reformatting the data. Which is why we introduced MacLinkPlus for Wang. Whether you're running a Wang VS system, an OIS or a Wang PC, MacLinkPlus provides a complete solution for document transfer and file conversion.

MacLinkPlus includes the entire collection of more than 40 translators—the key to accurate conversion of file formats such as rulers, indents, bold and plain text styles, margins, tabs, underlines, superscripts, subscripts, paragraphs, and tabular tables. If it looks a certain way on a Wang, it will look the same way on a Mac. And, of course, vice-versa. No time-wasting and difficult pre-conversion to ASCII or print files is necessary.

MacLinkPlus doesn't stop there, however. It offers full Wang VS Workstation capabilities, allowing easy access to Wang word processing, data processing and electronic mail. All 32 Wang Workstation functions can be executed through familiar Macintosh menus or command keys, and you'll even be able to use the mouse on Wang displays.

Software for the Macintosh, software for the Wang (8" or 5.25"), software for the PC and a direct connect cable (you can use a Hayes or compatible modem if you prefer), is included in the MacLinkPlus package; everything you need to be up and running in minutes.

So call (203) 268-0030 for your nearest DataViz dealer, because no matter which Wang system you're using, there's a MacLinkPlus solution to connect it to the Mac.

Who says you can't have the best of both worlds.
HOW FAST CAN YOU MAKE AN APPELTALK?

Up to three times faster. With the new TOPS FlashBox.

Most people wouldn't change a thing about their AppleTalk* network. Except to make it faster. Now you can do that—easily and inexpensively. With FlashBox.

Simply plug FlashBox into the back of any networked Macintosh. And in a flash, information will speed along your existing twisted-pair cabling (such as Apple's LocalTalk™ or regular telephone wire) at the FlashTalk™ speed of 770Kbps—up to three times the AppleTalk data rate.

What's more, FlashBox is only $189 per node, and can be installed on only those Macs you want. And because FlashBox can communicate at both FlashTalk and AppleTalk rates, it will automatically select the right speed to talk to any other Mac, PC, LaserWriter or peripheral on your network.

In fact, you don't even need to be running TOPS—FlashBox can also quicken the pace of AppleShare™, InBox™ and multi-user applications. And networked PCs equipped with a FlashTalk compatible card (such as the TOPS FlashCard™) can talk with Macs at FlashTalk speed.

Only FlashBox can make AppleTalk faster without putting you through major changes.

So call your nearest TOPS dealer. Just dial 800-445-TOPS (or 415-769-8700 from outside the U.S. and Canada). Or drop a card to TOPS, 950 Marina Village Parkway, Alameda, CA 94501.
Soar to New Highs, Effortlessly

When Software Ventures set out to create MicroPhone, it had a simple mission: to develop the most intuitive communications software ever written. Indeed, when MicroPhone was born, it was universally hailed as a breakthrough in communications software.

A product so friendly, it turned novices into experts. So sophisticated, it became, in the words of MacUser, a power user's delight.

MicroPhone is a legend. One of those precious software creations that single out the Macintosh as a superior computing machine.

With MicroPhone II, Software Ventures has set out to surpass itself: redefine power in telecommunications for years to come.

MicroPhone II is so revolutionary that PC Magazine was moved to say: “MicroPhone II is arguably the best

comm software ever written.” We won't have it any other way. MicroPhone II. The freedom to be yourself. At the top.

Critics' Choice

Stewart Alsop, P.C. Letter:
“MicroPhone . . . sets the standards that general-purpose communications software will have to follow.”

The New York Times:
“MicroPhone is a breakthrough in communications software . . .”

Let's Get Technical

MultiFinder compatible. Supports background file transfer and script execution. Offers a full-featured script language: variables, counters, and expression-analyzer for string and arithmetic operations. Scripts allow:

- control of all communications settings;
- screen addressing and text editing;
- filtering of incoming text.

Supports import and export of scripts as text files. Allows control of PBX's, Hayes and non-Hayes modems through flexible modem drivers. Runs at 50 to 57,600 baud. Emulates DEC VT52, VT100, and TTY type terminals. Mac II and LaserWriter compatible.

Works with all Mac large screen monitors. Supports the extended keyboard. Built-in text editor. Includes Glue, licensed from Solutions, Inc.
David Bunnell

The Expanding Mac Universe

The Mac is clearly light-years ahead of the PC pack. It should continue exploring "the final frontier" like there's no tomorrow.

The Macintosh software and application universe is expanding, and no cluster of OS/2s or Presentation Managers (the yet-to-be-released Mac look-alike graphics environment) in the IBM galaxy will be able to deflect Apple's path. I think it's cosmetically ironic that companies like Microsoft, IBM, and Hewlett-Packard are attempting to recreate the Macintosh's graphic interface as if the Mac were standing still. By the time they catch up to the light from that galaxy, the Mac will be 10 trillion light-years away.

They simply have too much to catch up with. Right now on the Mac side, there is a revolution going on in desktop presentations and desktop publishing. Even desktop video is coming on strong. Clearly, the Mac is the big winner in all three areas. It's already far ahead in graphics, and it's doing well in business applications.

There are a few space-cases in the computer industry who believe that when Presentation Manager is here, Apple will be yesterday's weather satellite. That's a joke. Presentation Manager will be a platform without any software to speak of, while the Mac already has thousands of applications and all kinds of creative energy propelling it. Remember when the shoe was on the other foot? In 1984 there was very little software for the Mac, and a lot of questions about its viability. Now, the situation has changed so dramatically that if IBM is really serious about getting into this space race, it should consider licensing the Mac from Apple. That's probably the best way it can compete.

Meanwhile, wouldn't it be great if Apple were confident enough about its future to quit the madness of this lawsuit against Microsoft and Hewlett-Packard for allegedly copying the Macintosh screen display? As it happens, though, Apple either is not confident enough, or is simply being defensive, and the suit is still lumbering along.

Here's a recap of some of the case's more memorable twists and turns. Apple's lawyers had been working for Hewlett-Packard on another case when Apple filed its copyright-infringement suit, so the federal judge disqualified the lawyers. Then it was revealed that the same judge who threw out Apple's lawyers not only has a son who works for Hewlett-Packard, but in earlier cases has made judgments in HP's favor, as well. So the heat is on to disqualify him, too. Meanwhile, the judge has delayed the trial until August 1989.

That delay would seem to help Apple's case, since Microsoft and Hewlett-Packard may be hamstrung in their efforts to develop much of anything until the matter is settled. In addition, the U.S. Copyright Office recently ruled that a software copyright protects the display on computer screens, which would seem to reinforce Apple's case. As Richard Glasgow, the Copyright Office's assistant legal counsel, has stated, "We think the screen will be protected, no matter what the code" used to create it.

Announcement of this ruling caused Apple and Lotus stock-market shares to go up. (Let's not forget that Lotus is still mired in its "look and feel" lawsuit against various competitors.)

Despite all of these legal contortions, Apple doesn't have much to worry about in the long run. It's going to continue to be enormously successful. There's no need to get hooked on the industry's paranoid fear that OS/2 and Presentation Manager are meteorites on a collision course with Apple. There's nothing nebulous about it; the Mac is not just an idea whose time has come. It's a machine whose universe is expanding.
**THIS IS WAY TOO EASY. Unsurpassed number-crunching power. Charts so graphic, they jump off the screen into page perfect presentations. You're actually looking forward to your next meeting. Because you're not just going to show them numbers. You're going to win them over with Wingz.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounts receivable</td>
<td>550.60</td>
<td>211.73</td>
<td>637.61</td>
<td>115.67</td>
</tr>
<tr>
<td>Property held for resale</td>
<td>372.19</td>
<td>245.66</td>
<td>365.33</td>
<td>798.15</td>
</tr>
<tr>
<td>Developed property</td>
<td>21.47</td>
<td>737.36</td>
<td>443.78</td>
<td>13.02</td>
</tr>
<tr>
<td>Other current assets</td>
<td>204.43</td>
<td>340.20</td>
<td>973.76</td>
<td>950.67</td>
</tr>
<tr>
<td>Current Assets</td>
<td>287.61</td>
<td>533.20</td>
<td>476.00</td>
<td>746.98</td>
</tr>
</tbody>
</table>

*Other current assets include undeveloped properties owned by United Wares.*
### United Wares

**Assets**

<table>
<thead>
<tr>
<th>Year</th>
<th>1985</th>
<th>1986</th>
<th>1987</th>
<th>1988</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Assets</td>
<td>550.60</td>
<td>211.73</td>
<td>637.61</td>
<td>115.87</td>
</tr>
<tr>
<td>Accounts receivable</td>
<td>372.19</td>
<td>945.66</td>
<td>365.33</td>
<td>13.02</td>
</tr>
<tr>
<td>Property held for resale</td>
<td>21.47</td>
<td>732.26</td>
<td>443.78</td>
<td>950.67</td>
</tr>
<tr>
<td>Developed property</td>
<td>204.43</td>
<td>540.20</td>
<td>915.76</td>
<td>746.98</td>
</tr>
<tr>
<td>Other current assets</td>
<td>287.63</td>
<td>530.10</td>
<td>478.00</td>
<td>737.30</td>
</tr>
</tbody>
</table>

*Other current assets include undeveloped properties owned by United Wares.*

---

**Note:** The page contains various financial and statistical data related to United Wares. The visible sections include asset breakdowns, current assets, accounts receivable, and other financial metrics.
No Macintosh software makes it easy to create such vivid 3-D graphics.

What you see is what you get with Wings. Presentation graphics, spreadsheet data, and text all on one page.

No Macintosh software makes it easy to create such vivid 3-D graphics.

Graphics Drawing Tools: Design objects with special drawing tools: Straight line, Arc, Circle, Spline, Star, Rectangle, and Polygon or Polyline.

Live and Adjust: Adjustable line width, 38 adjustable fill patterns, and unlimited clipping borders. Create any combination of colors. Color can be Außerdem: Written on work sheets, Graphic Elements: Graphic objects, clip art, photographs, PICT files, etc. imported on the Wings clipboard can be used.

Charts and Graphs Chart types: Twenty basic chart types: both scientific and business oriented: 2-D Bar, Line, Step, Stem, Combination, Horizontal bar, Pie, Mars, 3-D Bar, 3-D Line, 3-D Area, X-Y Scatter, Radar, Wire, Bar, Contour, Surface. Unlimited number of graph types can be created through user modification. Data smoothing: User controlable.

Undeleted graphs per worksheet: Multiple graphs can be created from the same data or different sets of data within a Wings worksheet.


Microsoft Access: Create and modify database tables. Application Programming Language HyperScript: Complete programming language: English-like. Event driven: A series of commands can be executed at a single event such as the click of a button. Programming features: Classic, powerful programming features include WHEN-ELSE, IF-ELSE, CASE statements, DO-WHILE loop, FOR-NEXT loop, PROCEDURES, Global and local variables, complete set of control commands in CDD and 3DD, etc.

Database selection criteria: Extract or link the information. Presentation graphics: Built-in tools check cell references. Protect Your Work: Protects against accidental deletion of work sheet. Add notes to work sheet. Then hide, view, or protect them. Adjust Rows and Columns: Rows and columns can be resized. Cell Selection: Select scaleable ranges of cells for manipulations. First Worksheet: Sample worth, text, value, formulas, or other criteria.

THE ULTIMATE PRESENTATION SPREADSHEET

INSIDE WINGZ

Spreadsheet

Wings toolbar: 32,768 rows by 32,768 columns.

Hierarchical menus: Certain menu items bring up a submenu.

Speed: Average recalculs is substantially up to other spreadsheets.

Space and memory management: Wings allocates memory only for cells that contain data, the most efficient memory use.

Minimal recalculations: Wings recalculates only cells affected by a worksheet change, reducing calculation time.

Calculation option: Wings has automatic and manual recalculations, as well as natural row, column, and intercell.

Linking: Any formula can refer to any cell on any worksheet in memory.

AutoCalc.C fingerprint, identifies cells by names rather than cell functions.

Wings has automatic and manual recalculations, as well as natural row, column, and intercell.

Security: Protect your Wings worksheets with passwords, handouts, or read only plus data encryption.

Announced Calls: Add notes to any worksheet. Then hide, view, or protect them.

Adjustable Rows and Columns: Rows and columns can be resized.

Cell Selection: Select scaleable ranges of cells for manipulations.

First Worksheet: Sample worth, text, value, formulas, or other criteria.

Built-in functions include:

Business functions: BONDVALUE, BONDDISC, BONDYIELD, PMT, PV, FV, PMT, RATE, NPER, PRICE, etc.

Mathematical functions: AVERAGE, COUNT, COUNTIF, MAX, MIN, SUM, PRODUCT, etc.

Text functions: LEFT, RIGHT, MID, RECEIVED, TODAY, YEAR, etc.

Logical functions: AND, OR, NOT, IF, ISNUMBER, ISDATE, ISDATA, ISERR, etc.

Date/Time functions: DATE, TODAY, YEAR, MONTH, DAY, HOUR, MINUTE, SECOND, MILLISECOND, DATEVALUE, ENDVALUE.

Database functions: ADODBConnection, ADODBConnectionCreate, ADODBConnectionOpen, ADODBConnectionClose, ADODBConnectionRemove, ADODBConnectionDelete.

Database functions: ADODBConnection, ADODBConnectionCreate, ADODBConnectionOpen, ADODBConnectionClose, ADODBConnectionRemove, ADODBConnectionDelete.

Spreadsheet:

Celsius, Celcius, Chose, ChoseIf, CHOOSE, CHOOSEIF, CHOOSEIFS.

Numerical functions: AVERAGE, AVERAGEIF, AVERAGEIFS, MAX, MIN, MAXIMUM, MINIMUM, MAXIMUMIFS, MINIMUMIFS.

Graphics Elements: Graphic objects, clip art, photographs, PICT files, etc. imported on the Wings clipboard can be used.

Charts and Graphs Chart types: Twenty basic chart types: both scientific and business oriented: 2-D Bar, Line, Step, Stem, Combination, Horizontal bar, Pie, Mars, 3-D Bar, 3-D Line, 3-D Area, X-Y Scatter, Radar, Wire, Bar, Contour, Surface. Unlimited number of graph types can be created through user modification. Data smoothing: User controlable.

Undeleted graphs per worksheet: Multiple graphs can be created from the same data or different sets of data within a Wings worksheet.


Microsoft Access: Create and modify database tables. Application Programming Language HyperScript: Complete programming language: English-like. Event driven: A series of commands can be executed at a single event such as the click of a button. Programming features: Classic, powerful programming features include WHEN-ELSE, CASE statements, DO-WHILE loop, FOR-NEXT loop, PROCEDURES, Global and local variables, complete set of control commands in CDD and 3DD, etc.

Database selection criteria: Extract or link the information. Presentation graphics: Built-in tools check cell references. Protect Your Work: Protects against accidental deletion of work sheet. Add notes to work sheet. Then hide, view, or protect them. Adjust Rows and Columns: Rows and columns can be resized. Cell Selection: Select scaleable ranges of cells for manipulations.

First Worksheet: Sample worth, text, value, formulas, or other criteria.

Built-in functions include:

Business functions: BONDVALUE, BONDDISC, BONNYIELD, PMT, PV, FV, PMT, RATE, NPER, PRICE, etc.

Mathematical functions: AVERAGE, COUNT, COUNTIF, MAX, MIN, SUM, PRODUCT, etc.

Text functions: LEFT, RIGHT, MID, RECEIVED, TODAY, YEAR, etc.

Logical functions: AND, OR, NOT, IF, ISNUMBER, ISDATE, ISDATA, ISERR, etc.

Date/Time functions: DATE, TODAY, YEAR, MONTH, DAY, HOUR, MINUTE, SECOND, MILLISECOND, DATEVALUE, ENDVALUE.

Database functions: ADODBConnection, ADODBConnectionCreate, ADODBConnectionOpen, ADODBConnectionClose, ADODBConnectionRemove, ADODBConnectionDelete.

Spreadsheet:

Celsius, Celcius, Chose, ChoseIf, CHOOSE, CHOOSEIF, CHOOSEIFS.

Numerical functions: AVERAGE, AVERAGEIF, AVERAGEIFS, MAX, MIN, MAXIMUM, MINIMUM, MAXIMUMIFS, MINIMUMIFS.
TAKING A FREE TEST FLIGHT ON WINGZ.

IT'S THE MOST ANTICIPATED NEW SOFTWARE FOR APPLE'S MACINTOSH. AND IT'S YOURS FREE. BUT YOU MUST HURRY. THE WINGZ TEST FLIGHT DEMONSTRATION VERSION IS AVAILABLE AT AUTHORIZED WINGZ DEALERS FOR A LIMITED TIME.

TO FIND THE LOCATION OF THE WINGZ DEALER NEAREST YOU CALL 1-800-331-1763 EXT. 3800. (IN KANSAS, ALASKA OR CANADA CALL (913) 492-3800.)

OR TO HAVE YOUR WINGZ TEST FLIGHT SOFTWARE SHIPPED DIRECTLY TO YOU, SEND $9.95 FOR POSTAGE AND HANDLING, CHECK OR MONEY ORDER, TO: WINGZ TEST FLIGHT P.O. BOX 15998 INFORMIX SOFTWARE, INC. LEXINGTON, KANSAS 66215-0998.

THE ULTIMATE PRESENTATION SPREADSHEET.
"Although this category, unlike spreadsheets and word processors, had a lot of new players this year, one seemed to us to be the clear leader. 4th Dimension, the powerful first product from ACIUS, takes the kudos."

MacUser, February 1988

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

Jonathan Sacks, InfoWorld, April 1988

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

Steve Mann, Macintosh Today, August 11, 1987

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

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

David Brandt, MacWEEK, January 19, 1988

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

Jan L. Harrington, MacUser, November 1987

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

Adam Green, Macworld, July 1987

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


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

Don Crabb, InfoWorld, January 11, 1988

Want to try it out?

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

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

Yes you can!

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

Demo version bundled on all Jasmine Hard Disk Drives.
Playing in Color
I've been unable to find even one really good, visually appealing color game for the Mac II. I will admit that Crystal Quest is a great game, but it gets boring after a while. Are there any decent Mac II games coming up soon?

David Klein
Houston, Texas

PCAI has a new color version of MacGolf (see October Reviews), Electronic Arts has just come out with Chuck Yeager's Flight Simulator designed for the Mac II, and Spectrum HoloByte has introduced Solitaire Royale, to name a few.—Ed.

Corrections
The address for Ashton-Tate, maker of Full Impact (Where to Buy, July 1988), is 20101 Hamilton Ave., Torrance, CA 90502-1319, 213/329-8000.

QuickShare does not limit a linked Mac and PC to being only 10 feet apart ("Machine Slaves," Reviews, August 1988). Additional cable can extend the maximum distance to 40 feet.

The chart in "Apple's PostScript Pair" (Reviews, August 1988) should have shown printer performance in seconds.

The phone number for Modern Graphics, maker of ChemStack (New Products, August 1988) is 317/253-4316.

Smart Alarms 2.9 (Bulletin, September 1988) works with Macromaker. Upgrades can be ordered for $10; they're free for six weeks after purchase of earlier versions.


Engineering the Marketplace
I found David Bunnell's column on Apple's neglect of the engineering market ("Engineering a New Mac Market," August 1988) quite timely, for I had just seen an ad touting the business uses of the Mac II in several engineering magazines. How do you convince people that the Mac is a "real" computer when Apple places ads that position it as a "window to the world" of other computers? All an engineer wants is a tool that is intuitive and blisteringly fast, that controls lab instruments, and that collects and analyzes data. The Mac is well suited to this kind of work, but the problem is convincing engineers to disregard Apple's misinformation.

Thomas D. McConnell
Burlington, Vermont

Searching for a Better Sushi
In response to Jerry Borrell's Commentary ("Selling Sushi to Yokohama") in your July issue, as a Japanese Mac user, I would like to register some complaints. Apple Computer Japan has not done a good job of popularizing the Mac in Japan, mainly because of its price (my Fat Mac cost me $3984; the price of the SE is $5824). The cost of software is also prohibitive; for example, Quark XPress sells for $1104. But above all, the Mac cannot handle Japanese well. Compared to Japanese input systems for NEC's PCs, KanjiTalk 2.0 is a second-class program. It requires more than 1 megabyte of memory and has a cumbersome and inaccurate conversion process. We Japanese consumers will buy American products if they're good, well-maintained, and reasonably priced. Please give us a better and a cheaper sushi.

Kiyotaka Imanaka
Rochester, Minnesota

Fan Fare
Some time ago I recall reading in Macworld News about a replacement fan kit. Also mentioned was Apple's policy of replacing the fan at no cost if the SE was suffering screen wobble. My dealer wants to charge me $140 to replace the fan, and Apple denies ever having such a policy. Was I dreaming?

Barbara J. Dyker
via Compuserve

You may have been. The news item (April 1988) dealt only with fan noise, not screen wobble, and said nothing about a
FINALLY, A MASS STORAGE SOLUTION FOR YOUR MEGABYTE HOGS.

Your Mac can do astonishing things with graphics and text. But as you well know, those software applications, 3-D diagrams, and bloated data files are eating up storage megabytes by the bushel. In fact, they're probably dipping into your last MB right now. But there is a solution. The Bernoulli™ never-ending storage solution.

PERFORMANCE.
Bernoulli offers high-performance, removable mass storage systems for the Mac. Unlimited primary storage systems with performance that compares to better hard disks (<40msec access time). And if you already have a hard disk, Bernoulli provides infinite extended storage capacity. So you can store and manage your projects on 20MB removable Disk Cartridges easily and inexpensively as you see fit. With increased on-line capacity plus never-ending additional storage at your fingertips.

BACKUP. Bernoulli also provides backup. Working backup that can give you an immediately usable, identical 20MB copy of your original in under 2 minutes. All in all, your Bernoulli system can function as your primary storage device and backup system all in one.

SECURITY. Bernoulli Technology™ is the one data storage technology that's virtually head-crash and disk-contamination free. As for durability, Bernoulli Disk Cartridges withstand over 1000Gs of shock. They're built to survive the trip across town, or across the world. Add to that the physical security Bernoulli provides. With Bernoulli removable Disk Cartridges, you can lock your data in a safe or desk drawer, or take
it with you. In effect, you retain absolute control of your files. And what could be more secure than that?

**CONNECTIVITY.** Finally, there's one more Bernoulli benefit you should consider: Bernoulli Disk Cartridges are transferable between the Macintosh™ and PCs and PS/2s. So you can now exchange files with the IBM® world as much (or as little, for that matter) as you like. Bernoulli provides the missing link. What else would you expect from the number one company in removable mass storage? So roll your megabyte hogs and your other storage problems into one low-cost solution. Bernoulli Boxes for the Mac are available in three models, in 5¼" and 8" form factors. For more information, see your Iomega Authorized Reseller, or call 1-800-832-5511.

© 1988 IOMEGA Corporation. IBM is a registered trademark and PS/2 is a trademark of IBM Corporation. Apple is a registered trademark of, and Macintosh is a trademark licensed to, Apple Computer, Inc.
MAXIMUM PROTECTION
Safeguard your hardware investment with the highest quality computer luggage and dust covers available. Our computer luggage utilizes 50% more padding than our competitors, a full 3/4" high density foam. We guarantee our custom fit dust covers for life - materials and workmanship.

Both our Dust Covers and Computer Luggage are handmade in the USA by skilled craftsmen.

HIGH TREK™ computer luggage for “trekking cross-town or cross-country™” $79.95-$99.95.

MACATTIRE™ dust covers “what the well-dressed Mac is wearing™” $7.95-$25.95.

See your local Apple Dealer or call us direct.

Mastercard and Visa welcome.
800-334-6046

Dealer inquiries welcome.

SOPRIS

SOFTIWORKS

Post Office Box 916 • Glenwood Springs, Co 81602

Circle 74 on reader service card

Letters

Correction

Dickens

What the Dickens Happened?
Here is the correct font sample for Howard Upchurch’s Dickens, marketed by Century Software (“Fit to Print,” April 1988). Also sold by Century is Thin Times Bold (mistakenly listed as shareware). Upchurch’s shareware font, Louisville ($25), can be ordered from him at 3409 O’Henry Dr., Garland, TX 75042, 214/272-7826.

free replacement policy. We did cover the SE’s screen jitters in Letters (July 1988), but again, no mention of free replacement. At any rate, $140 sounds too high; you should be able to get the job done for $90 to $100.—Ed.

Everything’s under Control
Although I appreciated your article on MS-DOS/Mac file translation (“Business Clinic,” July 1988), Danny Goodman neglected to mention three very valuable public domain programs that strip control characters from text files: Bruce Tomlin’s DeskZap desk accessory, Kent Flower’s FileCleaner, and John Wind’s Add/Strip. All three are available from major bulletin boards.

Bill Mounce
Glendora, California

If you don’t have a modem, you might instead try contacting a user group that specializes in mail-order public domain software and shareware. For more information on such groups, see “Users Friendly” (May 1988).—Ed.

Desktop Ergonomics
Just as the discovery of cane sugar helped decay the teeth of the world, so too might the user-friendly computer negatively affect the long-term health of its users.

How does using the desktop affect your eyes, back, ears, and manual dexterity, and what kinds of products and procedures are available to alleviate the strains of sitting at the average desktop?

Mark Powell
Albuquerque, New Mexico

(continues)
Let your creativity sail with Canvas 2.0™. Whether you're a seasoned professional or an occasional user, Canvas 2.0 has the power and speed you need while remaining a breeze to use.

Create multi-point Bezier curves and smooth polygons with unlimited control points. Points can be added or deleted, and curves can be joined or split (using the scissors or glue tool) to form complex shapes.

Auto-Tracing converts existing bit mapped images (dots) into true objects (shapes). It even works with high-resolution (300 to 2540 dpi) scanned graphics. This feature alone can save you countless hours of tedious work.

Navigate through complex drawings by using an unlimited number of layers to create perfect graphics for engineering, desktop presentations or graphic design. Then save or print them individually or all together to get the big picture. And when we say big...we're talking 9 feet by 9 feet.

Hit the mark with precision hairlines as thin as 1/1000th of an inch, then fill or stroke using PostScript® gray scales or patterns. Work faster by pre-defining custom line thicknesses and arrowheads.

Mac II users can choose from 16.7 million colors for objects, text or bitmaps. And Canvas 2.0 also works with Mac compatible color printers and film printers.

With accuracy to 1/64,000th of an inch you can position any object, text or bitmap precisely. Canvas 2.0 can even calculate and automatically display lengths, angles, areas and perimeters (auto-dimensioning).

Improved importing and exporting of text and graphics allows you to read and write to a variety of formats including PICT, PICT2, TIFF, MacPaint™ and MacDraw™.

Don't run aground with other drawing programs. Whether it's business graphics, presentations, desktop publishing, desktop engineering or architecture, Canvas 2.0 has all the features you need.

Set your course to your nearest Canvas dealer and ask for a complete demonstration or call us at: 1-800-GCANVAS.

In Florida (305) 594-6965
Canvas 2.0 Suggested Retail $299.95
Site Licenses Available.

All product names mentioned are trademarks of their respective holders

Circle 282 on reader service card
Develop better ideas much more quickly and easily. INSPIRATION™ is the productivity tool for anyone who writes or diagrams anything!

Outliners are great for organizing, but rigid structures inhibit creativity. INSPIRATION is outlining with a big difference. Flip between full-featured outlines and free-form diagram “mind-maps” to make idea development and organization uniquely stimulating, fast and easy. Any changes you make to the diagram change the outline, and vice versa.

Use INSPIRATION as a simple and powerful self-documenting diagramming tool. INSPIRATION is the only software with Instant Graphics™. Just type—a symbol pops up framing your text. Move idea-symbols around, their links stay with them. Change symbol shapes or link connections. Both outline and diagram views export to writing and presentation programs.

Let INSPIRATION evoke the great ideas within you! Develop more creative proposals, plans, reports, ad copy, articles, speeches, procedures, flow and organization charts.

Money-back guarantee. New Version 1.1 also includes superior outlining and diagramming, preferences, selective styling and hoisted mini-views.

Get INSPIRATION 1.1 for only $175 now. Visa/MC accepted. Call (503) 245-9011. Full-featured demo available.

Ceres Software Inc. 9498 S.W. Barbur Blvd., #103, Portland, OR 97219

BROADCAST QUALITY VIDEO HAS ARRIVED!

TV PRODUCER/RGB/PRO
Graphic Overlay-Genlock board for the Macintosh II
For info, call: Computer Friends (503) 626-2291

Letters

The U.S. Occupational Safety and Health Administration (OSHA) publishes a booklet called Working Safely with Video Display Terminals. Contact your regional, district, or area OSHA office, or call the national office at 202/253-9656. Krames Communications (312 90th St., Daly City, CA 94015, 800/228-8347, 800/445-7267 in California) makes available to companies two booklets on the subject: Fitness at the Terminal ($1.10) and Working with VDTs ($1.10).—Ed.

Leaving Low Quality Behind

I’m struggling with an ImageWriter II that has never turned out quality printing, and I can’t afford the extra $3000 to $5000 for a LaserWriter. Although I like my Mac, I’m now preparing to shift over to a PC-compatible—complete with hard drive, monitor, and printer—for less than I would pay for the least-expensive laser printer.

Tom Difloe
Camano Island, Washington

Before buying a whole new system, why not try hooking up a non-Apple printer to your Mac? Numerous PC-compatible printers—from low-cost dot matrix to high-end lasers—can be made to work with a Mac. See the next letter for more information.—Ed.

Brand X Printers

I’m planning to purchase a third-party, 24-pin printer for my SE. I would like to see an article exploring ways of doing this (including using Orange Micro’s Grappler) and determining which solution offers the most compatibility.

Greg Allen
San Jose, California

Lately we’ve noticed an increasing interest among readers in hooking up non-Apple printers to the Mac. For a look at the problems and some solutions, see “Printer Tools” in this issue.—Ed.

Bette on the SE

The latest indication that Macintoshes are successfully infiltrating the corporate world? In the hit movie Big Business, you can see office staffers hard at work on networked SEs throughout the huge conglomerate co-owned by twin sisters Sadie and Rose (Bette Midler and Lily Tomlin).

Zephir O’Meara
San Francisco, California

(continues)
Get rid of computer clutter with Comment 2.0, Deneba's text and graphic notation system with timed alarms and complete note management.

SPREADSHEETS... attach notes containing formulas and explanations to any cell within your spreadsheet. Then use these notes to create hypertext-like documents.

WORD PROCESSORS AND DESKTOP PUBLISHING... add comments, notes and suggestions to specific portions of text without altering the original document. You can even attach graphs and artwork to documents, making Comment the perfect clip-art filing system.

KEEP APPOINTMENTS, CREATE DIRECTORIES... Comment's time-based alarm system can call up notes hourly, weekly, even yearly. And creating a telephone directory is just a mouse click away.

NOTE MANAGER... lets you review and edit all your notes from one location. Comment works as a desk accessory with most popular software applications and is fully MultiFinder™ compatible.

GET UNSTUCK WITH COMMENT 2.0
(Suggested Retail: $99.95)

Comment™

by Deneba SOFTWARE

7855 N.W. 12th Street, Suite 202
Miami, Florida 33125 • (305) 594-6965
Site Licenses Upon Request

Circle 217 on reader service card
A lot of programs claim to be 'CAD.' But they're really just drawing programs. If you want to design something to be built, you need real CAD.

MGMStation™ is real CAD. It's part of a fast, sophisticated, cost-effective CAD/CAM package developed for engineers and designers. It offers capabilities equal to mainframe CAD packages, with floating point precision up to 16 decimal places. Unlimited zoom. Color or black-and-white output. Auto dimensioning. Multiple layers, multiple windows. Hatching and filling of arbitrary shapes. Sophisticated functions like filleting and chamfering. Display precision beyond that of QuickDraw™ (note the smooth curves). And built-in plotter drivers. Options include symbol libraries and an IGES conversion utility.

If you're designing mechanical parts, you may be interested in our CAM package, too. It handles milling, turning, sheet metal cutting and wire EDM.

MacUser If you are serious about creating producible designs on your Macintosh, you can't afford to waste your time on anything less. MGMStation. Real CAD.

MGMStation
from Micro CAD/CAM Systems, Inc.
5900 Sepulveda Blvd, Van Nuys, CA 91411 (818) 376-0008 AppleLink D0572 Telex: (650) 310-7078 MCI-UW

Circle 209 on reader service card

Portrait of the Great American Investor

Lisa Kramer looks after patients with names like Smokey and Snowball. But she looks after herself, too. Lisa invests in U.S. Savings Bonds.

Bonds pay competitive rates, like money market accounts.
Find out more, call 1-800-US-BONDS.

U.S. SAVINGS BONDS
THE GREAT AMERICAN INVESTMENT

Bonds held less than five years earn a lower rate. A public service of this publication.

Letters

Just a Member of the Band
Steven Levy was on target with his July 1988 column, "The Unbearable Heaviness of Being in the Computer Industry." As a musician and freelance journalist, I am keenly aware of the industry's tendency to bill technology as a means of advancing musical creativity. Although computers help a great deal, it will always be human minds and fingers that make music creative. To extend Levy's apt analogy, computers make us productive, but not just Macintoshs. Apple didn't invent MIDI, sequencers, or synthesizer editors, and it should be noted that those applications work as well (and more economically) in the MS-DOS, Amiga, and Atari environments.

Wheat Williams III
Nashville, Tennessee

The Mouse ThatCrashed
About a month after purchasing a Mac II, I began to experience shutdown and start-up problems. My dealer ran diagnostic tests on the entire system and everything checked out fine, but when I brought the Mac home, the problems remained. It suddenly occurred to me that everything had been tested except the mouse. So I connected the mouse from my Apple IIGS to my Mac II, and, to my surprise, everything functioned normally. As for the offending critter, it contains a black ball instead of the usual gray one, its retaining ring is of a totally different design, and the hole diameter is smaller.

Gary D. Van Aken
Littleton, Colorado

Apple has redesigned the ADB mouse for the SE and the Mac II several times, so you'll note differences in appearance, but we've heard of no evidence of defects in any of the designs. —Ed.

Letters should be mailed to Letters, Macworld, 501 Second St., San Francisco, CA 94107, or sent electronically to CompuServe (70370, 702) or MCI Mail (addressed to Macworld). Include a return address. We regret that, due to the high volume of mail received, we're unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of Macworld.
Stop packing. It's no longer necessary to climb a mountain in Nepal to consult a legendary guru. Because now there's Spelling Coach Professional™. The first hypertext spelling and reference system available for any microcomputer. It gives you instant access to Proximity/ Merriam Webster's Concise 85,000 word electronic dictionary with complete definitions.

Installed as a desk accessory (Swamis can't do that), Coach Professional™ is extremely easy to use. Simply select any word and in seconds a window appears showing you its definition, its correct hyphenation and all its uses and tenses. Just as they appear in Merriam-Webster's book version.

Coach Professional™ also includes the Coach™ Merriam-Webster Thesaurus. This 245,000 synonym thesaurus is organized by meaning group and is the only thesaurus with definitions to help you understand the difference between each meaning.

You can use Coach Professional™ interactively when you type, or your completed documents can be scanned at over 150 words per second. It shows your misspellings in context and suggests the correct spelling. Then one click and the correction is made.

In addition to the spelling dictionary, Coach Professional™ includes a medical dictionary, a legal dictionary and even contains a special 20,000 word geographical and biographical supplement.

So if you're looking for the meaning of it all, look into Coach Professional™. At $195 it's at least ten times cheaper than a round trip ticket to Kathmandu.

Also available from Deneba are Spelling Coach™ (spelling checker only) at $99.95 and Coach™ Thesaurus at $59.95. See your local dealer for a complete demonstration of any of our products. Or call us at 1-800-622-6827. In Florida call (305) 394-6965.
TRY FULL IMPACT AND SEE WHY EXCEL DOESN'T.

A recent tracking study performed by Numerical Understanding Methods Bureau, Inc. has determined that constant and prolonged exposure to spreadsheet output may result in cases of extreme drowsiness and lethargy. Contributing factors have been numbers without context, lack of graphic elements, and limited abilities in the treatment of text.

**SPREADSHEET USAGE**

<table>
<thead>
<tr>
<th>User Category</th>
<th>WEST</th>
<th>SOUTHWEST</th>
<th>NORTH</th>
<th>EAST</th>
<th>SOUTH</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Records</td>
<td>21</td>
<td>38</td>
<td>83</td>
<td>65</td>
<td>12</td>
<td>240</td>
</tr>
<tr>
<td>Analysis</td>
<td>43</td>
<td>47</td>
<td>26</td>
<td>28</td>
<td>13</td>
<td>197</td>
</tr>
<tr>
<td>Budgeting</td>
<td>38</td>
<td>62</td>
<td>25</td>
<td>25</td>
<td>13</td>
<td>138</td>
</tr>
<tr>
<td>Cost Accounting</td>
<td>24</td>
<td>45</td>
<td>64</td>
<td>48</td>
<td>73</td>
<td>274</td>
</tr>
<tr>
<td>Spreadsheet</td>
<td>11</td>
<td>61</td>
<td>56</td>
<td>19</td>
<td>16</td>
<td>187</td>
</tr>
<tr>
<td>Translating</td>
<td>52</td>
<td>84</td>
<td>68</td>
<td>48</td>
<td>44</td>
<td>300</td>
</tr>
<tr>
<td>E-mail</td>
<td>53</td>
<td>73</td>
<td>73</td>
<td>0.3</td>
<td>38</td>
<td>205</td>
</tr>
<tr>
<td>To Improve Text</td>
<td>14</td>
<td>41</td>
<td>83</td>
<td>27</td>
<td>38</td>
<td>205</td>
</tr>
</tbody>
</table>

**ARE SPREADSHEET EFFECTIVE?**

As seen in the chart above, the NUMB study found that spreadsheets are more effective in helping users to organize and present information. As a general rule, excitement levels tend to increase in concert with the more nonverbal presentations. A failure of the findings of the nonverbal data from the excitement/usage chart suggests that spreadsheets very greatly in effectiveness depending on user requirements.

**In Colorado, call 303-799-4900, ext. 3501. Trademarks/owner: Full Impact, dBASE/Ashton-Tate/Ashton-Tate Corporation; Microsoft, Microsoft Excel, Microsoft Works/Microsoft Corporation;**
It's the difference between merely analyzing something, and actually seeing what it means.

Introducing Full Impact from Ashton-Tate.

Full Impact is a spreadsheet product for the Macintosh that goes beyond the raw number-crunching capabilities of Microsoft Excel: it gives you the ability to easily turn your work into clean, crisp—and understandable—documents.

How? By letting you take full advantage of the way you're already used to doing things on the Macintosh.

Need to write some text explaining your analysis? And highlight certain passages? Full Impact's mini text editor gives you plenty of fonts, sizes, and styles to choose from.

Oops—maybe that block of text would look better elsewhere. Fine. Just click on it, and drag it there. Want to customize an icon? Or create and customize charts and graphs within your spreadsheets? Same easy process. You can even bring in art from other programs, then merge it with text and data, all on the same page.

But lest you get the impression that Full Impact is merely a presentation program disguised as a spreadsheet, consider this:

With over half a million cells (2048 rows by 256 columns), Full Impact gives you more than enough room to handle even the largest projects. And more than enough speed to recalculate them quickly.

You can open and work in as many as eight spreadsheets simultaneously. As well as create powerful, time-saving macros.

And, you can even exchange files with many other popular programs, including Excel and Microsoft Works, Lotus 1-2-3, all of Ashton-Tate's dBASE® products, and much more. So you won't be losing your investment in current data. Instead, you'll be gaining a faster, easier way of seeing what it all really means.

We'd like to make it easy for you to get the full impact of Full Impact. Just call 800-437-4329, ext. 3501, and we'll send you a free demonstration disk, along with the name of the Ashton-Tate dealer nearest you. And, for only $9.95, we'll mail you a full-capability product sampler.

What could be more impactful?

**SEE WHAT YOU MEAN**

<table>
<thead>
<tr>
<th></th>
<th>Full Impact</th>
<th>Excel 1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Memory</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>(allowing use of all cells)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mini Text Editor</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Customizable Icons</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Hierarchical Menus</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Mix fonts, sizes, styles, cell by cell</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Optional Automatic Saving</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Access RAM beyond 1Mb</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Print charts and spreadsheets on one page</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Line, Rectangle, Oval Drawing Environment</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>&quot;C&quot;-like procedural macro language</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Lotus 1-2-3/Lotus Development Corporation; Macintosh/Apple Computer, Inc.; Output created on Microsoft Excel 1.5 and Full Impact. ©1988 Ashton-Tate Corporation. All rights reserved.

Circle 220 on reader service card
Limited Time Offer

Order a drive now and receive:

- Complete hard disk management utilities.
- Modern and disk server for use within your LAN.
- Remote disk server to share hard disks in another LAN or at home.
- Available separately for $49.95.

also receive:
- Carrying case for Cirrus drives.
- Available separately for $30.00.

---

SPEED

RELIABILITY

QUIET OPERATION

COMPACT SIZE

POWERFUL SOFTWARE

“Small slick units... stack them horizontally or vertically, they don't make much noise and they're fast.”

Cirrus hard drives deliver power and speed without compromising reliability, ergonomics or desktop real estate. Superior 3½" drive technology and high-volume half speed fan provide cool, quiet operation you can rely and rely on.

All Cirrus drives are compatible with the Mac II, SE and Plus and are backed by a one year limited warranty. We also make 30 to 135 MB internal drives for the Mac II and SE. Call for prices.

Cirrus drives are shipped preformatted and ready-to-use with 2 SCSI ports, power and SCSI cables, terminators, manual and SilverServer utility software. This powerful, comprehensive software package includes: Auto mounting, auto parking, password protection, diagnostics and powerful volume sizing functions that let you freely partition your drive into one or more volumes, or combine several drives into a single large volume. Plus you can change SCSI drivers and the interleave factor for extra speed.

When you order Cirrus Drives you also get SilverServer's exclusive new modem server, disk server and remote disk server so you can share modems and disks on an AppleTalk Network or even access hard disks over the phone! Try a Cirrus drive soon. For over 2 years we've built drives of uncompromising quality so you won't have to compromise on performance.

---

Order your Cirrus Drive today, call 1-800-999-0143

---

Prices shown are cash prices and do not include shipping. Add 7% for Visa or Mastercard. 5% for American Express. Add 3% for rush handling. Cirrus, LaCie and SilverServer are trademarks of LaCie LTD. Macintosh and AppleTalk are trademarks of Apple Computer. Prices and specifications subject to change without notice. Excerpts reprinted with permission of MacWorld.
Commentary/Jerry Borrell

The Money of Color

Big league color and graphics are coming—at a price

Sometimes I have the feeling the Mac has lost its specialness, gone flat. Lost that magnetic draw for crowds of publicity specialists, resellers, and management information specialists. But then, just as I start to cast about and lust after newer computers, Mac graphics bring me back.

The old graphics hands at Apple, Bill Atkinson (MacPaint), Mark Cutter (MacDraw), Mike Potel (now in charge of system software), and Jim Barson (heads up video and fonts), are doing other things, but there is a group that is currently setting the groundwork for incredible enhancements to the Mac. Bruce Leak heads up the team on 24/32-bit color that was announced last summer. Dave Fung, who did color ROM work for the SE/Mac II, has directed the next-generation video card work (which will add broadcast-quality output). Mark Vickers is working a generation out, looking at hardware acceleration for the Mac. And Galyn Susman, who worked on the color picker, has become Apple's in-house divining rod for advanced graphics applications.

Their work will lead to a set of 1989 announcements that will put the Mac far ahead of any other personal computer. Even the Amiga, secretly admired by many of us, will no longer be in the same graphics league with the Mac. QuickerDraw, the high-performance extension to color QuickDraw initiated by Andy Hertzfeld and purchased by Apple for the current system software, is an indication of the future. The problem with bitmapped, window-oriented systems is that they have a hard time taking care of all the overhead for screen and system management while trying to update graphics. Apollo Computer and Sun Microsystems, both with 68020-based workstations, have discovered this phenomenon over the past several years, and most of their systems do not have very spectacular graphics.

Apple's new offerings will definitely make color on the Mac more attractive, but it will be the third-party developers that make a difference with what Apple provides. The Expo in August was swamped with communications, utilities, stackware, storage and memory, business applications, and accessories. But it was color that stole the show. Color everywhere, more color products than IBM PC users can have dreams about. Input, output, screens, video, animation. Gawd, even Microsoft has put color into spreadsheets—we're talking some fun. Unfortunately we're also talking some big bucks.

Cost is the bad news, but the good news is all the products that are being announced (and some are even shipping). Now we have five color paint and graphics packages to choose from: LaserPaint Color II (LaserWare), PixelPaint Professional (SuperMac), Photon Paint (Mediagenic), GraphistPaint II (Aba Software), and Studio 8 (Electronic Arts). Even the color drawing packages are increasing. MacDraw II now has competition from Canvas 2.0 (Deneba), Draw It Again, Sam (Aba Software), and Drawing Table (Broderbund).

While Apple makes the transition to real color (24 to 32 bits) on its video cards, third-party developers are wasting no time. In fact, despite some notable missteps (RasterOps had previously taken another approach to 24-bit color, but has already reengineered according to Apple specifications) the third parties are leading Apple in full color—TrueVision, RasterOps, Computer Friends, and SuperMac are all talking about their 32- and 24-bit cards.

This number of bits is important if the Mac is to be able to display images that rival 35mm slide quality, and it's getting there. If and when RAM prices ever decline, we'll hopefully have 24-bit color cards under $1500, and monitor/card combinations under $3500. The biggest problem with color, of course, is the cost of the memory for all of the data storage and the

(continues)
THE CREATIVE SIDE OF PAGEMAKER.

There's only one desktop publishing program that's equally adept at producing stunning graphic design and powerful business reports.

It's Aldus PageMaker®. And it means desktop publishing to more people around the world than any other program.

For creative professionals, PageMaker offers powerful features for precise page composition, document formatting, spot color, and text handling. All in a friendly, intuitive way.

For business professionals, PageMaker offers features like built-in templates and comprehensive support for long documents. It's the first desktop publishing program to run on both Macintosh® and PC computers. And it's compatible with more business software and peripherals than any other.
# Financial Report To Division Managers

The first quarter numbers are in . . .

<table>
<thead>
<tr>
<th></th>
<th>Three Months Ending</th>
<th>Six Months Ending</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MARCH 31, 1988</td>
<td>MARCH 31, 1987</td>
</tr>
<tr>
<td></td>
<td>MARCH 31, 1988</td>
<td>MARCH 31, 1987</td>
</tr>
<tr>
<td><strong>SALES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.</td>
<td>4,657,770</td>
<td>8,766,909</td>
</tr>
<tr>
<td>Europe</td>
<td>3,726,216</td>
<td>7,035,200</td>
</tr>
<tr>
<td>Asia</td>
<td>937,553</td>
<td>1,753,380</td>
</tr>
<tr>
<td>Net Sales</td>
<td>9,315,539</td>
<td>17,533,689</td>
</tr>
<tr>
<td><strong>OPERATING EXPENSES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of sales</td>
<td>2,081,761</td>
<td>3,523,581</td>
</tr>
<tr>
<td>Selling, general, &amp; admin</td>
<td>3,644,439</td>
<td>6,959,685</td>
</tr>
<tr>
<td>Research &amp; development</td>
<td>465,495</td>
<td>896,671</td>
</tr>
<tr>
<td>Income from operations</td>
<td>3,123,844</td>
<td>5,851,865</td>
</tr>
<tr>
<td>Equity in loss of K.C. operations</td>
<td>(386,915)</td>
<td>(286,134)</td>
</tr>
<tr>
<td>Interest income</td>
<td>73,473</td>
<td>108,171</td>
</tr>
<tr>
<td>Income before federal income taxes</td>
<td>3,039,402</td>
<td>5,743,982</td>
</tr>
<tr>
<td>Provision for federal income taxes</td>
<td>1,135,000</td>
<td>2,175,000</td>
</tr>
<tr>
<td><strong>Net Income</strong></td>
<td>1,903,402</td>
<td>1,043,200</td>
</tr>
<tr>
<td><strong>Net Income per Share of Common Stock</strong></td>
<td>50.17</td>
<td>50.06</td>
</tr>
</tbody>
</table>

...and they look very good.

In the first quarter of 1988 each division took advantage of strong economic conditions in their respective territories to post sales figures well in excess of their goals. Rigorous cost cutting combined with the new distribution system have helped keep our operating expenses in line. Net income increased 285% over the same period. There is every indication that the good work will continue through the rest of the year.

---

**THE BUSINESS SIDE OF PAGEMAKER.**

desktop publishing program available today.

Which explains why over 200,000 creative and business professionals around the world have chosen Aldus PageMaker.

To get a closer look at the creative and business sides of PageMaker, visit your authorized Aldus dealer, or call 1-800-33-ALDUS to order a $4.95 self-running demo disk. Or you can order a colorful videotape demonstration for just $9.95.

In Washington state call (206) 628-2375.*

---

*A Offer good in U.S. and Canada only. The PC demo disk requires an IBM PS/2, PC AT, or compatible with EGA or VGA card and color monitor. The Macintosh demo disk requires an Apple Macintosh 512K Enhanced, Plus, SE, or HH, or at least 1 MB RAM, Apple System 4.1 or higher, Finder 5.5 or higher. Aldus, the Aldus logo, and PageMaker are registered trademarks of Aldus Corporation. Apple and Macintosh are registered trademarks and Finder is a trademark of Apple Computer Inc. IBM is a registered trademark and PS/2 is a trademark of International Business Machines Corporation. ©1988 Aldus Corporation. All rights reserved.

Circle 306 on reader service card
Commentary/Jerry Borrell

high cost of the monitor. So if system cost (including hard drive, please) could come down to $3500, then a Mac II-like color system would sell for about $5500. And every time I shake my head and say that's too much, I remember that I paid about $5500 for my first IBM PC—kinda puts things into perspective, doesn't it? And that was in 1984 dollars.

Why, you ask, should a 19-inch color monitor cost so much? After all, it's basically a 19-inch color TV, isn't it? The reasons for the high cost are twofold. First, although some monitors are produced on the same assembly lines as consumer TVs (in Asia, naturally), they do have different or higher-performance electronics that merit a higher cost. Second, resellers in the United States pay more to their suppliers than they would if they were only selling televisions. And as those of us who used to hook up our color television to an Atari 400 or 800 know, there is a big difference in quality. Okay, the resellers are also making some money on the proposition, but competition should lower prices over the long run. And if you want a smaller monitor, then cost will certainly decline as the players from the IBM monitor market become more important in the Mac market.

If you've got the money, the biggest problem will be choosing the product—Adexx, Radius, E-Machines, SuperMac, Nutmeg Systems, PCPG, Sigma Designs, and MegaGraphics all have new 8-bit, monitor/video card combinations. And there are monitors for the Apple or SuperMac card from several other companies.

And speaking of video, it's apparent that we're still pretty far from having a professional-standard video card. Despite announcements from Julian Systems, Mass Micro Systems, AST Research, TrueVision, and Apple on video products, you would be hard put to convince a television engineer to use a video card to produce broadcast-quality genlocked video signal. But we've definitely got home video quality, and if you're just looking for video scanners, Pixelogic, Computer Friends, MegaGraphics, RasterOps, Data Translation, and Truvel are shipping products today.

Video input is only part of what we want, of course—many of us use color slides, or even 3-by-4-inch transparencies. Transparency scanners are making some headway as well. Truvel produces a scanner for 3-by-4-inch transparencies at 24

(continues)
Finally, the kind of scanner you've always wanted for your Macintosh.
It just took HP to

Scan. In less than 30 seconds, your image is transferred from the HP ScanJet scanner to your Macintosh screen.

Preview Scan. To add another image without leaving your application software, pull down the scanning desk accessory and begin with Preview Scan from the menu.

Edit/Paint. Bring in DeskPaint to touch up your images. Menus and point-click commands make it easy.

Place. Bring in your masthead from memory, place the scanned images wherever you want, copy and place multiple images, key in text, wrap, enlarge or shrink to fit.

The HP ScanJet scanner puts you several steps ahead of other Macintosh-compatible scanners. Because our desk accessory approach lets you scan, edit and paint images all together on the screen. Without having to jump from one application to another. HP's Desk Gallery software makes it all possible. So you can add the impact of photographs, illustrations and logos to your presentations, proposals, sales
Final Scan. Select a portion or all of your image to reduce or enlarge, and scan as line art, halftones, gray scale or negative images.

Print. Another click and you're done. Thanks to the HP ScanJet scanner, the fewest clicks from scanned image to final copy.

letters, newsletters and bulletins. And you can do it easier and faster than ever before. For as little as $2090 for the complete package. Call 1-800-752-0900, Ext. 688B, for your nearest HP dealer. Then try the HP ScanJet scanner for yourself. This is one case where seeing is believing.
Sorry to startle you, but the naked truth is that if you're not using The NightWatch & MacSafe to protect your hard disk files, anyone with access to your Macintosh can browse freely through your files—even changing them without your knowledge. It could be tonight!

With The NightWatch, you can shut down your hard disk securely when you leave the office. The NightWatch stands guard, preventing unauthorized access or erasure of your hard disk. The next morning, start up with The NightWatch user disk & enter your valid name and password. A simple & elegant security solution.

If you share your Mac during the day, MacSafe can help you restrict access to individual documents & applications. With MacSafe, you create folder-like safes and place the files in them you want to protect. It works much like the Finder, so you already know how to use it. With MacSafe's true password protection system (no encryption required), no one can get into your safes without the correct password. Simple, familiar, & fast.

Kent-Marsh Ltd. continues its tradition of security software you can count on with FolderBOLT™. Now you can lock up any folder on your Mac!

Call your dealer or Kent-Marsh Ltd. 800•325-3587

Kent-Marsh Ltd.
Security Software You Can Count On

Join our satisfied customers from Fortune 100 companies, universities, and small businesses in protecting your valuable files with The NightWatch & MacSafe.

MacUser magazine said that with MacSafe "you can rest assured that your files are in safe territory—4 mice!"


Commentary/Jerry Borrell

Computer-aided design is certainly blossoming around the Mac II. Autodesk has dominated the IBM market with its AutoCAD product, but will face challenges from specialized packages in the Mac market. IDD's Dreams looks very strong, and VersaCAD is making quiet, speedy progress towards advancing its product. Generic Software, the IBM CAD spoiler now, has out its $99 design product for the Mac, CADD Level I. Infinite Graphics has the first constructive solid-geometry CAD package for the Mac. It's far from ready, and it's slow as a glacier, but it will improve. On the high-interest side is Claris's entry into the CAD market, Claris CAD. The package was always a good one—and is better now, having been rewritten to sit on top of MacDraw II and extend that platform into professional CAD use.

The downside for Claris is that more people will nod their heads and say those guys only know how to buy products, when in truth the company is on a well-planned path to improve the existing Apple products, acquire strategic products, and release products developed in-house. Claris is now approaching the third phase.

It's architectural CAD that's making the most dramatic strides. Not only is ModelShop (Paracom) finally shipping, but Mac Interiors (CompServeCo), DynaPerspective (Dynaware), ArchitCAD (Abvent), and Mac Architron (Gimeor) are all competing. Mac Interiors is specialized for interior design. It renders with wire frames but has fills that make surfaces look solid. Mac Architron has exteriors and floor plans. And Dynaware has a dramatic 3-D approach to exterior design rendering.

I've talked about imaging products before, but there are some truly amazing ones coming our way—venerable Visual Information now sells a rendering package, The Presentation Toolkit, for under $400. Byte by Byte Corporation, a company that previously developed software for the Amiga, produces the Sculpt-Animate 4D software used to create the ray-cast image in this column.

A new company from France, GTFS, has a truly powerful color-imaging package, Optimage, featuring convolutions, Fourier transforms, filters, and artificial
Simply Accounting is simply magnificent

InfoWorld, March 14, 1988...

“Simply Accounting lists for $349, which gets you all six accounting functions. Other popular entry-level accounting systems for the Mac include Plains & Simple, priced at $395, and Back to Basics at $199.

Of course, these competitors provide only three accounting functions, compared to the six functions of Simply Accounting. You can get these other accounting functions with higher level systems from Great Plains and Layered Inc., but they hit your wallet for $600 or so a module.

Not every company will want to automate the additional functions of inventory, job costing, and payroll. But if you do, Simply Accounting delivers the goods in a cost-effective package.

Simply Accounting is one of the top choices for small businesses who want to start Maccounting.”

Available through most Apple® dealers. Suggested selling price of $349. Dealers may sell for less. Compatible with Bedford authorized DataPrint forms.

Supports AppleShare™ and MultiFinder™.
color enhancements. It's the sort of product you would expect to see on a minicomputer. Power Software has some similarly remarkable 3-D imaging software called MIPS running under its development system. And how can we forget Pixar—it may sell mainly to medical markets, but we'll always think of the company for its animations.

While I'm on the subject of animation, MacroMind's Marc Canter seems to have pulled another good product out of the hat—3D Works. Certainly it is far ahead of its only competitor (in terms of nearness to completion and features), Aegis's Animation Workshop. Apple's animation work under Galyn Susman has produced Apple's first animated film, Pencil Test, shown first at the Association for Computing Machinery's SIGGRAPH 88. The film is a captivating portrayal of an endearing little 2-D pencil that takes a walk in a 3-D world.

There are several new additions to the color world of DTP, including Mainstay's Markup, a program that allows files to be annotated much in the way manuscripts are corrected or edited at publishing companies. There is color clip art now; Image Club Graphics has a CD ROM with 100 megabytes of PostScript-format art, and Enabling Technologies has the first disks of 3-D color clip art. (You remember Enabling—the company that made Pro3D.)

Professional publishing work with color has accelerated; Pre-Press Technologies, Avalon Development Group, and Crosfield-Lightspeed are pushing for products on the Mac that will fit into magazine publishing environments. Avalon's PhotoMac is offering color touch-up, while Crosfield and Pre-Press are attempting to serve professional publishing environments with systems that manipulate color for separations.

Color output, sadly, is still in a primitive state. QMS reigns in this arena with its $25,000 thermal PostScript printer. Howtek and Sharp have prototypes of low-cost thermal printers for the Mac. Eikonix has a very interesting 3-by-4-inch thermal printer, which produces a high-quality picture of a Mac screen. Lasergraphics and Presentation Technologies have film recorders that can capture PostScript files as slides.

Deep in my heart there is a yen for games. Crystal Quest, MacGolf, and a few others have color, true. But I want video-disk-based scene simulation, or at least fast rendering of enough polygons to make a flight simulator seem real. Shading, textures, and shadows—awright, shadows are too much, but at least fast, flat shading so that 3-D shapes seem real. What we need is something like Billiard Parlor, one of the first color games for the Mac II. (It promptly bombed after System 5.0 but it was good while it lasted.) The pool table had the look of felt, the balls had little specular reflections, the cue stick gave a sense of action. It made us want more.

As the transition to color continues, a few things are missing—like a cheaper Mac II. You know—one with, say, three slots and costing about half as much as the current one. And fewer system memory limitations. I wouldn't be surprised to see both of these someday. Jean-Louis Gassée, we hear you, we're saving our money.

But most of all we're awaiting further versions of the products that I've just mentioned. The ones that mesmerize us. The best-kept secret of all is that when the kinds of images that you see here can be produced by each of us, Apple will be selling more Macs than even it suspects. □
Rodime drives for the Mac.

Speed like you've never seen.

FOR A LIMITED TIME!
All Rodime Drives are shipped with FASTBACK for the Mac!
The fastest backup for the fastest drive.
A $999.50 value, yours FREE!

OFFER EXTENDED!

The fastest average seek times of any hard disk drives for Macintosh™ — 26ms! And the largest capacities.

A combination any Mac user would love.
The 450 RX™ — 45 megabytes of internal storage for the Macintosh SE and Macintosh II.
The 1000 RX™ and 1400 RX™ — 100 and 140 megabytes of internal storage for the Macintosh II.

And the PLUS External Series for the Mac Plus and SE. 20 and 45 megabyte capacities that have compact housings that fit right under the Mac.
The 20 and 45 megabyte internal PLUS drives have fans that cool the drives and the Mac.

Plus. Designed by Rodime for easy installation.
Best of all, the RX and PLUS Series drives have the unmatched reliability and support of Rodime—the largest supplier of hard disk technology for the Macintosh.

Rodime drives. The largest capacities and the fastest speeds. Drive one today...experience the speed.

Rodime, Inc. Peripheral Systems Division, 29520 Chagrin Blvd., Pepper Pike, OH 44122, 216-765-8414
Rodime PLC, Nasmyth Road, Southfield Industrial Estates, Glenrothes KY6 2SD, Fife, Scotland

Circle 149 on reader service card
### HYPERWARE
- Activation
- HyperWare Birthday Bundle - includes Business Class & Focal Point...
- Report! For HyperCard...
- Bentam
- Complete HyperCard Handbook (2nd Ed.)...
- Bright Star Technology
- HyperCard...
- HyperDesk...
- Hyperpress Publishing
- Script Expert...
- Icon Factory
- MacroMind
- VideoWorks II HyperCard Driver...
- MicroMaps
- HyperAtlas...
- Power Up...
- HyperTalk...
- Softworks, Inc.
- HyperTools #1 or #2...
- Affinity
- Menu Fonts 2...
- CE Software
- Capture...
- Berkeley System Design, Inc.
- Steppeing Out II...

### UTILITIES
- Affinity
- Tempo II...
- Berkeley System Design, Inc.
- Steppeing Out II...

### DESK ACCESSORIES
- Affinity
- AffinityFile...
- Altas Bonadio Associates
- Expressionist 5.0 (attribution editor)...
- Borland
- Sidekick 2.0...
- Electronic Arts
- Disk Tools Plus...
- Exodus Software
- Hittler...
- Greene
- QuickDEX...
- Imagine
- Multi User Appointment Diary w/Smart Alarms...
- Think 'n Time...
- Software For Recognition Tech
- MinDraw...
- Solutions
- Smartphone & The Clipper...

### LANGUAGES
- Borland
- Turbo Pascal...
- Turbo Database Mac...
- Consulair
- 88000 Development System...
- Manx Software Systems
- Aztec C...
- Aztec C+...
- Microsoft
- Basic Interpreter 3.0...
- Fortran Compiler 2.2...
- SmelthersBarnes
- Protoloy...
- Symantec
- CAPP's Lightspeed C or Pascal...
- LightSpeed C...
- LightSpeed Pascal...
- Zedcor
- ZBasic...

### COMMUNICATIONS
- CE Software
- QuickMail...
- CompuServe
- CompuServe Navigator...
- Cooperate Applications II in A Mac...

### DATABASE SOFTWARE
- Acius
- 4th Dimension...
- Ashton-Tate
- dBase Mac...
- Borland
- Paradox...
- Fox Software
- FoxBASE+Mac...
- Odesta
- Double Helix...
- GeoQuery...
- Park Row Incorporated
- Publish or Perish...
- Personal Bibliographic
- Pro-Cite...
- Software Discoveries
- Record Holder Plus...

### BUSINESS SOFTWARE
- Ashton-Tate
- Full Impact...
- Bravo
- MacCalc...
- Cognition Technology
- MacSMARTS 3.02...
- Cricket
- Cricket Graph...
- Cricket Presents...
- Lange & Associates
- WorksPlus Commands...
- Microsoft
- Excel 1.5...
- PowerPoint 2.0...
- Works 1.1 (Integrated software)...
- nView Corporation
- MacViewFrame...
- North Edge Software
- Timeware III (time/expense tracking)...
- Satori
- Bulk Mailer 3.2...
- Select Micro Systems
- FlowMaster...
- Shanah Enterprises
- FastFrame/Construction Kit...

### WORD PROCESSORS AND OUTLINERS
- Ashton-Tate
- FullWrite Professional...
- Boothware Software
- Pro Resume Writer (multiple resumes)...
- Microsoft
- Word 4 (updated word processor)...
- Write 1.0 (new word processor)...
- Paragon
- QuickMak...
- T/Maker
- WriteNew 2.0 (word processor)...
- WordPerfect Corp.
- WordPerfect...

### SPELLING CHECKERS
- Aegis
- Doug Clapp's Word Tools...
- Deneba Software
- Spelling Coach 3.0...
- Spelling Coach Pro...
- Coach Merriam-Webster Thesaurus...
- Electronic Arts
- Thunder (spelling checker)...
- Microlytics
- Word Finder (synonym finder)...

### MICROSOFT WORD 4.0
- Lasso Word 4 (Microsoft) - Latest version of the best-selling document processing program. Complete WYSIWYG editing; powerful customization options; enhanced tables support; automatic pagination; and two-way file compatibility; (word processors) $249.00

---

*OVERNIGHT DELIVERY*

*ONLY $3.00*

*(see details below)*
From La Cie, these powerful Macintosh utilities lets local and remote users share hard disks and modems .. anyplace .. anytime. Requires no user participation at remote end. Provides complete hard disk management, fast disk duplication, and network chatter. (utilities) $93.00

A professional-level graphics program so powerful, art making is effortless. Adobe Illustrator 88 contains unique and powerful drawing techniques - autotrace, airbrushing, shading, masking, blending, color separations, and printing. Converts MacDraw files instantly. The use of templates allows precise and detailed artwork. Requires 1 M+. (desktop publishing) $325.00

Bring power, automation, and speed to telecommunications with the Macintosh communications solution from SuperMac. Puts a Macintosh interface on all Communications, including remote services and mainframes. No host programming required. Other applications can be developed with minimal programming experience by using the powerful TAL (Telecommunications Application Language) that is included. (communications) $359.00

I'm Kerry, call me at: 

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

Inquiries: 201-367-0440
Canada: 800-255-6447
FAX # 201-905-9279

I don't need to order right now, but please RUSH me my FREE copy of the brand new MacWarehouse Catalog.

NAME

ADDRESS

APTN

CITY

STATE

ZIP

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

M-F 8 A.M. TO 11 P.M. (Eastern Time)
 SATURDAY 8 A.M. TO 8 P.M. (Eastern Time)
SUNDAY NOW OPEN SUNDAYS!
8 A.M. to 8 P.M. (Eastern Time)

Circle 78 on reader service card
Greene

MacBottom HD21 (PCPC) — Small, durable hard disk with optional internal modem. Software includes new enhanced HFS Backup 3.0. (disk drives)
Call

MacDesktop 20 Meg .......................................................... 359.00
MacDesktop 40 Meg .......................................................... 789.00
MacDesktop 60 Meg .......................................................... 849.00
Cutting Edge
800K Drive 2.5" w/"NEW" .......................... 175.00
Wedge XL 30 Plus ......................................................... 629.00
Wedge XL 45 Plus ......................................................... 829.00
XL 30 Internal .............................................................. 595.00
XL 45 Internal .............................................................. 649.00
Dayna Communications
DaynaFile single 360K (5 1/4") ....................... 529.00
Dove
Mach II SE Accelerator Board ....................... 585.00
MacSnap 258 ................................................................. 315.00
MacSnap SCSI Interface Port ......................... 129.00
MacSnap 524 (512k to 1 meg) ....................... 195.00
MacSnap 548S (incl. SCSI interface) ............... 249.00
MacSnap 548 (512k to 2 meg) ....................... 195.00
MacSnap Plus 2 (Mac Plus to 2 meg) .............. 455.00
MacSnap 1024 Memory Expansion Board ....... Call
Everex
EMAC 200 (hard drive) ................................................. 520.00
EMAC 200 Deluxe (0 footprint) ....................... 585.00
EMAC 400 Deluxe (0 footprint) ....................... 995.00
EMAC 507 (tape backup) ........................................ 895.00
EMAC FS-102 ............................................................... 2495.00
Impact 40 MB Hard Drive ................................. Call
Impact 66 MB Hard Drive ............................... 999.00
PCPC
MacBottom HD21 (SCSI) — Call for special offer
MacBottom HD32 (SCSI) — Call
MacBottom HD34 (SCSI) — Call
MacBottom HD21 (SCI) w/Modem ................ 915.00
MacBottom HD21 (SCI) w/Modem ................ 1,045.00
MacBottom HD34 (SCI) w/Modem ................ 1,189.00
WSI (With SCSI interface) .......................... 269.00
Peripheral Land, Inc.
Infinity Turbo 40 Meg .................................................. 1299.00
PL 30 Meg Turbo Drive ................................. 819.00
PL 50 Meg Turbo Drive ................................. 919.00

MODEMS

Abaton
InterFax 12/48 ......................................................... Call
Everex
EMAC 2400 ................................................................. 225.00
Heyes
Smartmodem 1200 .................................................. 299.00
Smartmodem 2400 .................................................. 449.00
Smartmodem 9600 (V series) ....................... 965.00
Migea
Pocket Modem (ext. 300/1200 baud) ............ 115.00
Novation
Parrot Modem (with software) ....................... 99.00
Prometheus
Promodem 2400 .......................................................... 309.00
Shiva
NetModem 1200 (modem for network uses) .... 359.00
Super
Super Modem 2400 .................................................. 149.00
US Robotics
Courier 1200 Modem .............................................. 199.00
Courier 2400 Modem .............................................. 349.00

BLANK MEDIA

Goldstar
DS/DD (box of 10) ............................................. 15.00
Sony
DS/DD (box of 10) ............................................. 16.00
SS/DD (box of 10) ............................................. 13.00

INPUT/OUTPUT

Abaton
ProFont ................................................................. 85.00
Asher Engineering
Turbo Trackball (512 Plus or SE/II) ............... 69.00
Cutting Edge
CE-105 ADB Keyboard ........................................... 125.00
DataDesk
Mac 101 Keyboard .................................................. 130.00
Kensington
New Turbo Mouse ............................................... 105.00
Koala
MacVision (digital) .................................................. Call
Mouse Systems
A+ Mouse (512 Plus) .................................................. 65.00
A+ Mouse ADD (SE, II) ........................................... 85.00
New Image
MacScan (feed-thru) ............................................. 1,186.00
MacScan (flatbed) .................................................. 1,749.00

ACCESSORIES

Computer Friends, Inc.
Macprinter/Black Ink ........................................... 3.00
Macprinter (IV & W IV II) ............................ 41.00
Ergon
MacTilt or MacTilt SE ........................................... 68.00
Mouse Cleaner 360 ................................................. 15.00
The Muzzle (for the SE) ........................................... 82.00

1O Designs
ImageWriter LG Ribbon-Black ...................... 17.00
ImageWriter LG SE Color Ribbon .................. 20.00
IW II Ribbon-Black or Color ......................... 5.00
Four Color Ribbon ................................................... 12.00
Macvision Plus Carrying Case ..................... 64.00
Macvision SE Carrying Case ......................... 76.00
Ribbon for Seikosha — Black ....................... 6.00
Kalmar
Rolltop Cabinets (45, 90, or 135 disks) ........ Call
Kensington
Anti-Glare Filter ..................................................... 33.00
Apple Security Kit ..................................................... 34.00
AppleTalk Clips — cables or connectors ........ 1.00
Disk Drive Cleaning Kit ................................. Call
Mac II Monitor Cable Extension Kit ............... 35.00
Mac II Stand ............................................................. 20.00
MasterPiece Mac II .............................................. 105.00
Printer Stand ........................................................... 16.00
System Saver SE ..................................................... 59.00
Super Base ............................................................... 34.00
Mobotix Products
Fanny Mac OT .......................................................... 65.00
Omniuni Corporation
Mac Desktop Workstation ............................ 75.00
Orange Micro
Grappler/LQ ............................................................. 92.00
Polaroid
Circular Polarizing Filter ............................. 35.00
Targus, Ltd.
Deluxe Mac Plus/SE-XKB Case (black) .......... 65.00
ImageWriter II Case (black) ......................... 49.00
Mac Plus/SE Case (black) ............................. 59.00

continued...
• CT residents add 7.5% sales tax. NJ residents add 6.0% sales tax.

• Your credit card will not be charged until your order is shipped.

• Corporate purchase orders accepted subject to credit approval.

SHIPPING

Orders placed by 5:00 pm Eastern time (weekdays) for UPS ground  delivers overnight. (Some rural areas require an extra day.)

Dreamer

C.0.0. orders ship via UPS (Blue Label Airborne Express overnight unless otherwise specified)

All orders add $3.00 per order. We ship Airborne Express overnight unless otherwise specified.

Defective software replaced immediately. Hardware replaced or repaired at our discretion.

STANDARD 70.00 MOP

T/Maker

ClickArt Business or Publications $28.00

ClickArt EPS illustrations $75.00

DeskPaint 2.0

DESKTOP PUBLISHING PRODUCTS

ADOBE

Illustrator 88 $325.00

Aldus PageMaker 3.0 $475.00

Brainpower, Inc. Architect $185.00

Letraset Image Studio or Ready, Set, Go! 1 ea $179.00

Olduvai Read-It II (OCR) $199.00

Target Systems SPECIAL 189.00

NETWORKING PRODUCTS

Connect Inc.

MacNet $43.00

Farallon PhoneNET (128/512 Plus, SE & II) ea $179.00

Nuvotech TurboNET (128/512 Plus, SE & II) $75.00

SuperMac Network DiskFit $199.00

TOPS 2.0 $275.00

WOS Data Systems Timbuktu 2 User Pack $119.00

CAD/CAM

Graphisoft MiniCad 4.0 $375.00

Innovative Data MacDraft IIa (power drafting) $155.00

Silicon Beach

Digital Darkroom or Super 3D ea $159.00

SuperPaint (super graphics) $109.00

Solutions Curator (graphics management) $79.00

SuperMac PixelPaint $209.00

Symmetry PictureBase 1.2 $99.00

Impact 50 MB Hard Drive (Everest) — The EMAC Impact hard drive series features high speed performance, extensive SCSI addressing, external termination, whisper quiet operation and is compact, slim-line chassis. (disk drives) $59.95

Silicon Beach

Digital Darkroom or Super 3D ea $159.00

SuperPaint (super graphics) $109.00

Solutions Curator (graphics management) $79.00

SuperMac PixelPaint $209.00

Symmetry PictureBase 1.2 $99.00

Graphisoft MiniCad 4.0 $375.00

Innovative Data MacDraft IIa (power drafting) $155.00

Silicon Beach

Digital Darkroom or Super 3D ea $159.00

SuperPaint (super graphics) $109.00

Solutions Curator (graphics management) $79.00

SuperMac PixelPaint $209.00

Symmetry PictureBase 1.2 $99.00

Graphisoft MiniCad 4.0 $375.00

Innovative Data MacDraft IIa (power drafting) $155.00

I'm Kerry, call me at:

1-800-255-6227

(1-800-ALL-MACS)

Inquiries: 201-367-0440 Canada: 800-255-6447

FAX # 201-905-9779

MacWAREHOUSE

1690 Oak Street. P.O. Box 1579.

Lakewood, NJ 08701

MONDAY THROUGH FRIDAY 8 A.M. TO 5 P.M. (Eastern Time)

SATURDAY 8 A.M. TO 4 P.M. (Eastern Time)

NOW OPEN SUNDAYS 8 A.M. TO 8 P.M. (Eastern Time)

MWL8

© Copyright 1989 Micro Warehouse, Inc. MacWAREHOUSE® is a division of Micro Warehouse, Inc. MacWAREHOUSE® and Micro Warehouse are trademarks of Micro Warehouse, Inc. Item availability and price subject to change without notice.
Now.
Put Macintosh images on the big screen.

Finally, with the KODAK DATASHOW™ HR/M Projection Pad, users of Macintosh® computers won't have to look at fuzzy, blue-tinted projected images. Kodak presents the first black-and-white image for Macintosh, generated by an exclusive 20:1 contrast ratio and high-resolution 512 x 342 pixel display. Project any Mac program for a roomful of people. You'll see text and graphics that more closely match your monitor image than possible with any other LCD projection pad. You won’t have to put up with fluctuating contrast, either. The cooling system eliminates the heat buildup that causes these problems in other systems. Advanced technology also eliminates time-consuming vertical and horizontal image adjustments. And finally, the Kodak pad can be used with all Macintosh computers from 128K through SE, with the advanced interface we offer. For product and dealer information, call 1 800 444-KODAK (1 800 445-6325), Ext 835B.

Corporate Climbing
Gear From Kodak

THIS BLACK & WHITE IMAGE FOR MAC
ONLY FROM KODAK

The new vision of Kodak

Circle 194 on reader service card
Viruses R Us

Doctor, doctor, give me the news—
are my files unhealthy? And will we survive
the virus panic of '88?

There are times when everything hums
nicely in your life. Triple positive on the
biorythm chart. A jingle of coins in the
pocket, a comfortable chair, an engaging
book, a loving companion. Good water
pressure in the shower. Iced tea in the
summer, cappuccino in late fall. And then,
like an unforecasted gale-force gust when
you’re halfway across the high wire, a
discordant note strikes, and you realize that it
has been all illusion, a cheap card trick—
we are human, we are doomed, alone in
our miserable cells.

In this case, it was a message on my
answering machine that provided the grim
epiphany: The voice of an editor who had
just received a floppy disk from me. "Stev­
en," he said, "I hate to tell you this, but
you’ve got a bad virus. You’d better check
your system."

My immediate reaction was rather
sanguine. I’d been following the brouhaha
about computer viruses (see “Mad Macs"
in this issue for more on the subject) with
some degree of amusement. Though I ab­
stractly recognized the concerns of corpo­
rations and individuals threatened with
data loss or involuntary exposure to peace
messages resulting from computer viruses,
I had never really considered what it would
mean if, say, I had one. Not only had I ne­
glected to panic at the incipient threat of
infection, but I’d gone about my electronic
business as always, including downloading
software from such sources as Compu­
Serve, MacNet, or some guy I met at my
user group meeting.

Was I now to pay the price for my
carelessness?

Steven Levy is a Macworld columnist and the au­
thor of The Unicorn’s Secret: Murder in the Age of

Breaking the News Gently

Since I had no time that day to spend
with my Mac and its hard disk, I was able
only to switch the machine on and see the
normal desktop. It was not until a few
hours after I heard the message that I real­
ized its impact might be more profound
than I had imagined. Naturally, I spilled my
concerns to my loving companion, whom I
had only recently engaged in holy
matrimony:

"Does this mean you’ve lost any files?"
asked my bride.

"Not necessarily. In fact, I think that’s
careless with the known Mac viruses," I
replied.

"Are you sure?"

"No," I said glumly.
She laughed.
I took a deep breath before my next

remark. "And by the way," I said, "if I have
the virus, uh—you’ve probably got it too."
She was no longer laughing.
"You see, since I bring disks from my
computer home from the office and use
them in your computer, then—"

"You mean you’ve given the virus
to me?"

The conversation had taken an un­
pleasant turn. She wanted to know if I’d
been aware of the virus threat and, of
course, being a diligent computer column­
ist, I had. Then why hadn’t I done every­
things possible to avoid it? Because I didn’t
think it would happen to me. In other
words, my spouse surmised, in an accusa­
(continues)
You've known us as AppleCrate. We are now Crate Technology. So, just say Crate!

We offer a great line of external disk drives now known as MacCrate ranging from 20MB to our performance driven 80MB model all using Seagate quality disk drives.

We have expanded our product line to include InnerCrate: our solution for your Mac SE and Mac II internal disk drive needs. InnerCrates range from 30MB to our high performance 300MB model.

Introducing TapeCrate, our high speed quality backup system. TapeCrate's high speed data transfer rate, protects 60MB of your valuable information in just 12 minutes. TapeCrate comes with a 60MB data cartridge and is ready for “Plug and Play” operation.
### CRATE

**Mac CRATE**
- 20MB 65ms $545
- 40MB 28ms $740
- 60MB 28ms $839
- 80MB 28ms $1149

**Inner CRATE**
- Mac SE 30MB 28ms $560
- Mac SE 50MB 28ms $730
- Mac II 40MB 28ms $585
- Mac II 60MB 28ms $655
- Mac II 80MB 28ms $1085
- Mac II 300MB 16.5ms $2785

**Tape CRATE**
- 60MB tape backup $739

---

California 800-323-9994  Nationwide 800-543-5808
Call for same day orders or technical support.

CRATE TECHNOLOGY

Circle 97 on reader service card
The Examination

First, I had to determine whether or not I had the virus. Maybe it was all a misunderstanding. I knew that the most common Macintosh virus was something called Scores, particularly virulent among computers owned by the federal government and a certain computer magazine to which I contribute. One simple, yet not conclusive, test for the disease was to open the System Folder and see if the Scrapbook file looked like a Macintosh icon or a plain document icon. The former was the "healthy" symbol, and—thank God—that's what I had. But to be sure, I had to take the next step. So I called up a network and downloaded a couple of the antivirus programs that can determine the extent of an infection.

Ironically, one can easily contract a virus by seeking out software that ostensibly fights viruses. In fact, in the MS-DOS world, the creator of a program called FluShot (designed to prevent infection by certain viruses) had been systematically improving the program and renumbering the releases—FluShot 2, FluShot 3, and so on—when he discovered that a total stranger had put up a program on the BBSs that pretended to be the next release, FluShot 4. Sure enough, the so-called virus by seeking out software that ostensibly fights viruses. In fact, in the MS-DOS world, the creator of a program called FluShot (FluShot 4 implanted a nasty virus in the user's computer.

But in this case, I trusted the powers at CompuServe to police these particular programs. Besides, I was impatient—I had to know the prognosis. I got two virus-fighters: Virus Rx and Ferret. The first was a diagnostic program, produced by Apple, specifically designed to see if the dire Scores virus was present on the disk. I put the program through its paces. The hard disk rattled and rolled, apparently giving its scrutiny to any "invisible" files or INIT files that loaded themselves into the operating system without an invitation. Since my sys-
Introducing A Better Display For The Macintosh II...
For About $300.00 Less Than You’d Expect.

This is not just another display clone. It's the new Magnavox Analog Color (MAC) display, specifically designed and engineered to compliment the Macintosh II system.

When we decided to develop a display exclusively for the Macintosh II, we started with two objectives: Make it work better, and make it cost less.

Our 14" MAC display appeals to even the most discriminating user. It's equipped with our new proprietary 0.29mm dot pitch CRT for superb resolution, and a glossy CRT face for crystal clear images. Graphics and text on the MAC display shine at their best. The integrated tilt-base provides the ultimate in user comfort.

Additionally we offer a solid, two-year warranty instead of the usual 90 days. And the $699 retail makes this a great value.

Designing a superior display for the Macintosh II system was smart. Offering it for $300 less, that's very smart.
Introducing the
Shadow™ RM20
only $899.*

This flexible disk drive, with its high-capacity floppies, offers virtually unlimited primary storage and backup capacity. Insert a flexible RM20 floppy and you access 20Mb of storage.

Need even more capacity? Another disk, another 20Mb of memory.
Just remove the full floppy and insert an empty floppy for another 20Mb of storage capacity.

Need security? With flexible floppies, you can secure information file-by-file or all 20Mb at once.
You can remove and lock away files and accessories, and backup data at high speeds.

Want portability? Take your data with you, or send it to someone else.

Want convenience? A disk drive, a backup device, and full archiving capabilities ... all in one unit. Now you can operate like never before.

Why buy from Mirror?
- Buying direct saves money.
- Full 30-day "money back" guarantee.
- Full 2-year warranty.
- An on-going commitment to innovation.

You'll see more with Mirror
1-800-654-5294

Mirror Technologies, Inc.
2644 Patton Road
Roseville, MN 55113

*Shadow is a trademark of Mirror Technologies, Inc.
Prices subject to change.
Steven Levy

tem had seen a virtual revolving door of desk accessories, start-up screens, and other oddities, Virus Rx was pretty busy. But its final conclusion was that no Score's virus existed.

Still, I sought a second opinion from Ferret, another Freeware program. (Software artists have taken pity on users during this plague, and many have donated their virus-fighting efforts to the public domain.) After a tense period of disk access, Ferret confirmed my hopes—no virus. It did tell me that both the System and MultiFinder files on my Mac were "damaged and should be replaced," and I vowed to do just that at an early date. But the disease I'd been accused of spreading did not seem to be in evidence. It could, of course, be a rare virus undetectable by those programs. But aside from bomb screens caused by prerelease software, I had not been experiencing any problems. If this be illness, so far it was benign. On the other hand, I could not be sure that on a certain date a column in progress would not be replaced with a graphic depicting a cold mountain stream from which Canadian beers originate.

About That Virus...

It was around that time that I heard from the editor who had given me the bad news. "You might not have a virus after all," he admitted. (Now he tells me.) Apparently he had been using one of those vaccine programs that identify any alien data microbes instantly upon appearance, and the disk I had sent him set off bacteria alarms—it was then that he called me. But further examination of my disk failed to locate any viruses. So I was clean!

Or was I? Again, the vexing thing about viruses is that even if you test perfectly, there is no way—no way—of knowing if you carry a new, as-yet-unidentified form of virus that will destroy any or all of your data. Such is the uncertainty, doubt, and fear that the virus scare has engendered. To people like me, who have long supported hacker wizardry, insisting that "real" hackers almost never commit intentionally destructive deeds, this is a particularly depressing development. Though I still believe that the creators of viruses are few in number, the effects of their handiwork are truly causing panic and recrimination in software circles—and for good reason.

(continues)
Supra Modem 2400 by Supra Corp.

The **Supra Modem 2400** is an economical Hayes compatible modem with features that will satisfy the most demanding users. This super **Supra Modem** can run at 300, 1200, and 2400 baud rates, supports Hayes "AT" commands and "S" registers, and works with all popular communications software. Some of the noteworthy extras include: auto dial/auto answer, a programmable memory store for one phone number and user settings, a programmable-volume speaker, and eight indicator lights. All of these features are packaged into a very small, attractive case.

**StatView II by Abacus Concepts**

**StatView II** is a supercharged data analysis/presentation graphics program for the Mac II (and the Plus or SE with the 68020/68881 processors). It has all the statistical features of its predecessor StatView 512+, but now boasts increased speed, and graphics capabilities that rival stand alone programs—including full color support. Analyze your data with a comprehensive battery of descriptive, comparative and multivariate statistics, as well as non-parametric tests. Present your data in a variety of formats, and easily add text and graphics. With **StatView II**, you will extract meaningful information from your data without delay!

**StatView II** in a quick look.

<table>
<thead>
<tr>
<th>Desk Accessory Programs</th>
<th>Utility Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Affinity Microsystems Tempo II</strong></td>
<td>35. Read-It! TS (For Thunderstorm)</td>
</tr>
<tr>
<td><strong>Afile File</strong></td>
<td>42. Read-It! O.C.R. 2.0</td>
</tr>
<tr>
<td><strong>Beyond Inc. Menu Fonts 2</strong></td>
<td>48. PCPC HFS Backup</td>
</tr>
<tr>
<td><strong>Beyond Inc. SideKick V2.2</strong></td>
<td>54. Silicon Beach Software</td>
</tr>
<tr>
<td><strong>CE Software DiskTip 3.0</strong></td>
<td>59. Power Data Power</td>
</tr>
<tr>
<td><strong>Dada Software Comment 2.0</strong></td>
<td>61. PowerSpool 2.0</td>
</tr>
<tr>
<td><strong>Electronic Arts Disk Tools Plus</strong></td>
<td>62. DiskIt, 2.0</td>
</tr>
<tr>
<td><strong>Exodus Software Retriever</strong></td>
<td>65. Symantec MacSQQ!</td>
</tr>
<tr>
<td><strong>Languages</strong></td>
<td>69. FullDisk w/Color</td>
</tr>
<tr>
<td><strong>Borland Turbo Pascal</strong></td>
<td>79. FullDisk w/LaserWriter Option</td>
</tr>
<tr>
<td><strong>Turbo Pascal Numerical Methods</strong></td>
<td>82. FullDisk 6.0</td>
</tr>
<tr>
<td><strong>Turbo Pascal Tutor</strong></td>
<td>85. Symantec Lightspeed C</td>
</tr>
<tr>
<td><strong>Consulair</strong></td>
<td>89. Lightspeed Pascal</td>
</tr>
<tr>
<td><strong>Macintosh 68000 Development System</strong></td>
<td>93. TML, TML, Pascal II (Includes MPW)</td>
</tr>
<tr>
<td><strong>Insight Soft PC</strong></td>
<td>97. TML, Pascal II (Includes MPW)</td>
</tr>
<tr>
<td><strong>Mainstay V.I.P. 2.5</strong></td>
<td>101. TML, Source Code Library II</td>
</tr>
<tr>
<td><strong>SoftIce</strong></td>
<td>105. Zedcore ZBasic</td>
</tr>
</tbody>
</table>

**Communications Software**

| **CompuServe** | 24. Hayes Smartcom 11.3 |
| **Griever On Line Encyclopedia** | 25. VersaTerm |
| **Olympic Navigator** | 26. VersaTerm-Pre |
| **DataVault MacLink Plus with Cable** | 27. Software Ventures |
| **Dock Jones Desktop Express** | 28. Software Ventures |
| **Freesoft Red Ryder V8.0** | 29. M. D. Software |

**Supra Modem 2400**

**Supra Modem 2400** by Supra Corp. is an economical Hayes compatible modem with features that will satisfy the most demanding users. This super **Supra Modem** can run at 300, 1200, and 2400 baud rates, supports Hayes "AT" commands and "S" registers, and works with all popular communications software. Some of the noteworthy extras include: auto dial/auto answer, a programmable memory store for one phone number and user settings, a programmable-volume speaker, and eight indicator lights. All of these features are packaged into a very small, attractive case.

**StatView II** is a supercharged data analysis/presentation graphics program for the Mac II (and the Plus or SE with the 68020/68881 processors). It has all the statistical features of its predecessor StatView 512+, but now boasts increased speed, and graphics capabilities that rival stand alone programs—including full color support. Analyze your data with a comprehensive battery of descriptive, comparative and multivariate statistics, as well as non-parametric tests. Present your data in a variety of formats, and easily add text and graphics. With **StatView II**, you will extract meaningful information from your data without delay!
to Polish Up Your Mac...

Wedge XL30+ & XL45+ by Cutting Edge

These two compact, easy to install hard disk drives are ideal for the individual or small business. Each drive is shipped preformatted and with Apple's System software, including MultiFinder and Backgrounder laser printer spooling software. Just unpack it, plug it in, and you're ready to compute! The Wedge XL30+ and XL45+ feature automatic head park and lock on powerdown, easy daisy chaining, external address switches, rapid (23 ms) access times, and a one-year manufacturer's warranty. Quiet fans, small size, and a 6-foot SCSI cable let you take your data anywhere. Both drives are packed with manufacturer-tested backup software that makes data protection a breeze!

Wedge XL30+ .................................................. 629.
Wedge XL45+ .................................................. 829.

Cutting Edge 800K Drive by Cutting Edge, Inc.

The Cutting Edge 800K Drive features an LED in-use light, a manual eject mechanism, and a compact platinum case. It's compatible with the old and new ROMs so you can use it on a standard Mac 512K, a MacPlus, or a Mac SE. The Cutting Edge 800K Drive has a MTBF rating of over 11,000 hours and offers advanced technology and design at an economical price.

Cutting Edge 800K Drive ........................................ 175.

Studio/8 by Electronic Arts

Professional artists and amateurs alike will enjoy the power that Studio/8 reveals in the Mac II. Studio/8 is the first full-color, full-feature user friendly paint program designed specifically for artists. It features versatile airbrush, paintbrush, icon-based drawing tools, and color routines that you can customize. You'll be rid of hassles with custom typesetting because Studio/8 supports full text-editing features in the same text box and allows you to dynamically resize and redefine blocks of type, plus shear, rotate, and skew text. Studio/8 comes bundled with on-line help, a slide show program with built-in production features, a free font disk, and a library of backgrounds and textures.

Studio/8 .................................................. 309.

Components General Ledger by Satori

Components General Ledger is comprehensive, flexible accounting software for users who demand power and ease of use in one package. Custom fit, easily defined data input and report generation support gives you complete control over what goes in and what prints out. You create the account numbering system, and the special entry and regular journals - which can be manual offset or automatic offset types. It's easy to take advantage of Components General Ledger full drawing toolbox, PostScript support, and print preview function to improve the effectiveness of printed materials! Components General Ledger interfaces directly with Satori's Legal Billing II and Project Billing software to support your billing department easily and effectively!

Components General Ledger .................................. 385.

Spelling Coach Professional by Deneba

Spelling Coach Professional is much more than just a spelling checker, it's a complete reference system. It can spell check your document against Merriam Webster's 9th, Legal, and Medical dictionaries which together contain a total of 158,000 words. You also have instant access to a 245,000 synonym thesaurus, and the most amazing feature of all: a complete set of definitions. It supports both interactive and batch checking, and the dictionaries can be accessed through a desk accessory or stand alone speller. Powerful and accurate hyphenation routines are available on demand. Easily add your own words to the dictionary for even more power!

Spelling Coach Professional .................................. 105.

Positively A Plus

PROGRAMS

PLUS

800/832-3201

Circle 44 on reader service card
• • •

Positively APlus!
Blank Media

Disk Drives/Hard Disks/Upgrades
Appitd En1lnmln1
MacRAMS (/MB SIMMS Mac+, SE. ll) 489.
AST Rtst1rch
Mac286 Co-Processor (Mac II)
Call
Centr1I Point
Central Point SOOK External Drive
185.
CMS PRO-II Series 60-11/ I
735.
Compact Series SCJO (Mac+/SE/ II)
649.
Compact Series SC45 (Mac+/SE/ II)
859.
SD Series MacStack SD20(Mac+/SE/ II) 569.
SD Series MacStnck SDJO(Mac+/SE/11) 61 5.
SD Series MacStack SD60(Mac+/SE/ II) 849.
PRO-SE Series JOSE/ I or JOSE/ R
5J5.
PRO-SE Series 45SE/I or 45SE/ R
735.
60MB Tape Backup (Mac +/SE/11)
785.
Cuttln& Edee
Cutting Edge 800k Drive
Spttial 175.
Cutting Edge Wedge XL JO
Plus SCSI Hard Drive
Spttial 6'1.9.
Cuning Edge Wedge XL 45
Plus SCSI Hard Drive
Spttia/8'1.9.
Cutting Edge XL 30 Internal Hard Drive 505.
Cutting Edge XL 45 Internal Hard Drive 645.
Dove Computer Corpor1tlon
68020 Acu /erator Boards for Mac SE
MSE I (16 Mhz)
585.
MSE 2(16 Mhz w/ IMB)
1059.
MSE J (16 Mhz w/ Math Co-processor) 779.
MSE 4 ( 16 Mhz w/ IMB and
Math Co-processor)
1255.
MacSnap 524 (5/2K to IMB)
325.

MacSnap 524E (512 E to IMBJ
MacSnap 524S (512E to /MB w/SCSI)
MacSnap 548 (J/2K to 2MB)
MacSnap 548E (512E to 2MB)
MacSnap 548S (J/2E to 2MB w/SCSI)
MacSnap Plus 2 (MacPlus to
2MB Non Expandable)
MacSnap 2SE or 1024 Option(/ MB
Acc. or Mac// Memory Exp.)
SCSI Interface/ Port
MacSnap Toolkit (torx driver,
opener & grounding set)
Evtrn Emac 200 (20Mg Hard Disk)
Emac 20 Deluxe
Pusonll Computer Peripber1ls
Beige or Platinum Color. Optional
Built-In Modems Available.
MacBottom HD-21
(20+MB SCSI Hard Disk)
MacBottom HD-32
(32MB SCSI Hard Disk)
MacBottom HD-45
(45MB SCSI Hard Disk)
MacBottom HD-70 (70MB
SCSI Hard Disk) Plat only
Rodime Rodime 20 Plus Ext.
Rodime 45 Plus (Ext. 45 MB SCSI)
Rodime 450RX (Int. 45 MB Mac SE/ II)
Rodime 100 Plus (Ext. IOOM B SCSI)
Rodime 140 Plus (Ext. UOMB SCSI)
Rodime 1000 RX (Int. /OOMB Mac/I)

265.
409.
599.
585.
649.

Sin&le Sided 3'h" Diskettes
Bulk (Sony) JW SS/ DD Disks (10)
Sony 3W SS/ DD Disks (box of 10)
Double Sided 3'h" Diskettes
BASF JW OS/ DD Disks (box of 5)
Bulk (Sony) 3W OS/ DD (10)

3559.
1199.
t329.

Seikosba SPIOOO (lmage writer Comp.)
Summ1gr1phics Bit Pad Plus
ThunderWare
ThunderScan V4.0 with Power Port
225. Mac II Power Accessory
259. Video Technoloc
99. Laser 190 A(lmagewriter Compatible)

475.
129.

Modems

15.
520.
585.

Ab1lon lnterFax 12/48
Anchor Automation
MacPac 2400E w/software & cable
AST
AST-2x2400 (MacPlus/SE/11)
Epic
Epic 2400 Int. SE
Epic 2400 Int. Mac II
Epic 2400 Mini Ext.
(Hayes Compatible)
Everu
Emac 2400 Baud
H1yes Microcomputini
Smartmodem 1200
Smartmodem 2400
MDldw Commlink 2400
Mlgtnl
Migcnt Pocket Modem
(ext. 300/ /200 Baud)

659.
699.
859.
999.
629.
9J9.
829.
1169.
1319.
1045.

229.
335.
199.
42.
249.

Accessories
Abaton ProPoint (A DB Mouse
for Mac SE & Mac II)
99.
Asher Enclnmlnc
Turbo Trackball (Mac & Mac+ ar
Mac SE & Mac II)
69.
CH Products
Mach IV Plus: Quad or ADB
65.
Mirage: Quad or ADB
(Turns Joystick Into Mouse)
39.
Curtis M1nur1eturlng
Emerald-Surge Suppressor-SP-2
36.
Ruby-Surge Suppressor-SPF-2
55.
Cutting Edge Culling Edge EADB-105
Keyboard (Mac SE & Mac II)
135.
DataDesk
MAC-101 Keyboard/ Beige
(/28k/512k & MacP/us)
Special 139.
MAC-IOI ADB Keyboard/ Platinum
(Mac SE & Mac/I)
Special 139.
Eriotron Mousccleaner 360"
15.
MacTilt or MacTilt SE (Platinum Color) 68.
Farlllon MacRccorder Sound System
(Mac SE or Mac II)
145.
Impulse Audio Digitizer w/soundware 149.
1/0 Desicn Mac Luggage in Navy
Macinwarc Plus Carrying Case
64.
Macinwarc SE Carrying Case
76.
lmagewasc II Carrying Case
49.
HDware
54.
Kalmar Deslcns
Teakwood Roll-Top Disk Cam :
Micro Cabinet (holds 45 disks)
14.
Double Micro Cabinet (holds 90 disks)
23.
Triple Micro Cabinet (holds 135 disks)
32.
Kensln1ton External Disk Drive Cover
8.
Extra Long ADB Keyboard Cable
25.
Macintosh II Stand
20.
Macintosh II Monitor Extension Cable
33.
Mouse Pocket (Reg. or ADB)
8.
Mouseway (Mousepad)
8.
lmageWriter or lmageWritcr II Cover
9.
Macintosh Plus/SE Dust Cover
9.
Macintosh SE w/extended Kybd Cover
9.
Mouse Cleaning Kit w/ Pocket
17.
Disk Drive Cleaning Kit
20.

9.
17.

Ccntcch 3'h" OS/ DD Color Disks (10)
Sony 3'h" OS/ DD Disks (box of 10)
Fuji 3'h" OS/ DD Disks (box of JO)
Maxell 3W OS/ DD Disks (box of /0)
Verbatim 3W OS/ DD Disks (box of 10)
3M JW OS / DD Disks (box of 10)

19.
18.
19.
20.
19.
20.

475.

lilt/ Swivel
22.
Apple Security Kit
34.
Antiglarc Polarizing Filter
33.
Modem/ Fax Protector 10
15.
29.
Modem/ Fax Protector 20
Power Tree Surge Suppressors
(10, 20, or 50)
Call
Printer Muffler Stand (80 & 132)
21.
Printer Muffler 80
43.
System Saver Mac (Beige or Platinum)
64.
Super Base
34.
System Saver SE
59.
Masterpiece Mac II
105.
New Turbo Mouse (Reg. or ADB)
109.
Mobius Fanny Mac QT (Beige or Plat.) 65.
Mouse Systems A+ Mouse (MacPlus)
65.
A+ ADD Mouse (Mac SE/ Mac II)
85.
Moustr1k Mouse Pad 7' x9" Size
8.
MousePad 9"x II" Size
9.
Or1nge Mitro Grappler CJ Mac/GS
84.
Grappler L/ Q
98.
Ribbons
Available in Black, Blue, Brown, Grun,
Orange, Purple, Red, Yellow. Silver & Gold
lmageWriter Ribbon
4.
lmageWriter Black 6-pack
20.
lmageWriter Rainbow Pack (6 Colors)
20.
lmageWriter II-Four Color Ribbon
9.
lmagcWriter LQ Black
17.
lmageWriter LQ Four Color
20.
Sei.kosha Ribbon Black
6.
Silicon Comforts MacChimney
(Very Effective Cardboard
l.llminate Convection Cooling Device) 16.
Smith & Bellows
Mahogany Disk Case (holds 96)
30.
Sopris Sortworks
High Trek Carry Cases - Platinum Gray, Navy
49.
lmagewriter II Case
Macintosh Plus, SE w/Standard Kybd
59.
Macintosh SE & Extended Kybd Case
69.
Targus (Can1dl)
lmagewriter II Carry Case Olk.
45.
Macintosh Plus Carry Case Olk.
59.
Deluxe MacPlus-XKB Olk.
65.

415.
179.
625.

315.
315.
155.
225.
299.
449.
189.

115.

NoV1tlon
Novation Parrot 1200
109.
Praclle1l Peripher1ls
109.
Practical Modem 1200SA
Practical Modem 2400SA
189.
MacCommpack
249.
(UOOSA w/ Microphone & Cable)
Promttheus
Promodem 2400M Ext.
(Soft ware & Cable)
199.
Promodem 2400
(Hayes Compatible)
309.J
Supra Corpor1tlon
Supra Modem 2400
Spttial 149.
U.S. Robotics
Courier 1200 (Hayes Compatible)
199.
Courier 2400 (Hayes Compatible)
349.
Courier 2400E (Hayes Compatible)
379.
Courier HST 9600 (Hayes Compatible) 689.

800/832-3201

Printers & Digitizers
AST Research TurboLaser P/S
TurboScan (Sheetfeed model)
TurboScnn (Flatbed model)
Koal1 Technotocles Corp.
MacVision 2.0 (Digitim)
Kurt1 IS ADB Tablet
Cordless 4 Button Cursor

12.
13.

Customer Service (203) 378-3662 • FAX (203) 381-9043
Monday thru Friday 9 A. M. to 9 P. M.
Saturdays IO A.M. to 6 P. M. (& stern Time)
OUR POLICIES
• We accept MASTERCARD and VISA with no added surcharge.
• Your credit card is not charged until we ship.
• If we must ship a partial order the shipment that completes the order is
sent freight free.
• If you arc ordering by mail, we accept private and company checks. With
MASTERCARD and VISA orders mclude card number and expiration
date. Connecticut residents add 7.5% sales tax.
• Locations more than I day away shipped via Federal Express Standasd
Air service.•
• Federal Express Priority I service also available.
• Sorry, we cannot accept COD orders.

SHIPPING
• Continenlll United States: Add $3.00 per order to cover Federal Express
Standard Air service~ APO/ FPO orders shipped 1st Class Mail (add 3%
$5.00 Min charge). Alaska, Hawlll and Outside Continental US: call or write
for information.

RETURNS
• Defective software will be replaced immediately by the same item. Defective
hardware will be replaced or repaired at our own discretion. Call customer
service at (203) 378-3662 to obtain a Return Authorization Number before
returning goods for replacement. Products purchased in error subject to a
20% restocking fee.
AU items subject to 1vailability. Prices subject to d1111ce without notice.
Mill-in orders (especillly from fordcn countries), please furnish telephone

number.
•When your order Is shipped from our r1elllty ln Str1trord, CT, Fedtfll
Express Sllndud Air SttYke will deliver the p1ekl1e In I to 2 cbys.
This SttYice d«S not guarantee next d17 delivery.
_j (

~· 1~- ~,

Now Shipping Standard Air Service by [P»'~ i

75 Research Drive
Stratford , Connecticut 06497
800/832-3201
©

Copyright 1988 Programs Plus, Inc.


In my own case, I still have nightmares about what could have happened if I'd been infected just a few months ago, when an entire book-manuscript-in-progress rested on my hard disk. What if those files, along with the ones I had scrupulously backed up, had been compromised in such a way that I couldn't print them out? My imagination fails when I consider what my reaction might have been, especially if sharp objects or strong barbiturates had been at hand when I discovered the damage.

**Strained Relations**

Yet, even after my unnerving bout with the prospect of data meltdown, I am reluctant to join what seems to be a growing lynch-mob mentality of those rightfully offended by this phenomenon. Insulting the perpetrators of these destructive acts and wishing them dead adds little to what I consider a form of dialogue between the virus criminals and the user community. I compare this situation to the still-controversial one involving "crackers" who break into restricted information networks that store credit-card information or government secrets. To me, the issue was not that clever teenagers were breaking into the networks, but that our system so blithely encouraged storage of sensitive data on such vulnerable networks.

The underlying message of the virus spreaders might be more complex. After all, it is not only networks that suffer from viruses, but single-computer users as well, who could contract infection not only from downloading software, but also from loading corrupted commercial programs. Fear of viruses provides an unhappy disincentive to the free exchange of information. How could viruses be anything but an unmitigated blight?

Only in this: viruses might be the last warning we have about how deeply dependent we're becoming on our computers. The success of personal computers is now unquestionable. As a result, our culture is taking a giant step into the unknown. Who can predict the secondary impact of total computer saturation? I know my experiences with the Macintosh and the Apple II that I previously owned have changed my life for the better, but I also see an age approaching where my dependence on the Mac and its descendants will be so complete that I will be unable to assess its effect by such glib qualitative criteria. Did the automobile make our lives "better"? Did television? Of course—but both were instrumental in destroying many of our most deeply held values.

So perhaps the virus scare is giving us an opportunity to take a deep breath and assess our surroundings one more time before we take the plunge into a future where data handling becomes so important that a clever 14-year-old can throw an electronic monkey wrench into all we hold dear. Realistically, I see no alternative to pushing forward with the computer revolution. And I want the benefits of that revolution in my own life.

But just the other day the newspapers ran a story about a ring of child molesters who kept track of their victims by personal computers. For just a second, I thought the world could use a few more computer viruses. Of course, I came to my senses, and if you ask me now what I think about viruses, I will mouth the requisite condemnations. Because there really is no other alternative to the future, where Vannevar Bush and George Orwell arm wrestle daily, and every silver lining has a thundercloud.
More Power!
12 Issues for $47.40

☐ Send me 1 year/12 monthly issues of MACWORLD for $24. Save 20% off the basic subscription rate.
☐ Save Even More! 2 years/24 monthly issues for $37.90.

Please Bill me later.

Name ____________________________________________
Company __________________________________________
Address __________________________________________
City State Zip _______________________________________

By regular subscription, Macworld is $30 for 12 issues. The annual cover price is $47.40 (12 issues). Offer available to subscribers in the U.S. only. Please allow 6-8 weeks for delivery of your first issue.

MACWORLD
More Information!
12 Issues for $47.40

☐ Send me 1 year/12 monthly issues of MACWORLD for $24. Save 20% off the basic subscription rate.
☐ Save Even More! 2 years/24 monthly issues for $37.90.

Please Bill me later.

Name ____________________________________________
Company __________________________________________
Address __________________________________________
City State Zip _______________________________________

MACWORLD
More to Give!
12 Issues for $47.40

A one-year subscription (12 issues for just $24) will be sent to the person listed below. Save 20% off the regular subscription rate of $30 and nearly 50% off the annual newsstand price of $47.40.

Please Bill me later.

Send Gift to: Name __________________________________
Address __________________________________________
City/State/Zip ______________________________________

Send Gift from: Name ________________________________
Address __________________________________________
City/State/Zip ______________________________________

Please allow 6-8 weeks for delivery of your first issue. Offer good in the U.S. only.

MACWORLD
Save Almost $24.00 Off the cover price.

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 1262 BOULDER, CO
POSTAGE WILL BE PAID BY ADDRESSEE
MACWORLD
Subscription Department
P.O. Box 51666
Boulder, CO 80321-1666

Save Almost $24.00 Off the cover price.

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 1262 BOULDER, CO
POSTAGE WILL BE PAID BY ADDRESSEE
MACWORLD
Subscription Department
P.O. Box 51666
Boulder, CO 80321-1666

Save Almost $24.00 Off the cover price.

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 1262 BOULDER, CO
POSTAGE WILL BE PAID BY ADDRESSEE
MACWORLD
Subscription Department
P.O. Box 51666
Boulder, CO 80321-1666

Save Nearly 50% When You Subscribe Today!

MACWORLD
The magazine that helps you get the most from your Mac

Macworld is your key to it all. Productivity. Creativity. Whether you want to upgrade software, hardware... or learn to use what you have to its fullest potential.

That's what Macworld does—links the Mac's potential to yours.

We look out for your interests. We tell you what's new for the Mac. What it does. Who it's for. Compare similar products—and name names! Discuss pros and cons. Assess value for money for both hardware and software.

We help clarify your options. Is the upgrade worth it? What does this program do that your present software doesn't? Will it work with your printer? If we help you make just one right decision, your subscription is worth it!

Macworld is more product-driven, more YOU-oriented than ever before. The thing to do now is make the most of your Mac. Macworld is the key.

- Applications
- Power Upgrades
- Buying Guides
- Straight-Shooting Reviews

Mail the Attached Card Today!
Of the many spreadsheets available, one and only one gives you the ease of learning, ease of use, raw speed, and the most visually compelling and flexible formatting available — MacCalc.

A basic reality of the use of computers and software is that faster is better. Period. MacCalc is the fastest spreadsheet. Period. Faster than Excel, faster than any other Mac spreadsheet. And that’s not just opinion; this fact has been proven repeatedly in tests by MacUser, MacWorld, MACazine, MacWEEK, & InfoWorld. MacCalc’s incredible performance lets you work more smoothly — more naturally.

MacCalc was designed to give every level of user easy access to all of its capabilities, so all of that speed doesn’t go to waste while you learn the program — you get flying right from the start. MacWeek summed it up rather well, “MacCalc answers the frustration of Excel users — MacCalc is exceptionally easy to use.”

With desktop publishing level formatting abilities, MacCalc users produce stunningly professional presentations of their information, and that lets them get their point across not only faster, but better. With unique fonts, sizes, styles, and/or formats for each cell, individually variable row heights as well as column widths, you can highlight important numbers, make titles stand out... in other words, make your point.

MacCalc’s extensive list of features include: Lotus 1-2-3 file/SYLK data compatibility; cell notes; on-line help; intelligent database functions; keystroke macros (via Apple’s MacroMaker); and much more.

With MacCalc’s list price only $139, Infoworld concluded that MacCalc is “the clear value leader.” MACazine stated unequivocally that “MacCalc is the spreadsheet of choice for those who want useful functionality without undue complexity,” and finally concluded “...[MacCalc] is a must have.”
Will everyone who hates making backups please raise their hand.
Backing up your data doesn't really take an eternity, it just seems that way.

Unless you have an Irwin® minicartridge tape backup system.

In which case you don't think about eternity. You think about what's for dinner and how you just might beat the rush hour.

Because our EzTape® software lets you automatically store exactly the data you want, whenever you want.

Without the hassle of complicated commands or complex procedures.

So instead of heading for a case of floppies at day's end, you can head for home. Irwin tape drives work with all the popular networks.

And backup tapes written on one Irwin drive will be read perfectly by a similar or higher capacity Irwin model.

With our patented AccuTrak™ precision tracking technology, you can transfer data from a Mac to a PC to a PS/2. And vice versa.

Another accomplishment that's ours alone.

All of which may explain why our systems are the hands-down favorite over all others combined.

So call 1-800-BACKUP1 for the Irwin dealer nearest you. Making backups may never become your favorite thing to do.

But an Irwin system could become your favorite way to do it.

Circle 82 on reader service card

© Copyright 1988, Irwin Magnetic Systems, Inc., 2101 Commonwealth Blvd., Ann Arbor, MI 48105. Irwin and EzTape are registered trademarks, and AccuTrak, EzStart and Irwin BACKUP are trademarks of Irwin Magnetic Systems, Inc. Other brand or product names are trademarks or registered trademarks of their respective holders.
If you can plug in a telephone, you can install your own AppleTalk network. Our PhoneNET System makes it easy as A.B.C.

PhoneNET uses ordinary phone wire. No soldering. No rewiring. And it's so reliable, PhoneNET almost never needs servicing.

Our installment plan is flexible. PhoneNET fits any floor plan. It's expandable, too. By simply adding our StarController or PhoneNET Relay, you can link PhoneNET systems from different floors or buildings into one big network.

Call (415) 849-2331, ext. 35 for the Farallon dealer nearest you, and find out how little it takes to get started on the PhoneNET installment plan.
Apple Connects with New Scanner

Scanners that convert hard-copy images into a screen format aren’t new to the Mac, but an Apple scanner is. Apple’s flatbed scanner, the AppleScanner, provides a computer connection to almost anything on paper. Apple has priced the unit at $1799, including software, to encourage both users and developers to take advantage of the billions of color and black-and-white images currently available.

The AppleScanner plugs into the SCSI port of the Mac and fires up with AppleScan or HyperScan software. HyperScan was written by HyperCard inventor Bill Atkinson largely as a quick and simple way to bring graphic images into HyperCard stacks. It can reduce or enlarge images, change the contrast or brightness of a scan, overlay an image with any one of 36 screens, or sharpen an edge. And HyperScan is fast, inputting an image into HyperCard in about two minutes.

AppleScan is more complex. It can assign any one of 16 gray levels (4 bits per pixel) to each pixel, resulting in an image that is more photographic than HyperScan’s high-contrast images, in which each pixel is either black or white. While other scanners offer up to 256 levels of gray (8 bits per pixel) to assure true photographic quality, Apple decided on 16 levels of gray to match the capabilities of its laser printers.

AppleScan can input line, halftone, or gray-scale art and can scale an image from 25 to 400 percent, depending on the output resolution, which can vary from 75 to 300 dots per inch (dpi). User-adjustable controls include brightness, threshold, and contrast. You can establish settings easily within the settings dialog option, which allows you to quickly test the results of various settings and then print examples. You pick the one that looks best and use the associated settings.

The AppleScanner also supports optical character recognition (OCR) software such as Caere’s OmniPage, which allows the scanner to scan text that can then be edited with a word processor.

Apple’s scanner also directly supports the AppleFax modem, enabling you to scan a document and send it to any fax machine for printing. This technique significantly increases the quality of the resulting image over that offered by a traditional fax-to-fax system. For further information, call Apple Computer in Cupertino, California, at 408/996-1010.

3-D Animation

MacroMind, creator of VideoWorks, has announced 3D Works and RenderWorks, three-dimensional animation and rendering packages capable of animating sequences and individual frames, and shading the final images. Based on the Twist animation software developed by Julien Gomez at Ohio State University, 3D Works offers a VideoWorks-like interface and a score. One of the program’s strengths is its flexibility in controlling an animated object’s motion. After setting the start and end points, the animator can choose from a variety of paths for the object to travel: linear or cubic spline (B-spline, bezier, and Catmull-Rom). 3D Works interpolates the object’s positions for movement along the path. The animator also controls whether the object moves at a constant velocity or accelerates from a standstill to a set speed.

RenderWorks can apply a number of different algorithms to render or draw the final objects in a frame. Objects can be rendered with a faceted surface, shaded using the Gouraud (continues)
We’ve taken LEVEL5 to the Macs.

One of the world’s most widely used expert systems is now available for the Macintosh.

Powerful, fast and easy to learn, LEVEL5 not only runs on the Macintosh—it uses all of the unique facilities that make the Macintosh so special. What’s more, LEVEL5 applications are portable to all other LEVEL5 platforms—IBM mainframe, DEC VAX, even the PC and PS/2.

LEVEL5 supports knowledge bases as large as 10,000 rules. Plus graphics and pictures. And it can access EXCEL spreadsheets and HYPERCARD stacks.

LEVEL5 already has thousands of users running hundreds of successful applications. And LEVEL5 is a product of Information Builders, Inc., creators of FOCUS—the leading fourth-generation language. A $100 million company, IBI supports LEVEL5 at 45 locations worldwide.

To order the Macintosh version of LEVEL5 (just $685, VISA or MasterCard accepted), or for more information, call 1-800-444-4303. Or write Information Builders, Inc., 1250 Broadway, New York, NY 10001.
or Phong models, or drawn with a reflection map, texture map, or bump map applied to the surfaces.

The number of objects or light sources that may appear in a scene is unlimited, and the light sources and camera can be attached to other objects. The program generates opacity information and can store and retrieve that data from 32-bit per-pixel video display boards using an alpha channel buffer.

3D Works has another unique feature: it can animate an object's transformation from one shape to another by interpolating the intermediate shapes when the animator specifies a start and end shape.

Macworld News

**HYPERCARD**

**Building Stacks Better and Faster**

In addition to Client, a $195 HyperCard stack that serves as a client information database, Softworks is offering HyperTools #1 and HyperTools #2 ($99.95 each), utility packages that extend the functionality of stacks.

Both packages present their tools as buttons on a startup card. HyperTools #1 and #2 each contain sixteen tools (four of which appear on both disks). HyperTools #1 includes tools to help you install, align, and create arrays of fields and buttons. HyperTools #2 offers data formatting and validation, font viewing, sorting, and other stack-building tools. The utilities come with indexed manuals, and their scripts are not protected.

HyperTools #1 and #2 are intended to help stack builders and script writers build stacks better and faster. However, novice script writers should be forewarned that the effort to understand and use prewritten HyperTalk code can often be as substantial as the effort to write code from scratch.

The Client stack is geared for use by salespeople. Fields are designed to hold information about each customer's access, contact history, financial background, and interests. The stack helps implement HyperCard's reporting and mailing-list functions. Like many HyperCard-based database applications, Client is painfully slow. The scripts are password-protected.

For further information, contact Softworks in Huntington, Connecticut, at 203-926-1116.

Dukakis strategists used Macs, a DEC MicroVAX II, and DEC terminals to track trends on the Democratic Convention floor.

**Mac/VAX Connection**

**Tracks Demos**

When Michael Dukakis's presidential campaign bandwagon got rolling at the Democratic National Convention in Atlanta, Macintoshs were part of the action. Dukakis campaign strategists depended on a computer system composed of Macs, a Digital Equipment Corporation (DEC) MicroVAX II, and DEC terminals to track delegate opinions and trends on the convention floor.

Dukakis whipped the floor, gathering background and information on the delegates' positions on the issues. Using DEC terminals, other campaign workers entered the information into a MicroVAX database.

Meanwhile, Mac users stationed at the Dukakis headquarters accessed the database with Pacer Software's PacerShare to generate graphs and charts with Access Technology's Trapeze. Staffers then imported

Softworks' Client is an information database that salespeople can use to hold information about each of their customers.

...and newsletters. The flyers included digitized pictures of Dukakis and his key supporters, created with a Canon still-frame camera, PixelLogic's ProViz digitizer, and a Microtek scanner.

The information system at the convention was developed by SIS, which used the VAX for speed and storage, the Mac for graphics and data analysis, and connectivity software to tie everything together. For more information on the system, contact SIS of Boston, Massachusetts, at 617/720-5500. —Brita Meng

**HYPERCARD**

**Hot Stacks**

Check with a user group or bulletin board about obtaining these hot new freeware or shareware HyperCard stacks: **Deprotect** by Ned Hawth and **Allan Foster**. A password-
Thank You.

To all that visited our booth at the Boston Macworld Expo. The support that Jasmine received was phenomenal. We appreciate the time you took to talk with us.

When asked to vote for the best products, you reinforced our confidences by awarding us the Macworld World Class Award in both of the categories in which we competed. We also received the MacUser Eddy Award in January.

Our customers are fundamental to our success. Your satisfaction is our #1 concern. You proved that all our efforts are worthwhile. Our dedication to bringing you the most advanced technology at the most competitive prices will continue. That's our promise.

Thank you again for your continued support. We look forward to seeing you in January at Macworld San Francisco, right here in our own backyard.

1988 Macworld Magazine World Class Award
Alternative Mass Storage
MegaDrive

1987 MacUser Eddy Award
DirectDrive 80

1988 Macworld Magazine World Class Award
Hard Disk Drives
DirectDrive 80

“...Our evaluation indicates that the Jasmines' DirectDrives are excellent. Jasmine did not cut any corners in design and construction... Only the price is lower than the competition’s...”

MacWeek

“...You can easily fall in love with the quiet Jasmine drive... The drive ran flawlessly during the review period, with very good performance and no compatibility problems of any kind.”

Rick Ford, Macworld

“I suspect a major reason for their success is that they produce a good product at a good price... On this basis, I would recommend Jasmine products without hesitation.”

Jack Warner, Palm Beach Post

© 1988 Jasmine Technologies, Inc. DirectDrive and MegaDrive are trademarks of Jasmine Technologies, Inc.

Circle 457 on reader service card

1740 Army Street
San Francisco, CA 94124
415-282-1111
Death Mall 3000 takes you on an elaborate HyperCard adventure in a futuristic shopping mall. Encounter intergalactic creatures as you make your way through the mall. 

Death Mall 3000 by John Malay: An elaborate and well-drawn adventure game (go east, west, north, south) set in a shopping mall. —Scott Kronick

Apple’s New Developer Tools

Writing Macintosh software is no piece of cake, but Apple’s Developer Tools Group hopes to make it easier by the end of 1988 with the release of three new software development tools that were initially written for internal use by Apple’s Software Quality Assurance Test Tools Team.

RAMdump lets you dump the entire contents of RAM to a floppy disk, which can be especially useful after a program crash. By having a floppy copy of a crashed Mac’s memory (RAM) contents, you can examine and debug problems at any time—even long after a crash. Beta testers should find it a good way to send information on software crashes to the software developer.

RAMdump’s partner is an application called ReAnimator, which re-creates the crash with the RAMdump information. It lets a programmer see exactly what was going on in the Mac when the program crashed. For example, instead of asking a beta tester for a list of INTIs in the system, a developer can get the information from ReAnimator.

The third tool, Extended Discipline, helps to catch and identify incorrect parameters for Mac Toolbox calls. It will work with any Mac debugger that supports Apple's defined Extended Discipline interface. Not only does it find inconsistencies in a programmer’s code, but it also requires the programmer to write code according to Apple’s programming guidelines.

Apple has another research project in progress called Player Piano, which allows automatic testing of applications with scripts. It requires one Mac to control the script, and another to execute the application being tested. The controller feeds events—open window, save file, and so on—to the executing Mac over AppleTalk. Currently, this type of testing is done manually at Apple.

With Player Piano, you can concentrate on writing scripts for extensive automatic testing and stop wasting time on manual testing. For further information, contact Apple Computer, Developer Tools Group—Test Tools, 20525 Mariani Ave., MS: 275, Cupertino, CA 95014, 408/996-1010. —Brita Meng

HYPERCARD

How Readers Use HyperCard

In just one year, HyperCard has gone from being a gleam in author Bill Atkinson’s eye to being one of the most popular major applications on the Macintosh. Fifty percent of the 483 individuals who responded to
...let experts manage your art collection!

Whether you're looking for that elegant egret or your bushy bluebird, The Curator takes the confusion out of finding and integrating art in all of today's common formats.

The Curator accesses graphics in TIFF, Encapsulated PostScript™ (Macintosh or IBM), Glue™, MacPaint, PostScript and PICT formats from any program through a desk accessory (or MultiFinder application). It can even convert your art to a different format. Now you can use all your graphics in almost any application.

Take a drawing from Illustrator™ and copy it into Word™. Scan a picture into TIFF format and paste it into MacDraw™. Trace your signature in FreeHand™ and paste it into any word processor. If the art is not in a format your program will accept, convert it and try again. It's that simple.

When you work with graphics, you remember what they look like, not what they're named. So, The Curator gives you a visual table of contents for your whole disk.

You can also search for your files by name or keywords without filing them in a database. If you have art in PictureBase™ format, The Curator will convert it, complete with keywords. Or, you can use The Curator to add keywords. You'll never have to wonder where you left that elegant egret again.

If you use one, or many standard graphic formats, you need The Curator to manage your art collection. Get yours today!
Macworld's latest reader survey currently use HyperCard. (Surveys were mailed to 1000 randomly selected readers.) Forty-seven percent of respondents using HyperCard reported purchasing the program. The others had obtained the program either with a new Macintosh or from a bulletin board, friend, or dealer. An impressive 76 percent of respondents using HyperCard felt it played an important part in increasing their capabilities, although 21 percent found it difficult to use.

Ninety percent of respondents using HyperCard said they had used the Browsing mode, and only 6 percent of those who had tried Browsing found it difficult to use. The same was true of the 83 percent who had tried the Typing mode; only 6 percent of those who used Typing found it difficult.

While these HyperCard users wanted to see some improvements added—such as report-printing capabilities, more speed, the ability to fill large screens, color support, and more programming capabilities—30 percent said HyperCard had already led them to purchase another Macintosh product.

With the fruits of HyperCard to be found in over 1000 stacks currently available on public domain bulletin boards and in a rising number of commercial products, more and more people are probably wondering, OK, Bill, what's next?

Macworld News

Ray Tracing for Mac IIs

Ray tracing has long been the domain of mainframes and minicomputers. Ray-tracing algorithms simulate the path of light rays from a light source to a viewpoint, creating photo-realistic images, but the process takes hours or even days of computation. When a ray encounters an object while rendering an image, the algorithm must take into account not only the properties of the object (is it opaque, transparent, translucent, reflective, or textured?), but also the object's relationship to other objects (will shadows hit it, will other objects be reflected in it, will it be reflected in adjacent surfaces?). If you've seen computer graphics depicting reflective spheres floating above a checkered ground, you've seen the classic ray-traced scene.

Amazingly enough, a sophisticated ray-tracing program is being converted to run on the Mac II. Ray Tracing Corporation of Palos Verdes, California, plans to release MacTracer this winter. Priced at $895, MacTracer will run on a Mac II with 4MB of memory and an 8-bit or 24-bit color card. This high-end desktop tool will enable an architect to realistically simulate a building and its environs, for example, or a scientist to illustrate a molecular structure.

According to Ray Tracing's president, Greg Passmore, the company's programmers are squeezing an existing program that runs on high-end graphics computers into the Mac II and adding a Mac-like interface, while retaining much of the functionality of the original program. MacTracer's modeler creates 3-D models in memory; rendering algorithms then produce a realistic image, employing features such as shadow casting, reflections, refractions, texture-mapping, compositing, several levels of antialiasing, multiple colored-light sources, and water-simulation equations. MacTracer saves files in PICT format for printing to film recorders, laser printers, or videotape, or pasting into color graphics programs such as PixelPaint.

For further information, contact Ray Tracing Corporation, 2516 Via Tejon, #316, Palos Verdes Estates, CA 90274, 213/373-2998. -Erfert Fenton

Ellyn November of Ray Tracing Corporation shows off the graphic power of MacTracer, a sophisticated ray-tracing program.

NuBus Interface and Controller

A key part of Apple's strategy to break into the workstation market is Texas Instruments' 32-bit NuBus architecture for the Mac II. But as Apple and TI have learned from potential third-party coprocessor board developers, designing an interface to implement the NuBus protocol has been an arduous and time-consuming task.

TI and Apple have responded by creating a new interface (continues)
How to shoot a moose with your Mac.

Scan it with SCAN-IT™

When it comes to computers, scanning images is a different animal. Until now! With Howtek color scanners and software, you can accurately scan four-color artwork directly into your computer. Images can be cropped, resized, even color corrected. In fact, you should see what Howtek peripherals can do.

Images up to 11" x 17" in size, or film transparencies up to 8" x 10". The Scanmaster/35™ digitizes mounted or strip film in either positive or negative format.

Software That Enhances Your Image

With MacScan-It™ software, all scanner functions are at your fingertips. Simply select an image area to scan, zoom, crop or resize with an easy-to-use menu. What's more, you can make global color and contrast corrections for a perfect tonal balance. So any image can be scanned, and enhanced, in a matter of minutes.

Picture Perfect Quality

Need more convincing? Just look at the color images to the left. They were scanned on a Howtek scanner with picture-perfect quality. At Howtek, we're dedicated to the development of affordable, high-quality color peripherals. Now they're available to you, in living color. Stop hunting around. For more information on Howtek's complete line of IBM PC and Macintosh products, including scanners and plain-paper color printers, call 603-882-5200.

Or contact us at 21 Park Avenue, Hudson, NH 03051. Do it today. And put your company head and antlers above the rest.

Howtek Scanmaster/35 and Scanmaster

603-882-5200
Texas Instruments' new chip set uses the NuBus protocol to cut NuBus board design time.

meant to trim NuBus board design time from two months to two days. Instead of asking potential developers to implement a custom interface using a programmable logic device, TI has introduced a chip set that implements the NuBus protocol. The chip set includes a 32-bit interface controller chip and a 16-bit transceiver chip, both of which are capable of replacing as many as 45 discrete logic devices. Thus, space devoted to the NuBus interface on an add-in board has been reduced from 10 to only 3 square inches. Board makers can use the extra real estate to add memory or features.

These changes, of course, are supposed to encourage the development of more specialized add-in boards for the Mac II. According to Levco's vice president of software, Duane Maxwell, there was a lot of duplicated effort among people working on the NuBus card interface, which was crying out for a single- or multiple-chip solution. "The new interface is a hardware version of a common library of routines," he says. "It will encourage people using other bus technology, like VME, to write to NuBus."

In addition, TI plans to make a separate, 16-bit CMOS controller chip available in December for Apple's Macintosh Coprocessor Platform (MCP). Originally introduced to aid third-party developers of hardware and software products, the MCP card has been outfitted with a specialized operating system called MR-DOS, otherwise known as multiprocesing real-time disk operating system. Apple reportedly built its token ring add-in card using MR-DOS and the MCP--Rusty Weston

Max Headroom, Move Over

Hyperanimation was popularized by John Sculley, who has been showing a videotape of the Knowledge Navigator in which a talking-head agent carries on a dialog with a man using a futuristic computer. The agent greets the user, reminds him of appointments, and fetches information from databases just for the asking.

If you've ever wanted your own Max Headroom, now's your chance to have what might be a real anthropomorphic agent. HyperAnimator, which Bright Star Technology claims is the next component needed to realize true artificial intelligence, combines animated faces with sound to enhance HyperCard stacks or other applications with interactive talking heads. Its random-access animation automatically synchronizes vocal sounds with vigorous lip movements to create the illusion of programs that talk.

HyperAnimator can accept images from a wide variety of sources including digitized video, hand-drawn cartoons, and automatically produced claymation. Or you can hook it up directly to an inexpensive robot, such as Teddy Ruxpin. The audio portion can come from sound digitizers, such as Farallon Computing's MacRecorder, or any voice synthesizer. It comes in two versions: HyperAnimator ($149) adds synthetic actors to HyperCard stacks; HyperAnimator Developers Toolkit ($495) allows software houses to apply hyperanimation to their own applications. For more information, call Bright Star Technology in Bellevue, Washington, at 206/885-5446--R. Colin Johnson

Gary Bond's book explains HyperTalk-extending subroutines.

HYPERCARD

XCMD's for HyperCard

No sooner does HyperCard provide a programming language for the rest of us than along comes a book about an aspect of the language only an advanced user can understand.

XCMDs are computer language subroutines that extend HyperTalk, HyperCard's programming language. Once created by the user in a language such as Pascal, C, or Assembly, these subroutines operate identically to the built-in commands and functions of HyperTalk. Unlike HyperTalk, building XCMDs is not for the uninitiated.

Gary Bond's XCMD's for HyperCard (MIS Press, 1988) is the first book to specifically address HyperTalk's extensions. Each of the many examples are presented in both Pascal and C. In fact, so much of the book is dedicated to providing programming examples, it is surprising that programmer Sioux Lacy, who converted the Pascal examples into C, was not given coauthor status.

Prior to this book's publication, technical information on XCMDs had been almost non-
Crystal Quest won
Best Arcade Game
1988 MacWorld Hall of Fame

"Hottest Game in Town!"
—John Dvorak

When John Dvorak called Crystal Quest the hottest game in town, CritterEditor was being born. CritterEditor gives you power to create an unlimited supply of games. It's a graphic and sound editor that can make over 1,000 changes in Crystal Quest. Change colors, graphics, sounds, point values, animations, and more. How good is it?

"If you thought Crystal Quest was hot before, it is going to sizzle when this fun hits the street"
—Rick Goombs, Mac II Review

Available Now.
Crystal Quest 2.2 with CritterEditor $79.95.
Crystal Quest 2.2 $49.95.
Orders: (800) 331-4321 or in California (800) 851-1986.

Circle 137 on reader service card

New

Fluent Laser Fonts™

All 22 volumes now available for both Macintosh® and IBM® PC™ compatible computers.

Gazelle™ Kells © Meath™

Paladin™ Abilene™ Collegiate™

Orders: (800) 331-4321 or in California (800) 851-1986.

Information: (408) 624-8716

Circle 137 on reader service card
Your Best Stacks

"Your Best Stacks" returns this month with a stack submitted by Bob Davis. The stack is a full-function Home-Card and Finder replacement titled Portfolio, which comes in two versions, one for registered owners and a shareware version that is fully functional except for some inaccessible scripts. Also, in the shareware version a function for launching an application from a scrolable list is disabled; you can launch applications using a launch button, but not from the scrolable list. This button can be exported by Portfolio to any other stack you have. Of the relatively large number of Finder-replacement stacks I have seen, this is the one I would use. It has an extensive list of features, including many Finder options.

The screen design is clear, concise, and uncluttered. All of the buttons are easy to learn and become intuitive rapidly. Selecting one of the letter buttons at the lower left of the screen sends you to the card that can launch an application, desk accessory, or HyperCard stack. The buttons on the upper right of the screen allow you to perform Finder functions and add and delete buttons from cards. This stack's scripts are very well done and are extremely well documented internally; extensive use of comments has made them easy to follow. Learning HyperTalk is much easier if you can find sample scripts to learn from, and these are very good. You will want to become a registered user for this stack, because a number of scripts are protected in the unregistered shareware version. All in all, Portfolio is clearly worth the download time, and I recommend it highly.

Stackware authors, be sure to send in your best stacks for consideration in this column, and please identify them as commercial, shareware, or public domain. If the shareware version is different from the registered version of your stack, please include a copy of the registered version for evaluation as well. You should also include a text file describing what makes your stack different or unusual. I will post any stack that appears in "Your Best Stacks" to the two BBBS I run so that all of MacWorld's readers can download it and try it themselves. My BBBS is PC Pursuit, a virtual bulletin board service that is compatible with the majority of Macintosh users and is available for sale at 408/253-3926, and my remote board is on Portal at 408/725-0561 or C.PORTAL via PC Pursuit and Telenet.-Bob "Laserman" Murrow

New Player in the Shell Game

When Paperback Software's VP-Expert for the Mac makes its debut this fall, it may well change the rules in the AI market much as did when it first appeared on the IBM PC.

The Mac version includes features not available in combination on competitive shells, even at substantially higher prices. These features include hypertext file structures that automatically generate hypertext links between file entries, one-command creation of interactive graphic elements such as gauges, meters, and output graphs; and a special "demon" rule that monitors expert-system conditions and activates whenever certain factors change.

VP-Expert Mac will probably be priced in the same range as the company's PC version, which sells for $250. At that price, it would become one of three Mac shells priced under $500 and would offer more capabilities than most shells costing over $500.

Initially, the Mac version won't be compatible with the PC version because the Mac version contains additional features. Plans call for the two products to be almost completely compatible in early 1989.

VP-Expert for the PC is indisputably the largest-selling expert-system shell of all time—thanks largely to its combination of real power and attractive price.

Paperback was founded by computer-industry pioneer Adam Osborne, who said he is "gradually and deliberately transforming the company into one that is in the intelligent business applications market." For further information, call Paperback in Berkeley, California, at 415/644-2116.-Dan Shafer

On Guard!

Only 3 viruses are active in the Macintosh community, compared with over 40 in the MS-DOS environment, according to Interpath, an antiviral software (continues)
Fast Forms™
Paperwork Without The Work.

When presenting business information, it is important to portray a professional and consistent image. Business forms are no exception.

Fast Forms gives you the **power and freedom** to create, customize, and use professional forms on your Apple® Macintosh® computer.

You can use Fast Forms for tasks ranging from simple office memos to order forms, packing slips, complex invoices or even annual tax forms.

All with the flexibility to match the look of your most familiar forms.

And once you've drawn or scanned your forms, use the Fast Forms desk accessory (also included) to fill in and print while using any other program.

At last you can quickly address an envelope or print an invoice without interrupting your more important work.

Features such as gray screens, hairlines, variable type sizes, text editing, customizable grids, and printing and non-printing drawing planes have made Fast Forms the drawing program of choice by thousands of users.

Place **data entry fields** on your form where information is filled in. Fast Forms will format fields and even perform calculations for you automatically.

Since version 1.2 now supports both import and export, Fast Forms works even better with your other Macintosh programs.

Now you can import information from your database to fill in and print any form, or export information while using Fast Forms as an effective data entry tool.

For offices with more than one Macintosh, additional desk accessories can be purchased separately.

And yes, for those of you who want some help getting started, Fast Forms still comes with a free template disk filled with forms ready to use.

Since Fast Forms is still only $149, you're guaranteed great value for your money.

Plus, if you buy Fast Forms today, we'll refund your money tomorrow (early 1989) when you purchase **Fast Forms Professional**, the next generation of forms management solutions.

For more information on Fast Forms, please call or write:

*Shana Corporation*
Advanced Technology Center
105, 9650 - 20 Avenue
Edmonton, Alberta, Canada T6N 1G1

(403) 463 - 3330 

Circle 297 on reader service card
company based in Santa Clara, California. And because MSDOS antiviral programs tend to be commercially based, they take longer to get to market than the Mac’s public domain programs, which are distributed quickly over bulletin boards.

For instance, there are now 6 commercial antiviral programs for MS-DOS computers, while the Mac has the same number of antiviral public domain programs. These programs include: Vaccine, Virus Detective, Agar, Ferret, Interferon, and KillScores. KillScores, which repairs a disk infected with the Scores virus, is distributed on disks for $2 each within the Dallas/Fort Worth Mac User’s Group by Howard Upchurch, a viral investigator and Mac user.

The presence of a virus can be hard for the average user to diagnose, and relatively few Mac users actually experience an infection (only 8 percent, according to a recent Macworld reader survey). The best advice for those who are infected, according to Steve Costa of the Berkeley Macintosh User Group (BMUG), is to copy all document files to other media, reformat your hard disk, and start over with a fresh System and original copies of application software. Document files can then be returned to the hard disk, Costa believes.

Dealers, businesses, developers, and software pirates are most likely to get viruses because they have lots of software going through their equipment. Typically, individual users who aren’t connected to networks won’t pick up viruses unless they transfer applications or system files.

Users who want protection from viruses, or who want viral detection programs, can order a $3 diskette (Utility 8) from BMUG, 1442A Walnut St., #62, Berkeley, California 94709.

Apple Plus
New AI

With its first official appearance at the American Association for Artificial Intelligence show in Minneapolis last August, Apple demonstrated its hardware and networking solutions in tandem with more than a dozen third-party suppliers of AI-related products and engineering productivity tools.

One of the most noteworthy new high-end products was Gold Hill Computers’ GoldWorks II for the Macintosh II. Rather than being ported from the PC to the Mac, this expert-system development tool is built on top of a specially engineered version of LISP that was put together for Gold Hill by the Coral Software team.

The result is a $7500 product that requires no special add-in board and runs on a Mac II rather than on the more expensive microExplorer platform from Texas Instruments. (Other high-end expert-system development tools—such as Inference Corporation’s ART and IntellisCorp’s KEE—require the microExplorer, a Mac II with a special add-in board and software that TI markets in conjunction with Apple.)

HyperCard interfaces of one kind or another appeared on several AI products at the show. Hyperpress Publishing’s new IntelliCard program, a HyperCard-based delivery vehicle for expert systems built using the company’s Intelligent Developer shell, features the ability to extract all of the rules, facts, and graphics from a working Intelligent Developer knowledge base and automatically create a HyperCard stack. The designer can then modify the stack to provide interactive graphic buttons, external file links, hypertext, and other features.

IntelliCard comes in two versions. Bundled with Intelligent Developer at a total package price of $395, the program includes all the knowledge-extraction and stack-generating tools needed to build standalone, Mac-based applications. As a separate add-in, IntelliCard SQL adds the ability to access SQL databases, such as Oracle, directly from within IntelliCard rules. This means that an expert-system developer can give users a customizable interface while rules and facts are kept out of their reach so that the knowledge is protected from accidental alteration or disclosure.—Dan Shafer

How Do You Spell Relief?

Two new optical character recognition (OCR) software packages may be just what the doctor ordered for those of you who are sick and tired of retyping printed documents into the Macintosh.

OmniPage, from Caere Corporation, recognizes text from scanned pages, even if there’s a mix of graphics, images, fonts, and type styles on one page.

For those tired of retyping: Caere’s OmniPage recognizes text from scanned pages, even if there’s a mix of graphics, images, fonts, and type styles on one page.
Why do so many Mac II Owners Choose National?

Because National memory expansion cards give them:

1. Top A/UX performance
   Apple + A/UX™ + National adds up to a powerful workstation. One that gives them the highest performance for their memory-hungry A/UX applications.
   What applications do you have in mind? Software development, CAD/CAM, high resolution graphics, large databases, or multi-user applications? The NS8/16 memory expansion card has the power to unleash your creativity.

2. Up to 16 Mbytes of memory in a single NuBus slot
   1MB RAM chips to save power consumption and card slots.

   And they’re 100ns chips to give top performance. Your applications will run dramatically faster.
   Your Mac II™ can hold up to five NS8/16’s, for up to 80 Mbytes of RAM.

3. Full A/UX Compatibility
   The device driver is included.
   A/UX uses the NS8/16 as system memory so all of your A/UX programs will run without any modification.
   Also included is software that allows the expanded memory to be used as a RAM disk in the standard Mac operating system.

   You get a full five-year warranty and support from the leader in add-in products for the Mac II.

Join the satisfied Mac II users who have chosen National memory expansion cards
Call today 1-800-538-8510
(in California 1-800-345-4006)

Circle 196 on reader service card

National Semiconductor
Compatible Products Group
Tel: 408-562-4719

Macintosh, Mac II, and A/UX are trademarks of Apple Computer Inc.
You can save text in either ASCII or MacWrite format. In addition, you can merge text into spreadsheets, databases, and forms on the Mac. Listing at $795, OmniPage comes with built-in drivers for Apple, Hewlett-Packard, and Canon scanners. It can also recognize text from TIFF files produced by other scanners.

Inovative's ReadStar II is a $4500 trainable system that can read typed and typeset characters at constant or proportional pitch—kerned characters, italics, boldface, and even foreign languages. You can actually see text-recognition speed up during the training procedure, which is relatively painless. You can save text in ASCII format so it can be imported into other Mac applications. ReadStar II is compatible with Microtek, Hewlett-Packard, Canon, and Ricoh scanners.

For more information contact Inovative at 1911 N. Fort Myer Dr., #708, Arlington, VA 22209, 703/522-3053; Care at 100 Cooper Ct., Los Gatos, CA 95030, 408/395-7000. —Brita Meng

Color Images Find Their Avalon

Macintosh desktop publishers no longer have to rely on dedicated prepress production systems to prepare color images and photographs for printing.

PhotoMac for the Mac II, from the Avalon Development Group of Cambridge, Massachusetts, combines 24-bit color image processing with a full range of color prepress capabilities. The result is complete color pages with graphics, images, and text. The $695 program will be distributed by Data Translation starting in November.

With PhotoMac, designers can retouch images with transparent paint, opaque paint, or colors picked from the image.

Avalon has developed a special color-mapping algorithm that enables users to do full-color 24-bit editing on a Mac II 8-bit color display. PhotoMac also uses a special virtual-memory architecture to handle very large images—up to 32,000 by 32,000 pixels—with just 2 megabytes of memory. The maximum image size and number of image windows that can be simultaneously opened is determined by available disk space, not RAM. At least a 40MB hard disk is recommended for use with PhotoMac.

PhotoMac imports any Mac PICT file, as well as IBM PC Targa and Vista image files. It supports such input devices as 35mm slide scanners, flatbed scanners, and video capture boards. Designers can retouch images by painting and air-brushing in transparent paint, opaque paint, or a color picked directly from the image.

Image manipulations include rotation to any angle, resizing, and flipping. In addition, designers can montage several images by cutting and pasting between image windows. Special effects convert full-color images to monochrome, and color negatives to positives. The final image can be saved in either PICT2 format or Quark XPress TIFF-24 format, for import into layout applications.

PhotoMac supports three color-correction systems for prepress functions: red-green-blue; cyan-magenta-yellow-black; and luminance-hue-saturation. Users can select any of the three to color-correct all or part of an image. Proofs can be printed on color thermal printers, or separations can be produced on a Linotype 300. For more information, contact Data Translation, 100 Locke Dr., Marlboro, MA 01752, 617/481-3700.

HyperCard E-Mail

Billed as the next-generation communications program, HyperCard-based Dashboard certainly has a head start in that it uses push buttons to maximize ease of use. And like most HyperCard stacks, it offers a user-customizable graphic interface to make it look the way a communications program should.

But its ease of use doesn't mean a lack of capabilities. Dashboard lists the status of your electronic mail and lets you send, receive, forward, edit, print, store, or delete mail. Dashboard lets you forward mail to a predefined group of individuals, send and read messages on bulletin boards, access software libraries, join conferences and filter out selected participants, and access current and historical stock quotes for all markets. Other customization features include the ability to automate entire communication sessions and to build interfaces to communication services (many interfaces are supplied with the program).

Dashboard supports two communication sessions in two different windows at the same time, and it emulates VT100 and TTY terminals. It features Xmodem, Ymodem, MacBinary, Kermit, and CompuServe B protocols, and it lets you store frequently called numbers in an address book. Developed for TenPoint0 (a division of Medigenic) by Mitel Development, Dashboard is expected to ship by year's end at a list price of $199. For further information, call TenPoint0 in Menlo Park, California, at 415/329-0800.
We only carry the latest versions of products. Version numbers in our ads are current at press time.

**SOFTWARE**

We offer the latest versions of products. Version numbers in our ads are current at press time.

CP denotes copy-protected.

NCP denotes not copy-protected.

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Version</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aatrix Software</td>
<td>NCP</td>
<td>$99.95</td>
</tr>
<tr>
<td>Aatrix Payroll Plus 1.0</td>
<td>NCP</td>
<td>$99.95</td>
</tr>
<tr>
<td>Aatrix TimeMinder</td>
<td></td>
<td>$109.99</td>
</tr>
<tr>
<td>Aatrix Payroll PLUS 1.0</td>
<td></td>
<td>$159.99</td>
</tr>
<tr>
<td>Aba Software</td>
<td>NCP</td>
<td>$289.95</td>
</tr>
<tr>
<td>Access Technology</td>
<td>NCP</td>
<td>$95.00</td>
</tr>
<tr>
<td>MindWriteExpress 2.0</td>
<td></td>
<td>$149.00</td>
</tr>
<tr>
<td>Trapese 2.0</td>
<td></td>
<td>$159.00</td>
</tr>
</tbody>
</table>

**TML Systems**

TML Pascal II—Create any type of Macintosh program. Native code Pascal compiler includes complete Macintosh Programmer’s Workshop software & documentation. $79.
Orders beamed

3961 Talking Tiles 1.0 $79.
3962 HyperAnimator 1.0 $89.
4065 PosterMaker Plus $36.
4067 Calculus 1.0 $60.
4122 Geometry 1.0 $60.
1423 Jam Session 1.1 $30.
1427 Print Shop 1.3 $36.
4067 Calculus 1.0 $60.
1576 Badoni (V1) $45.
1423 Jam Session 1.1 $30.
1427 Print Shop 1.3 $36.
1587 San Serif (V2) $45.
1575 Fluent Fonts 2.0 $27.
1426 Physics 1.1 $60.
4196 FileMaker II $239.
1125 MacProject II $395.
1129 MacWrite 5.0 $105.
1123 MacPaint II $105.
1618 Retail Business 3-Pak $359.
1612 Inventory Control 2.6 $239.
1610 Mac3D 2.1 $119.
1611 C.A.T. 2.0 $239.
1613 Rags to Riches Ledger 3.1 $120.
1614 Rags to Riches Payables 3.1 $120.
1615 Professional Billing 2.9 $239.
1622 Rags to Riches 3-Pak $289.
1616 Professional 3-Pak $359.
1617 Rags to Riches Receivables 3.1 $120.
1618 Retail Business 3-Pak $359.
1613 Rags to Riches Ledger 3.1 $120.
1614 Rags to Riches Payables 3.1 $120.
1615 Professional Billing 2.9 $239.
1622 Rags to Riches 3-Pak $289.
1616 Professional 3-Pak $359.
1617 Rags to Riches Receivables 3.1 $120.
1618 Retail Business 3-Pak $359.

Nolo Press ... NCP
WillMaker—Prepare your own valid will without a lawyer. Follows a simple question and answer format, allowing you to update your will whenever necessary. $35.

Nolo Press ... NCP
WillMaker—Prepare your own valid will without a lawyer. Follows a simple question and answer format, allowing you to update your will whenever necessary. $35.

1588 Ritz/Right Bank (V3) $45.
1589 Monterey (V4) $45.
1591 Prelude Script (V6) $45.
1532 Coventry Script/Eugenia (V7) $45.
1594 Cyrillic (V9) $45.
1577 Bocdoni Ultra (V10) $45.
1578 Sans Serif Bold (V11) $45.
1579 Sans Serif Extra Bold (V12) $45.
1580 Gatsby Light (V13) $45.
1581 Micro (V14) $45.
1582 Micro Extended (V15) $45.
1583 Guillem Roman (V16) $45.
1584 Campanile-Girotto (V17) $45.
1585 Alexandria (V18) $45.
1586 Jott Casual (V19) $45.
4204 Gazelle & Kells Meath (V20) $45.
4205 Paladin & Abalene (V21) $45.
4206 Collegiate (V22) $45.
1727 Calendar Maker 3.0 $27.
1728 Desktop 3.0.2 $27.
1729 QuickKeys 1.1 $54.
3963 QuickMail 1.0 $175.
4195 FoxBASE+/Mac $209.
2384 Comic Strip Factory 1.6 $45.
1616 Professional 3-Pak $359.
3938 MathTalk Fractions $32.
3939 MathTalk $32.
3940 First Snap $32.
3941 Smooth Talker $32.
3942 Spell It $32.
3943 Foundation Publishing ... NCP
2384 Comic Strip Factory 1.6 $45.
3953 FirstMac 1.02 $54.
3955 Suitcase 1.2.1 $37.
3954 PowerStation 2.5 $37.
2216 PhotoShop $19.
2217 FileMaker 1.0 $19.

Electronic Arts ... NCP
1543 Thunder 1.1 $30.
1544 Deluxe Music Construction Set 1.0 $31.
1545 Enzan-Hoshigumi USA ... NCP
1614 Rags to Riches Receivables 3.1 $120.
1615 Professional Billing 2.9 $239.
1622 Rags to Riches 3-Pak $289.
1616 Professional 3-Pak $359.
1617 Rags to Riches Receivables 3.1 $120.
1618 Retail Business 3-Pak $359.
Claris ... NCP
1123 MacPaint II $105.
1129 MacWrite 5.0 $105.
4196 FileMaker II $239.
1117 MacDraw II 2.0 $329.
1125 MacProject II $395.
Cricket Software ... NCP
1669 Plot-O Graph $105.
1668 Cricket Graph 1.2 $119.
1667 Cricket Draw 1.1 $169.
1670 Cricket Presents 1.0 $289.

DataViz ... NCP
1823 Finesoft $145.
1734 Math Blaster! 1.0 $27.
Deneba Software ... NCP
1770 Merriam-Webster's Thesaurus 2.0 $36.
1767 CommNet 2.0 $54.
1765 Canvas DA 1.01 $54.
1766 Canvas 2.0 $169.
1768 Coach Professional 3.0A $109.
DreamMaker ... NCP
4115 MacGallery (HyperCard format) $29.
4068 MacGallery (MacPaint format) $29.
Dubl-Click Software ... NCP
1824 Calculator Construction Set 1.04 $36.
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 (7-9) $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.

Nolo Press ... NCP
For the Record—An essential tool for estate planning. Organizes your personal records—makes them easy to find and retrieve. An invaluable companion to WillMaker $29.

1-800/Mac&Lisa 880C

MacConnection, 14 Mill Street, Marlboro, NH 03456 1-800/622-5472 603/446-7711 FAX 603/446-7791
©Copyright 1988 PC Connection, Inc. MacConnection is a division and trademark of PC Connection, Inc.
All items subject to availability. Prices subject to change without notice.
*Defective software replaced immediately. Defective hardware replaced or repaired at our discretion.
Solutions, Inc. ... NCP

The Curator—Eliminates cutting & pasting into a scrapbook. Has a pictorial table of contents. Accepts artwork from PICT, TIFF, MacPaint, and glue formats. $79.

FWB Software ... NCP
2232 Hard Disk Partition 2.0 .......................... 45.
2231 Hard Disk Utility 2.03 .......................... 54.
Great Wave Software ... NCP
2277 TimeMasters 1.0 .......................... 22.
2274 American Discovery 2.1 .......................... 39.
2273 ConcertWare + MIDI 4.0 .......................... 79.
2272 Crystal Paint 1.0 .......................... 41.
Greene, Inc. ... NCP
2269 QuickDEX 1.4A .......................... 32.
Hyperpress Publishing ... NCP
4233 Icon Factory .......................... 29.
4232 Script Expert .......................... 49.
ICOM Simulations ... NCP
4084 On Cue 1.3 .......................... 36.
4085 TMON 2.8.1 .......................... 99.
Ideasform ... NCP
2419 DiskQuick 2.10 .......................... 27.
2420 MacLabeler 2.2 .......................... 27.
2418 HyperBook Maker 1.0 .......................... 31.
Imagine ... NCP
2422 Smart Alarms 2.5 .......................... 35.
2423 Multi-user Appointment Diary 1.0 .......................... 85.
Individual Software ... NCP
4209 Typing Instructor Encore .......................... 26.
Infosphere ... CP
2513 LaserServe 1.1 .......................... 62.
2512 MacServe 2.4 .......................... 158.
Innovative Data Design ... NCP
2417 MacDraft 1.2B .......................... 149.
Insight ... NCP
4089 SoftPC ........................................ 479.
Intuit ... NCP
2425 Quicken 1.0 .......................... 35.
Kent Marsh Ltd. ... NCP
2591 The NightWatch 1.0 .......................... 89.
2592 MacSafe 1.0 .......................... 89.
LaserWare ... NCP
4095 LaserPaint Color II 1.8 .......................... 359.
Layered ... NCP
2615 Notes for... Excel 1.0 .......................... 40.
2617 Notes for... Works 1.0 .......................... 40.
2618 Notes for... Word 1.0 .......................... 40.
2608 Front Desk 2.0 .......................... 75.
2613 Insight OneWrite 1.0 .......................... 185.
2610 Insight Expert AR 2.0 .......................... 479.

2423 Multi-user Appointment Diary 1.0 .......................... 45.
2231 Hard Disk Utility 2.03 .......................... 54.
Great Wave Software ... NCP
2277 TimeMasters 1.0 .......................... 22.
2274 American Discovery 2.1 .......................... 39.
2273 ConcertWare + MIDI 4.0 .......................... 79.
2272 Crystal Paint 1.0 .......................... 41.
Greene, Inc. ... NCP
2269 QuickDEX 1.4A .......................... 32.
Hyperpress Publishing ... NCP
4233 Icon Factory .......................... 29.
4232 Script Expert .......................... 49.
ICOM Simulations ... NCP
4084 On Cue 1.3 .......................... 36.
4085 TMON 2.8.1 .......................... 99.
Ideasform ... NCP
2419 DiskQuick 2.10 .......................... 27.
2420 MacLabeler 2.2 .......................... 27.
2418 HyperBook Maker 1.0 .......................... 31.
Imagine ... NCP
2422 Smart Alarms 2.5 .......................... 35.
2423 Multi-user Appointment Diary 1.0 .......................... 85.

2611 Insight Expert GL 2.0 .......................... 479.
2609 Insight Expert AP 2.0 .......................... 479.
2612 Insight Expert Inventory 2.0 .......................... 479.
2614 Insight Expert Time Billing 2.0 .......................... 479.
Learning Company ... CP
2670 Reader Rabbit 2.0 .......................... 33.
2619 Image Studio 1.0 .......................... 279.
2621 Ready, Set, Go! 4.0A .......................... 279.
4218 Ready, Set, Show 1.0 .......................... 279.
Linguist's Software ... NCP
2649 Tech .......................... 59.
2543 LaserTech FOREIGN LANGUAGE FONTS
2635 MacKana/MacKanji .......................... 39.
2628 SuperFrench/German/Spanish .......................... 39.
2622 MacAkkadian .......................... 59.
2623 MacArabic .......................... 59.
2627 MacCyrillic .......................... 59.
2530 MacGreek .......................... 59.
2631 MacHebrew .......................... 59.
2633 MacHieroglyphics .......................... 59.
2634 MacHindi Sanskrit .......................... 59.
2636 MacKanji .......................... 59.
2637 MacKorean .......................... 59.

2648 MacSemin/Coptic .......................... 59.
2652 MacThai .......................... 59.
2651 MacGreek Old Testament .......................... 79.
2645 MacChinese Mandarin .......................... 79.
2625 MacChinese Cantonese .......................... 79.
2632 MacHebrew Scriptures .......................... 79.
2647 MacGreek/Hebrew/Phonetics .......................... 89.
FOREIGN LASER FONTS
2641 LaserHebrew .......................... 79.
2644 LaserTranlsilter .......................... 79.
2639 LaserFrench/German/Spanish .......................... 79.
2640 LaserGreek .......................... 79.
2642 LaserKorean .......................... 89.
2638 LaserCyrillic .......................... 115.
Lundeen & Associates ... NCP
2664 WorksPlus Spell 1.1 .......................... 46.
2663 WorksPlus Command 1.1 .......................... 60.
MacroMind ... NCP
4202 Black & White Movies (17 of them!) .......................... 30.
4110 Clip Sounds (sound effects & music) .......................... 36.

2417 MacDraft 1.2B .......................... 149.
2418 HyperBook Maker 1.0 .......................... 31.
2422 Smart Alarms 2.5 .......................... 35.
2423 Multi-user Appointment Diary 1.0 .......................... 85.

Fabulous Fontbook Volume I

FOREIGN LASER FONTS
2641 LaserHebrew .......................... 79.
2644 LaserTranlsilter .......................... 79.
2639 LaserFrench/German/Spanish .......................... 79.
2640 LaserGreek .......................... 79.
2642 LaserKorean .......................... 89.
2638 LaserCyrillic .......................... 115.
Lundeen & Associates ... NCP
2664 WorksPlus Spell 1.1 .......................... 46.
2663 WorksPlus Command 1.1 .......................... 60.
MacroMind ... NCP
4202 Black & White Movies (17 of them!) .......................... 30.
4110 Clip Sounds (sound effects & music) .......................... 36.
for just $3.00!

Chang Labs ... 5 years
C.A.T. — Powerful relational database for managing Contacts, Activities, and Time. Use to organize events, meetings, day-to-day projects, expense reports, personnel records, etc. $239.

3033 Post ART 35...
3031 Icon-II 1.01 39...
3030 FontShare 1.01 149...
3035 Read-ItTS 1.06 79...
3034 Read-It 1.06G 199...

OWL International ... NCP
3082 Guide 2.0 119...

Peripherals Computers & Supplies ... NCP
3129 KaleidaGraph 1.10 125...
3130 VersaTerm 3.20 69...
3131 VersaTerm PRO 2.20 199...

Personal Computer Peripherals ... NCP
3175 HFS Backup 2.02 28...

Postcraft International ... NCP
3157 Laser FX 1.6 115...

MacConnection

1-800/Mac&Lisa

1478 Prototype 1.0 72...

SoftStyle ... NCP
3282 Printworks (Dot Matrix) 3.23 43...
3281 Printworks (Daisywheel) 3.0 56...
3283 Printworks (HP laser) 3.0 85...

SoftView ... NCP
3471 MacInUse 2.0 42...
3473 TaxView Planner 2.0 (1987-1991) 49...
3481 FormSet Business Forms Edition 1.0 59...

Software Discoveries ... NCP
3374 Merge Write 1.0 35...
3373 Record Holder Plus 3.0 45...

Software Ventures ... NCP
3454 Microphone 1.1 119...
3455 Microphone II 2.0 225...

Solutions, Inc. ... NCP
3448 SmartSpeak 1.0 35...
3457 SuperGlue 1.03 52...
3446 The Curator 1.04 79...

Springboard ... CP
3528 Art-a-la-Mac Vol. 1 23...
3530 Certificate Maker 1.0 24...
3532 Certificate Maker Library Vol. 1 16...
3531 Entry Games 28...

SuperMac Software ... NCP
3383 SuperSplot 5.0 54...

SuperLaserSpool 2.0 82...
3378 Multi-User SuperLaserSpool 2.0 199...
3377 DiskIt 1.4 54...
3379 Network DiskIt 1.4 199...
3381 Satellite 2.0 155...
3380 PixelPaint 1.1 209...
4086 Acknowledge 349...

Survivor Software ... NCP
3269 MacMoney 3.01 62...

Symantec ... NCP
3392 Acta 2.01 36...
3318 HyperDA 2.01 38...
4160 PictureBase/WritePaint 99...

3D Graphics ... NCP
3942 Images with Impact 59...

Telegraphics ... NCP
3630 HyperTutor 1.0.1 29...

Think Educational ... CP
3615 MacEdge II 1.0 28...
3616 Mind Over Mac 1.4 28...

TIMaker ... NCP
3640 ClickArt Personal Graphics 28...

Silicon Beach Software ... NCP

Digital Darkroom—Take your basic scanned TIFF image and turn it into a work of art by varying its contrast, brightness and sharpness. AutoTrace feature creates PICTs from bit maps. ... $159.
Stellar selection

3632 ClickArt Business Images ........ $28.
3636 ClickArt Holidays ............... $28.
3637 ClickArt Letters Vol. 1 ........ $28.
3638 ClickArt Letters Vol. 2 ........ $28.
3639 ClickArt Business Images ........ $28.
3640 ClickArt Holidays ............... $28.
3641 ClickArt Letters Vol. 1 ........ $28.
3642 ClickArt Letters Vol. 2 ........ $28.
3643 ClickArt Business Images ........ $28.
3644 ClickArt Holidays ............... $28.
3645 ClickArt Letters Vol. 1 ........ $28.
3646 ClickArt Letters Vol. 2 ........ $28.
3647 ClickArt Business Images ........ $28.
3648 ClickArt Holidays ............... $28.
3649 ClickArt Letters Vol. 1 ........ $28.
3650 ClickArt Letters Vol. 2 ........ $28.
3651 ClickArt Business Images ........ $28.
3652 ClickArt Holidays ............... $28.
3653 ClickArt Letters Vol. 1 ........ $28.
3654 ClickArt Letters Vol. 2 ........ $28.
3655 ClickArt Business Images ........ $28.
3656 ClickArt Holidays ............... $28.
3657 ClickArt Letters Vol. 1 ........ $28.
3658 ClickArt Letters Vol. 2 ........ $28.
3659 ClickArt Business Images ........ $28.
3660 ClickArt Holidays ............... $28.
3661 ClickArt Letters Vol. 1 ........ $28.
3662 ClickArt Letters Vol. 2 ........ $28.
3663 ClickArt Business Images ........ $28.
3664 ClickArt Holidays ............... $28.
3665 ClickArt Letters Vol. 1 ........ $28.
3666 ClickArt Letters Vol. 2 ........ $28.
3667 ClickArt Business Images ........ $28.
3668 ClickArt Holidays ............... $28.
3669 ClickArt Letters Vol. 1 ........ $28.
"Did you beam it up or what?"

"Gentlemen: Did you beam it up or what? Fil just passed the word to everyone that this is the old, I don't know, call it the American way or whatever. Or, as some Brazilian friends of mine once put it, 'That's what we like about America. If you want something, boom, you got it!' Keep up the good work."

Leo D. Bores, M.D.
Director, Bores Eye Institute
Scottsdale, AZ
Call 800-622-5472.

Nuvotech ... 1 year
2999 TurboNet/AppleTalk connector cable $6.
3001 TurboNet ST (DB-9) ... 24.
3000 TurboNet ST (DIN-8) ... 30.
Orange Micro ... 1 year
3036 Grappler ... 79.
4076 Grappler LO ... 92.
Personal Computer Peripherals ... 2 years
3177 HD-WSI (Apple HD-20 to SCSI) ... $69.
3181 MacBottom HD 21 SCSI ... 779.
3180 MacBottom HD 21 w/Modem ... 829.
3185 MacBottom HD 21 w/Modem ... 859.
3186 MacBottom HD 32 SCSI ... 699.
3187 MacBottom HD 32 w/Modem ... 749.
3188 MacBottom HD 32 w/Modem ... 789.
3190 MacBottom HD 70 SCSI ... 999.
3191 MacBottom HD 70 w/Modem ... 1099.
3176 .MacBottom IHD-144 Meg ... 159.
3175 MacBottom IHD-144 Meg ... 189.
Practical Peripherals ... 5 years
3100 1200 Baud External Modem ... 59.
3102 2400 Baud External Modem ... 89.
3089 Mac Communications Pack ... 249.
Sharp ... 90 days
3453 JX-450 Color Scanner ... call.
3447 Shiva ... 1 year.
3444 NetSerial X232 ... 379.
3442 NetModem V1200 ... 999.
3443 NetModem V2400 ... 979.
SoftStyle ... 90 days
3277 MacEnhancer ... 159.
Summagraphics ... 90 days
3371 MacTablet 12" x 12" ... 379.
Thunderware ... 90 days
3648 ThunderScan 4.0 with PowerPort ... 199.
3645 Mac II Power Accessory ... 42.
DISKS
2214 Fuji 3½" DS/DD Disks ... 18.
3297 Sony 3½" DS/DD Disks ... 19.
3772 Verbatim 3½" DS/DD Disks ... 19.
2792 MAXELL 3½" DS/DD Disks ... 20.
INFORMATION SERVICES
CompuServe
1676 CompuServe Information Service ... 24.
1671 Grolier's Online Encyclopedia ... 32.
INFOCUS
2276 The Macintosh Bible ... 16.
1673 CompuServe Navigator 2.02 ... $45.
1674 Standard Service/Navigator Bundle ... 59.
Dow Jones
1789 Dow Jones Membership Kit ... 24.
1785 Desktop Express ... 95.
1786 Market Manager Plus ... 189.
ACCESSORIES
Bantam Books
1403 Complete HyperCard Handbook ... 24.
1773 I/O Design
2378 MacLuggage H/DWare ... 54.
2376 MacLuggage Macinware Plus ... 64.
2379 MacLuggage Imageware II ... 59.
2381 MacLuggage Macinware SE ... 76.
Kalmar Designs
2532 Tekwood Roll-top Case (45 disks) ... 14.
2531 Tekwood Roll-top Case (90 disks) ... 20.
2533 Tekwood Roll-top Case (135 disks) ... 28.
Microsoft Press
4057 Microsoft Works on the Apple Mac ... 15.
4056 Working with Word ... 17.
2654 Excel in Business ... 18.
Moustrak
Available in a variety of colors.
2694 Moustrak Pad (standard 7" x 9") ... 8.
2692 Moustrak Pad (large 9" x 11") ... 9.
2693 Moustrak Pad L/F (9" x 11") ... 10.
Moustrak Designer Series (Features selected photos from the book, "A Day in the Life of America.") ... 12.
Ribbons
3255 ImageWriter II Black Ribbon ... 4.
3261 ImageWriter II 4-color Ribbon ... 9.
3270 ImageWriter II Rainbow Six Pack ... 20.
SourceSoft
3260 ImageWriter LO Black Ribbon ... 17.
4011 ImageWriter LO 4-color Ribbon ... 20.
Sopris Softworks
4163 The Gallery (folding disk holder) ... 20.
4017 ImageWriter II Cover ... 11.
4109 Mac Plus Cover Set ... 15.
4108 LaserWriter II Cover ... 17.
4102 High Trek ImageWriter II carry case ... 49.
4103 High Trek Mac Plus carry case ... 59.
4104 High Trek Mac SE & ext. kybd. case ... 69.
Sopris Software
3618 ImageWriter II Carry Case ... 49.
3517 Mac Plus/SE Carry Case ... 59.
4015 Mac SE & Ext. Kybd. Carry Case ... 69.
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, charged by weight.
We accept VISA and MASTERCARD.
Available in black, brown, orange, green, purple, red, yellow, silver & gold.
3260 ImageWriter LO Black Ribbon ... 17.
4011 ImageWriter LO 4-color Ribbon ... 20.
Sopris Softworks
4163 The Gallery (folding disk holder) ... 20.
4017 ImageWriter II Cover ... 11.
4109 Mac Plus Cover Set ... 15.
4108 LaserWriter II Cover ... 17.
4102 High Trek ImageWriter II carry case ... 49.
4103 High Trek Mac Plus carry case ... 59.
4104 High Trek Mac SE & ext. kybd. case ... 69.

SHIPPING
Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all non-C.O.D. orders placed before 6 PM EST will ship Airborne the same night for next day delivery, except for orders 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 800-446-7711 Monday through Friday 9:00 to 5:00 EST.
at earthly prices.

<table>
<thead>
<tr>
<th>Product</th>
<th>Warranty Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting Edge</td>
<td>1 year</td>
</tr>
<tr>
<td>CE 10SADB Keyboard</td>
<td>$135.00</td>
</tr>
<tr>
<td>600Dk Disk Drive</td>
<td>$175.00</td>
</tr>
<tr>
<td>The Wedge XL 30+SCSI Drive</td>
<td>$629.00</td>
</tr>
<tr>
<td>The Wedge XL 45+SCSI Drive</td>
<td>$829.00</td>
</tr>
<tr>
<td>Datadisk</td>
<td>2 years</td>
</tr>
<tr>
<td>MAC-101 Keyboard (beige)</td>
<td>$139.00</td>
</tr>
<tr>
<td>MAC-101 Keyboard (platinum)</td>
<td>$139.00</td>
</tr>
<tr>
<td>MAC-101 Keyboard (ADB)</td>
<td>$139.00</td>
</tr>
<tr>
<td>HyperDink</td>
<td>463</td>
</tr>
<tr>
<td>Dove Computer</td>
<td>90 days</td>
</tr>
<tr>
<td>SCS InterfacePort</td>
<td>$289.00</td>
</tr>
<tr>
<td>MacSnap 524E</td>
<td>$379.00</td>
</tr>
<tr>
<td>MacSnap 548E</td>
<td>$549.00</td>
</tr>
<tr>
<td>MacSnap 546S</td>
<td>$599.00</td>
</tr>
<tr>
<td>MacSnap 256S</td>
<td>$439.00</td>
</tr>
<tr>
<td>MacSnap Plus 2</td>
<td>$439.00</td>
</tr>
<tr>
<td>MAC SE 68020 ACCELERATOR BOARDS</td>
<td>$585.00</td>
</tr>
<tr>
<td>Model MSE1</td>
<td>$585.00</td>
</tr>
<tr>
<td>Model MSE2 (1 Meg)</td>
<td>$979.00</td>
</tr>
<tr>
<td>Model MSE3 (math chip)</td>
<td>$779.00</td>
</tr>
<tr>
<td>Model MSE4 (1 Meg/math chip)</td>
<td>$1159.00</td>
</tr>
<tr>
<td>Software Ventures</td>
<td>NCP</td>
</tr>
<tr>
<td>Microphone II</td>
<td></td>
</tr>
<tr>
<td>Powerful scripting &amp; background features make connecting to your information service a snap. MultiFinder compatible. Includes Glue™.</td>
<td>$225.00</td>
</tr>
</tbody>
</table>

**HARDWARE**

Manufacturer's minimum limited warranty period is listed after each company name. Some products in their line may have longer warranty periods.

- **Abaton**        ... lifetime
- **ProPoint ADB**  ... 99.
- **Asher Engineering**    ... lifetime
- **TurboTrackball ADB**  ... 69.
- **AST Research**  ... 6 months
- **Mac 286:**        ... call
- **AST TurboScan:** (sheetfeed) ... call
- **AST Turbo Laser P/S:** call
- **Curtis Manufacturing**    ... lifetime
- **SURGE SUPPRESSORS**
- **Safestrip:**  ... 21.
- **Diamond:**       ... 32.
- **Emerald:**       ... 36.
- **Sapphire:**      ... 47.
- **Ruby:**          ... 55.
- **Microlytics**        NCP
- **GOfer:** - Where's that letter? Which memo mentioned coffee breaks? Find them last! GOfer quickly searches all your text files for keywords & tells you what's buried where. $45.

<table>
<thead>
<tr>
<th>Product</th>
<th>Warranty Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model MVE4xv4 (4 Meg/math chip)</td>
<td>$239.50</td>
</tr>
<tr>
<td>1024 Option</td>
<td>$439.00</td>
</tr>
<tr>
<td>Ergotron</td>
<td>1 year</td>
</tr>
<tr>
<td>Mouse Cleaner 360°</td>
<td>$15.00</td>
</tr>
<tr>
<td>The Muzzle (platinum)</td>
<td>$62.00</td>
</tr>
<tr>
<td>MacTilt (platinum)</td>
<td>$68.00</td>
</tr>
<tr>
<td>MacTilt SE</td>
<td>$68.00</td>
</tr>
<tr>
<td>MacTilt Large</td>
<td>$85.00</td>
</tr>
<tr>
<td>Mac II Workstation Model A</td>
<td>$525.00</td>
</tr>
<tr>
<td>Mac II Workstation Model B</td>
<td>$535.00</td>
</tr>
<tr>
<td>Farallon Computing</td>
<td>1 year</td>
</tr>
<tr>
<td>PhoneNET AppleTalk</td>
<td>$9.00</td>
</tr>
<tr>
<td>PhoneNET PLUS (PIN-8)</td>
<td>$35.00</td>
</tr>
<tr>
<td>PhoneNET PLUS (DB-9)</td>
<td>$35.00</td>
</tr>
<tr>
<td>PhoneNET Starcontroller</td>
<td>$139.00</td>
</tr>
<tr>
<td>PhoneNET Punch Down Block</td>
<td>$69.00</td>
</tr>
<tr>
<td>TrafficWatch</td>
<td>$159.00</td>
</tr>
<tr>
<td>FWB Software</td>
<td>1 year</td>
</tr>
<tr>
<td>PocketHammer40</td>
<td>$219.50</td>
</tr>
<tr>
<td>PocketHammer41</td>
<td>$219.50</td>
</tr>
<tr>
<td>Hammer91</td>
<td>$299.50</td>
</tr>
<tr>
<td>Hammer155</td>
<td>$429.50</td>
</tr>
<tr>
<td>Hammer300</td>
<td>$429.50</td>
</tr>
<tr>
<td>Hayes</td>
<td>2 years</td>
</tr>
<tr>
<td>Smarticon 3.0B</td>
<td>$88.00</td>
</tr>
</tbody>
</table>

**SuperMac Technologies** ... NCP

Acknowledgement - A communications construction set. Comes with pre-designed Macintosh-style interfaces for many communications services including CompuServe and GEnie. ... $349.00
Mad Macs
The scoop on Macintosh viruses: their history, identification, and eradication

I

It used to be power surges. Then it was MultiFinder and System 6.0. Now, when the Mac crashes or balks, we blame it on a virus. No matter how bomb-tolerant we become, we always feel better if we can point a finger at some culprit.

The truth is, computer viruses are responsible for few of our daily fiascoes. The hype and resultant mystique/paranoia that have grown up around these tiny bits of code would lead us to believe that pressing two disks together can spread a virus, and that the sneakerier varieties can deduce your mother's maiden name. Unraveling the web of misinformation and urban mythology reveals that Mac viruses are neither common nor malicious. They do pose a threat, however, in that they undermine the climate of trust and openness that has flourished in the Mac community.

As of this writing, there are three main families of viruses plaguing Mac users. This article chronicles the history and implications of each and includes guidelines for avoiding them. Understanding a few basic facts about these electronic hazards is the first step in halting their spread.

There is no need for alarm. The symptoms most often associated with the existing Mac viruses—printing and access problems (with drawing and spreadsheet programs, in particular) and system crashes when opening applications—have generally been the result of coincidences and incompatibilities between the viral code and the code of the system or application. Although all three kinds of electronic free-loaders attach themselves to system files or applications, none have been shown to target data files. You can easily eradicate a virus by replacing the System Folder and infected applications with clean copies from the original master disks. This, of course, presents a problem for software pirates.

Some consider viruses benign, but individuals who have lost hours and patience getting rid of the little devils probably wouldn't agree. No matter how well-intentioned or talented the virus-writers may be, they are creating uninvited interlopers. No matter how thoroughly the virus code is tested and researched, no programmer can reliably predict how the virus will interact with the myriad programs and configurations that are out there.

Of Trojan Horses, Worms, and Viruses

Many Macintosh users recall, with varying degrees of bitterness, last year's Sexy Ladies stack. Unlucky viewers discovered that while they were scanning cheesy images, a snippet of code busied itself erasing sectors on their hard disks. This was not a virus. It was a Trojan horse.

Trojan horses appear to be legitimate programs, but they have hidden agendas. They can put up messages, bomb programs, or erase information. Some shuffle data around or slip it out software trapdoors. Harmful as Trojan horses have proven to be, particularly in the mainframe and IBM worlds, they do not reproduce themselves and they cannot contaminate other programs. The damage is localized, and deleting the offending program usually solves the problem.

Mac users haven't had to worry much about worms—electronic intruders that tunnel their way through memory like moles munching through a carrot patch—but the Apple II community has some horror stories to tell of paralyzed programs and tied-up systems. (These should not be confused with WORMS—write-once, read-many optical disks.)

And then there are viruses. Computer viruses are programmed with two objectives. One is to replicate. To do this, a virus copies itself into a valid program. When you open an infected application in a sterile system, the virus invades the system files. From that vantage point, the virus seeks out other uninfected appli-
How the Scores Virus Invades a System

Day One
An application infected with Scores is modified to run the virus's installation code before running the application code. When the application is launched, the virus checks the system file to see if it is already infected. If it is not, the virus adds the following files and resources to the System Folder:

```
<table>
<thead>
<tr>
<th>Adds</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>INIT ID=6</td>
<td></td>
</tr>
<tr>
<td>INIT ID=10</td>
<td></td>
</tr>
<tr>
<td>INIT ID=17</td>
<td></td>
</tr>
<tr>
<td>apl ID=128</td>
<td></td>
</tr>
<tr>
<td>DATA ID=4001</td>
<td></td>
</tr>
</tbody>
</table>
```

The virus creates both files if they don't already exist.

- Icons change from small Macs to generic dog-eared pages.
- Both files function normally.

Note Pad and Scrapbook Files

```
<table>
<thead>
<tr>
<th>Changes</th>
<th>Type</th>
<th>Creator</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSYS to INIT</td>
<td>ZSYS</td>
<td></td>
</tr>
</tbody>
</table>
```

Scores and Desktop Files

The virus creates invisible Scores (type RDEV) and Desktop (type INIT) files.

Note that the space (the underscore character here stands for a space) allows this file to coexist with the valid Desktop file.

How the Scores Virus Attacks Applications

Day Two
The Scores virus lies dormant in a newly infected system for two calendar days. Then, during start-up, the INTs installed by the virus load into RAM, where they begin executing their routines.

At three-and-one-half minute intervals, the virus goes in search of sterile applications, sometimes interfering with routines such as printing.

If the virus finds an uninfected application, it installs a 7026-byte CODE resource into the application's second free resource slot. This new resource contains a copy of the virus code, and it adds 7K to the infected application's size.

The virus then inserts code into the jump table of the application's CODE ID=0 resource. Applications normally jump to the next code segment from the 11th word of the resource. This is where the virus installs code that tells the application to jump to the newly installed viral resource (see "Resource Slots").

After executing its code, the virus returns control of the Mac to the application.

Day Four
Four days after initial infection, the virus begins looking for programs with the identifiers ERIC and VULT. The virus does not install itself on these target programs. When someone opens one of these applications, the virus lets it run for 25 minutes and then bombs the program.

Day Seven
On the seventh day, the virus waits 15 minutes after someone launches a VULT program, and then the virus forces the program to crash whenever the VULT program attempts to write to disk.

And so the virus spreads, from infected application to sterile system, from system to applications, from one Mac to another.

Second free resource slot

```
<table>
<thead>
<tr>
<th>CODE ID=0 Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>word 1  word 2  word 3  word 4</td>
</tr>
<tr>
<td>word 5  word 6  word 7  word 8</td>
</tr>
<tr>
<td>word 9  word 10  word 11  word 12</td>
</tr>
<tr>
<td>word 13  word 14  word 15  word 16</td>
</tr>
</tbody>
</table>
```
And the cycle repeats itself. (See "How the Scores Virus Invades a System" and "How the Scores Virus Attacks Applications" for more details.)

The second function is determined by the person who creates the virus. One virus might put up a message, another might bomb specific programs, while others might erase sectors on a hard disk or rewrite a segment of code until it fills a volume's memory.

**Peace de Résistance**

Only a truly committed misanthrope would admit to being against world harmony, but the "Universal Message of Peace" that found its way amongst thousands of Mac screens on March 2, 1988, the first anniversary of the Mac II's introduction, raised a lot of hackles. Neither Richard Brandow, the Montreal editor of *Macmag* who commissioned the virus, nor Arizona programmer Drew Davidson, who wrote the virus, were reticent about taking credit for their part in its inception. Brandow splashed his name across the virus message and Davidson left his in the code. Neither admits, however, to uploading to bulletin boards the New Products from Apple stack that contained a fuzzy picture of the as yet unreleased Apple scanner and the seed copy of the Macmag virus last December.

Brandow contends that the Macmag virus was an innocuous vehicle for informing the Macintosh community about viruses, "The Association Canadienne de Développement Didacticiel (a Canadian software developers' organization) gave us an award back in March, 1988," says Brandow. "They felt that because of the Macmag virus, people were less inclined to pirate software."

Not everyone was as enthusiastic. After a few thousand early copies of a demonstration program distributed with Aldus's FreeHand became infected with the Macmag virus, Aldus spokesperson Laury Bryant said, "We feel that Richard Brandow's actions deserve to be condemned by every member of the Macintosh community." The media downplayed viruses prior to the Macmag story. On February 15, 1988, for instance, the *Washington Post*'s T.R. Reid wrote in his "Personal Computing" column, "...the first key point to recognize about the computer virus reports—they don't involve personal computers."

Ironically, the day before, the *Hearst News Service* had distributed an article that bore the headline, "Artistic Virus' Insinuates Itself into Mac World." According to the story, there was fear within the Mac community that the Macmag virus would cause widespread destruction. The article went on to describe Brandow as an adherent of the Church of the SubGenius. SubGenii were identified as an "ill-defined group of sometime pranksters." When asked about his connection with the Church, Brandow said, "I am not a member of the Church of the SubGenius, but I do subscribe to *Neoism*, a philosophy of perpetual change, total freedom, and absolute truth; and these principles did play a part in inspiring the virus."

The Macmag virus entered systems via an infected application, installing itself in the start-up System file as an INIT. The virus was not meant to be noticed until March 2, 1988, when the message would appear and the virus would delete itself. Although several accounts report that hundreds of thousands of users were infected with the Macmag virus, gauging how widely the virus actually dispersed itself is difficult. If you didn't turn on your Mac on March 2 you didn't see the message; and because the virus subsequently deleted itself, you can't tell if you were infected.

Despite the fact that the virus was quite discreet—Davidson is proud of its 1.7K size— its presence was exposed before the target date and the response of many users, particularly those on bulletin boards, was quite bitter.

"I ended up looking like the guy in the black hat," admits Davidson. "The main reason I wrote this is that I wanted to be the first. I don't want them to continue. The problem is, once something becomes this sensational, there are a lot of copycats."

**Copycats**

Viruses are not a new phenomenon in Europe. A little over a year ago, some source code examples of viruses were posted on West German electronic bulletin boards by a programmer who had been victimized by...
Viral Antidotes

Detecting and eradicating the current Mac viruses is not that difficult. Although it is possible to have a virus in your system for months without major symptoms or serious harm, the sooner you spot one and get rid of it, the fewer other applications and systems you'll infect.

Symptoms
Most symptoms peculiar to known Mac viruses are not, alas, all that peculiar. System crashes, excessive access times, printing glitches, and odd noises can usually be traced to causes other than viruses. If your system is more erratic than usual, however, or if you regularly add new software to your collection, it makes sense to check for viral infection.

Detection of nVIR and Scores Viruses
Several virus-detection programs (see "Antiviral Chart") are designed to look for the known viruses. Most are posted on the major bulletin boards as freeware or shareware, and Virus Rx is available from authorized Apple dealers. Virus Rx, VirusDetective, VirusCheck, and Interferon look for evidence of both the Scores and nVIR viruses. Ferret and KillScores are specific to Scores. The default settings in RezSearch program it to look for the nVIR viruses.

One quick way to check for the Scores virus is to open the System Folder. If the small Mac icons for the Scrapbook and Note Pad files have been replaced by generic dog-eared page icons, the System is almost certainly infected.

Run one of the detection programs from a locked floppy and check all systems and/or applications that are on your hard disks and floppies. Virus Rx is a good one. Read its report carefully. It lists every INIT, CDEV, RDEV, and invisible file on a disk. These will generally be normal. If Virus Rx labels any files "Dangerous", "Fatal", or "Altered", however, skip to the Eradication section of this page.

If the detection program finds no virus, install Vaccine, a free anti-viral CDEV written by Don Brown of CE Software, in all System Folder. Whenever a program attempts to install or modify significant resources (for example, CODE, INIT, CDEV, RDEV, nVIR), Vaccine puts up a dialog box. If you are using Font DA Mover or installing a new program that alters these resources, you can click on the Granted button when the warning comes up, or you can turn Vaccine off temporarily. Should the dialog box come up at any other time, click the Denied button and immediately run a virus-detection program.

Vaccine is an excellent alert program, but a few caveats are in order:
- Be sure to run a detection program before installing Vaccine. If a System is already infected when you install it, Vaccine won't put up warning dialogs, although it might cause the system to crash or hang up.
- You must open Vaccine from the Control Panel (click on the icon to bring up a window) to make sure the Turn Protection On box is checked, and you must reboot after installing Vaccine before it can begin working.
- Expert and MPW modes are available, but these options should only be used by those familiar with the ways resources are installed.
- Users combining Vaccine with System 6.0 report problems ranging from crashes to destructive changes made to INITs and CDEVs.
- Not wishing to engage in a spiraling contest with virus writers, the writers of Vaccine will not update it to detect any future viruses.

Eradication of the nVIR and Scores Viruses
Once you've determined that your disks are infected, you must purge the virus from them. Although Apple's resource editor, ResEdit, can be used to identify viral resources and invisible files, it should not be used to clear the viral code. The Scores virus, for instance, changes its resource identifiers if you try to delete the individual resource, and they reassert themselves the next time you start up.

KillScores and Ferret are programmed to remove the resources and two invisible files that distinguish the Scores virus from systems and applications. VirusDetective removes nVIR and Scores resources. Use these with caution. Some applications fail to function properly after a viral code has been removed, and traces of a virus can sometimes remain in System Folder files.

The following routine is a sure way to rid volumes of viruses:
1. Back up your data files.
2. Erase the infected disk.
3. Check master disks with a detection program.
4. Restore system files and applications from original master disks.
5. Restore your data files.
6. Run a detection program again to make sure no viral traces remain.
7. Check any other disks you've used recently.
er's would write defenses against viruses. The signature of these demo-viruses was nVIR.

In September, 1988, for instance, it was revealed that members of Hamburg's Computer Chaos Club had infiltrated NASA's Space Physics Analysis Network. Although members of the club adamantly denied adding or altering information in the files, the arrest of the club's virus expert in March of 1988 gave rise to fears that viruses might already have been planted, or that members of the club might release viruses as revenge for their leader's arrest. The University of Hamburg, for instance, responded by forming a Virus Epidemic Center to detect viruses and to produce antiviral programs.

As of this writing, researchers such as Kevin Kelly of the Whole Earth Review and David Spector, the senior systems programmer for the New York University School of Business, have identified almost a dozen variations of the nVIR and Macmag viruses. In Spector's words, "The real problem with posting the source code for the nVIR virus—and the Macmag virus was just as bad, really—is that it provides templates for other [virus developers]." The spread of nVIR appears to have been contained, and none of the nVIR viruses that have escaped into the community have been terribly destructive. The most common variety inserts code that sometimes causes an application to beep when you open it. Ironically, if you have MacinTalk installed, instead of a beep you'll hear the words, "don't panic." Because early versions of MacinTalk may be incompatible with the Mac II, it is possible that when the virus tries to voice the message, the Mac II will bomb.

According to Wade Blomgren of University of California, San Diego, Academic Computing, nearly 50 Macs at the University became infected with the virus. In an attempt to stem the proliferation of nVIR outbreaks, Blomgren wrote a detection program called RezSearch. An associate, Mike Scanlin, published Vaccination, a program that inoculates applications against the virus. According to Scanlin, "Once your System file is infected, every application launched from that System will become infected. The whole infection process only takes a second or two, so there is little chance you would notice it." (See "Antiviral Chart" for products that can detect the presence of nVIR viruses.)

**Evening the Score**

The Scores virus, named for an invisible file that the virus creates in the System Folder, has been the most troublesome for Mac users. Programmers at NASA headquarters in Washington, D.C., were among the first to spot Scores. Senior Computer Systems Scientist Dave Lavery noted that about 20 percent of NASA's 120 Macintoshes began exhibiting difficulty in running MacDraw, in printing from any application (especially MacDraw), and in using the Set Startup option. They also had difficulty running Excel, Excel files became corrupted, and applications crashed frequently when starting up. After spotting some unfamiliar resources, Lavery contacted Apple. Investigators spent two days solving the problem.

Lavery assumes that the virus entered NASA via a program downloaded from a Bulletin Board. "Large businesses and government, in particular, really need to have someone watching over software configuration," says Lavery. Now, all software is double-checked before it is opened on NASA Macintoshes.

Lavery uploaded a fairly extensive report about the virus to bulletin boards, and in early April 1988, Howard Upchurch of the Mac Pack and Apple Corps of Dallas posted the Lavery article, with an addendum, and then published an even more comprehensive article of his own. Infected as early as November of 1987, Upchurch had spent months keeping detailed notes on the virus's behavior and effects. Although he admits to blaming most of his early troubles with the virus on MultiFinder, Upchurch's research and persistence provided a body of information that proved quite helpful to many in uncovering the mechanics and history of the virus. (See "How the Scores Virus Invades a System" for a discussion of how the virus spreads.)

**Who Is Eric Vult?**

Virus experts agree that the author of the Scores virus had a mission. Besides containing code ensuring that it replicates, Scores targets two proprietary programs developed at EDS (Electronic Data Systems), a

---

**Legal Remedies**

Gary Hickman, attorney for the Software Development Council, says there are legal remedies against virus writers. "The goal is to simplify the process," he notes, "to get new laws on the books that address the problem specifically."
# Antiviral Chart

<table>
<thead>
<tr>
<th>Program</th>
<th>Author</th>
<th>Type</th>
<th>Size in Bytes</th>
<th>Cost</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agar</td>
<td>Bill Krimmel Aba Software</td>
<td>APPL</td>
<td>361</td>
<td>Free</td>
<td>Acts as electronic petri dish. Install on disks that contain applications or system files. Check occasionally to see if anything has attached itself to it. Check against screen dump of entire program done in ResEdit.</td>
</tr>
<tr>
<td>CRC 1.0</td>
<td>Raymond Lau</td>
<td>APPL</td>
<td>4034</td>
<td>Free</td>
<td>Calculates CRC (Cyclic Redundancy Checks) of Data and Resource forks in decimal form and bytes and times calculation. Can check for changes in files.</td>
</tr>
<tr>
<td>Ferret 1.1</td>
<td>Larry Nedry</td>
<td>APPL</td>
<td>16,242</td>
<td>Free</td>
<td>Detects and removes Scores virus; repairs applications. Notifies if file is infected and gives option to cancel, skip, or repair. Offers delete buttons for INIT or RDEV resources for Scores and Desktop_. files. Shows probable date of infection. Points out damaged applications.</td>
</tr>
<tr>
<td>Interferon 3.0</td>
<td>Robert Woodhead</td>
<td>APPL</td>
<td>25,585</td>
<td>Donations to Vision Fund</td>
<td>Detects Scores and nVIR viruses and watches for attempts to add code to a common system file, changing the type to INIT. Deletes applications infected with Scores and nVIR viruses. Warns if it encounters VULT or ERIC. Option to report anomalies. HFS only.</td>
</tr>
<tr>
<td>KillScores</td>
<td>Howard Upchurch, et al.</td>
<td>APPL</td>
<td>26,806</td>
<td>Free</td>
<td>Detects and removes Scores virus; repairs applications. Repairs System, Finder, MultiFinder, Scrapbook, and Note Pad. Removes phony Desktop_. files. Repairs most damaged applications. Torn Vaccine off before running. Select disk or folder to be disinfected.</td>
</tr>
<tr>
<td>RezSearch</td>
<td>Wade Blomgren</td>
<td>APPL</td>
<td>26,653</td>
<td>Free</td>
<td>Detects Scores and nVIR viruses. Specifies resource type, ID number, and size for search. Looks for nVIR by default. Can find nonviral resources. Verbose mode lets you see each file name and directory name as program examines them. Can save results to file. Incompatible with MultiFinder. HFS only.</td>
</tr>
<tr>
<td>Shield</td>
<td>Symantec Corporation</td>
<td>INIT</td>
<td>21,411</td>
<td>$99.95</td>
<td>Monitors disk directory on start-up disk. If operation is attempted that would damage directory by setting data to zeros, Shield brings the action to a stop and informs you of attempt. HFS only. (Shield is part of Symantec Utilities for Macintosh.)</td>
</tr>
<tr>
<td>Vaccination</td>
<td>Mike Scanlin</td>
<td>APPL</td>
<td>3117</td>
<td>Free</td>
<td>Innoculates applications against Scores virus. Immunizes applications against the nVIR virus. System file must be immunized manually using ResEdit.</td>
</tr>
<tr>
<td>Vaccine</td>
<td>Don Brown GE Software</td>
<td>CDEV</td>
<td>11,875</td>
<td>Free</td>
<td>Warns when it encounters Scores and nVIR viruses. Warns when something attempts to modify certain significant resources. User can grant or deny permission (for example, allowing changes to resources when installing programs or using Font/DA Mover). Expert mode displays small icons in upper right. MPW mode, also. Put in System Folder and reboot.</td>
</tr>
<tr>
<td>Virus Rx</td>
<td>Apple Computer</td>
<td>APPL</td>
<td>41,229</td>
<td>Free</td>
<td>Detects Scores and nVIR viruses. Lists files as &quot;Dangerous&quot;, &quot;Fatal&quot;, or &quot;Altered&quot; if it finds suspicious resources or files. You must replace these files. Lists damaged applications, all INIT, CDEV, and RDEV files, as well as invisible files. Provides good safeguarding information in documentation.</td>
</tr>
<tr>
<td>VirusCheck</td>
<td>Albert Lunde</td>
<td>APPL</td>
<td>53,366</td>
<td>Free</td>
<td>Detects Scores and nVIR viruses. Checks active System Folder, boot blocks, and all applications for changes by comparing OldSystemCheckSum with new output file. Checksum of applications less detailed than for contents of System Folder. Distributed in compiled and source code. HFS only.</td>
</tr>
<tr>
<td>VirusDetective</td>
<td>Jeffrey S. Schulman R.O. Box 50 Ridgefield, CT 06877</td>
<td>DFIL</td>
<td>22,879</td>
<td>$10 Shareware</td>
<td>Detects and removes applications infected by Scores virus. Desk accessory. Can search for resources by size or range of sizes, name, or ID. Add these resources to the default settings: apl ID = 128, DATA ID = -4091, INIT ID = 17, and INIT ID = 6. You must clear invisible Scores and Desktop_. files with ResEdit.</td>
</tr>
</tbody>
</table>

98 November 1988
company that provides computer and communications services to major corporations and government agencies. Founded by H. Ross Perot and now owned by General Motors, EDS maintains worldwide data networks and employs more than 48,000 individuals.

According to EDS sources, some time after one programmer was fired, an anonymous disk containing a copy of the Scores virus showed up at EDS's Dallas office. Soon afterward, Macintosh users at EDS reportedly began to experience slowness, random crashes, and printing problems, as well as systematic crashes with in-house programs containing the identifiers ERIC and VULT.

Scores was apparently written to target two of EDS's in-house programs that bear the ERIC and VULT identifiers. Although Scores does cause the target programs to crash (see "How the Scores Virus Attacks Applications"), the author of the virus seems to have designed it more to vex than to destroy information. Because its mission is so specific, it appears that the program's escape into the population at large was unintentional.

Many Macintosh users would like to see the creator of Scores in court. EDS spokesperson Roger Still says, "A civil suit is not appropriate in this case.... Besides, the outbreak was so contained—a couple of dozen Macs—and we feel it was dealt with quite thoroughly. We followed every possible lead, but that case is now in the past for us."

Other victims are not so quick to dismiss the case. The virus has reportedly invaded the United States Environmental Protection Agency; the National Oceanic and Atmospheric Administration; and the United States Sentencing Commission. Sources indicate that Apple has been working with law enforcement agencies since the outbreak of the Scores virus, and in early July 1988, NASA reportedly called on the FBI to investigate.

"I believe that whoever wrote this," says NASA's Lavery, "could not foresee enough of the potential system configurations to prevent an occasional collision between the virus and other active applications and printer drivers. Some people think that it has run its course," he concludes, "but I don't think we've seen the last of it."

There Ought to Be a Law

There are no laws that deal specifically with computer viruses, but several state legislatures have recently passed laws that prohibit unauthorized access to computers. On January 1, 1988, California enacted section 502 of the Penal Code. It declares that anyone who "knowingly accesses and without permission adds, alters, damages, deletes, or destroys any data, computer software, or computer programs which reside or exist internal or external to a computer, computer system or computer network..." is guilty of a public offense. Individuals accused of authoring and/or knowingly distributing a virus in California could potentially face $10,000 fines, loss of computer equipment, and three years in jail.

The Software Development Council (SDC), a coalition of six regional trade organizations, recently formed a combined developer/legal task force to combat software viruses. SDC's spokesperson Gary Hickman, an attorney who specializes in high-tech law, points out, "In civil suits, damage calculation is tricky but not insurmountable. Calculations would include loss of memory and time, pain and suffering, and the intentional infliction of emotional distress. The goal is to simplify the process, to get legislatures to address the problem."

"The problem," he continues, "is that most lawmakers are just not trained in the technology. To make laws work, they need tinkering like a car. Ultimately, the point is to make the creation of viruses impermissible. Unambiguously. Even in the name of fun. The fact that a Canadian software developers' organization gave Brandow an award for his virus is an appalling thought. What he did was no better than breaking into a house and leaving a note that says he could have ripped the owner off."
Tips for Keeping Your Mac Virus-Free

- Run virus checks before backing up.
- Back up, back up, back up. And archive more than just the most recent backup. Imagine discovering that not only is your system infected, but so are your backups.
- Never work with original master disks. Write-protect them (snap open the lock tab on the floppy) and make copies. Use the copies to install and run programs. This precaution can't be emphasized enough. If you don't have uninfected original disks, you aren't going to be able to replace applications that pick up a virus.
- Make a backup copy of your uninfected System Folder. All the customization that you've added—INITs, CDEVs, fonts, desk accessories—are in danger of being lost if you have to throw away infected system files.
- Network users with access to shared applications should observe the same precautions as individual users: verify that the current system and applications are virus-free. Test all new programs. Better yet, use the server for accessing data files only and avoid running server-based applications.
- Quarantine infected systems.
- Disconnect them from networks and don't move files from them until the virus is completely eradicated.
- Keep unfamiliar software on floppy disks until its quality is determined. The major bulletin boards have been quick to diagnose and eradicate any problems in their files. Still, it is in your best interest to be suspicious of all new downloaded software.
- If you're exchanging software with other users, be suspicious of all new programs.
- Don't be in a hurry to put new software on a hard disk. Run it from a floppy with the hard disk turned off. Some viruses contain time bombs and their effects may not show up right away.
- The Shield INIT in Symantec Utilities for Macintosh (SUM) offers a unique protection. It will not allow any information on the start-up disk to be erased. This is a safeguard that could be extremely valuable should any future viruses emulate those in the mainframe and IBM worlds that attempt to erase data information.

Testing Unknown Software

1. Boot the Mac from a floppy start-up disk.
2. Unmount any internal hard disk by dragging its icon to the trash.
3. Record the sizes of the System and related files by using the Finder's Get Info command. The size of the System shouldn't change unless you add or remove fonts, desk accessories, or other resources. Record the size of a familiar application.
4. Put the unknown software and the familiar application of known size on a floppy and run the new software with a copy of the System that you checked in the previous step. (A program like Agar, designed to provide an electronic medium for growing viruses, can also be placed in the System Folder.)
5. Using the Control Panel, update the Mac's date setting and run the program several times on the new dates. Some viruses are time bombs that lie dormant for a predetermined length of time.
6. Check the size of the application, the System, and/or Agar against their previously recorded size. Unaffected applications should not, as a rule, grow any larger in size.
7. Run the familiar application and note any unusual behavior.

T/Maker's Heidi Roizen is the president of the Software Publishers Association. She's concerned that "the more stringent you make the laws, the more likely it is that criminals will work to get around the laws." She believes that issuing procedures for developing and duplicating software, along with educating users, is the answer.

The first virus case before the courts is being tried at the time of this writing. Donald Gene Burleson faces a charge of "harmful access to a computer" in Fort Worth, Texas. Burleson is accused of planting a virus that deleted 168,000 records of employee sales commissions. This is the first test of a three-year-old Texas computer sabotage law. Its outcome is expected to set a precedent for potential cases in other states.

As Ash Jain of the Irvine Resource Group aptly notes, not all Mac users are equally susceptible to viral attack. "A single user at home who doesn't, as a rule, trade software, is generally quite safe," says Jain. Someone who works in a network environment is in an entirely different position. When you add bulletin board access to the formula, you have an even more complex and vulnerable situation.

Although incidences of the Scores virus seem to have peaked in late spring of '88, isolated outbreaks
Glossary

**aplt** Usually an Appletalk driver device.

**CDEV** Code for Control Panel device.

**Creator code** A four-letter code that identifies the application that created a file (for example, MPNT for MacPaint and XCEL for Excel).

**Data fork** Usually contains information generated by the user of a program.

**Desktop file** An invisible data file created by the Finder to keep track of files, folders, icons, and so forth.

**INIT** Files placed in the System folder. INIT resources found in INIT, RDEV, and CDEV files are loaded into RAM at start-up and are executed first.

**RDEV files** Device drivers in the System Folder.

**Resource fork** Generally contains an application’s program code, as well as information on fonts, formatting, menus, icons, and so forth.

**Type code** Sometimes called a file’s signature; a four-letter code that identifies what kind of information a file contains (for example, APPL for an application and TEXT for text-only data).

**ResEdit** A resource editor distributed by Apple.

are still reported regularly. Until these outbreaks stop, users need to take precautions whenever adding software to their collection. (See “Tips for Keeping Your Mac Virus-Free.”)

**Safe or Sorry**

Electronic bulletin board systems (BBSs) have been unfairly blamed for the lion’s share of viral infections. It’s true that the accessibility and diversity of files on BBSs make them obvious targets for viral-terrorists, but it is to the credit of the major BBS operators that they have been quick to diagnose and eradicate any viruses in their files.

CompuServe, for instance, added associate sysops (system operators) to monitor all information uploaded onto its boards. MacNet sysop Pat O’Connor reports, “I run one of the larger BBSs, and I have never seen a virus.” Steve Costa of BMUG says that its system has never been infected and that few users attending their meetings have reported virus attacks. Costa says that only 1 out of 20 users who call BMUG to report a virus actually has one.

One unfortunate consequence of virus hysteria is that innocent people find themselves branded. Raymond Lau, author of the popular Stufflt compaction program, found himself defending the integrity of his program when version 1.2 picked up a virus. The rumors grew until finally a British newspaper reported that the Mac community was heavily infected with the “Stufflt Virus.” The infected Stufflt problem appears to have been somewhat localized in Texas, and the program has been clean since Lau began uploading version 1.40A of Stufflt in May 1988.

Software developers have also had to beef up security. Because viruses interfere with the development of new software, and because fear of infection can undermine public trust in a company’s products, software developers are doubly vulnerable. A source at one major company noted that after an outbreak of the Scores virus, “everything just started crashing.” The company quickly instituted stringent testing routines, quarantining of unknown software, mandatory classes on viruses for all employees, and archival backups. There have been no further outbreaks, and no infected software ever shipped.

**Forewarned is Forearmed**

Laws provide one kind of solution to the virus problem, but the real answers lie in the development of hardware and software safeguards and in the willingness of users to be more cautious. We will have to sacrifice some degree of freedom to security; but most of the precautions recommended for avoiding viruses are healthy habits to cultivate anyway. The big three rules to remember are:

- back up regularly and keep archival backups;
- write-protect disks whenever practical; and
- don’t panic.

See Where to Buy for contact information.
How to Buy a Macintosh

In which our consultants tell you what to buy and what it’ll cost you

So you want to buy a Macintosh. Great—which one? And how much memory will it take to do your job? Which printer is appropriate? What kind of storage device will you require, and what other equipment do you need?

Back when the Mac was a closed box, putting together a system was easy. Today, matching your available funds against your requirements, and your requirements against the available hardware options, can start to make you feel as if you’re personally in charge of balancing the federal deficit.

But at least you’re not on your own. To help you find your way through the Macintosh decision maze, we’ve devised the accompanying questionnaire (see “Macintosh Needs Analysis”). Once you’ve filled out the form and figured out exactly what you expect from a personal computer, the rest of this article will help you to decide which hardware and software configurations match your personal computer profile.

Different Macs for Different Hacks

The Macintosh Plus is the no muss, no fuss model for people who want a tool they can use without becoming mechanics. It’s easy to set up and use, takes little desk space, and is transportable. Like all members of the Macintosh family, it comes with an 800K internal floppy disk drive, 1 megabyte (MB) of memory, and ports for connecting hard disks, modems, and network cables. The Plus has no expansion slots for adding new capabilities, but you can expand the RAM (random-access memory—see below) from 1MB to 4MB. The Plus has no fan, which means it’s quiet, but also somewhat less reliable.

The Macintosh SE is a workhorse; it can do everything the Plus can, 15 to 20 percent faster. It combines the Plus’s transportability and small footprint with heavier construction, and it has one expansion slot so it can grow with your needs. An expansion card (which fits into the slot) provides your machine with programming and processing power to do such things as run MS-DOS applications, tie into mainframes or networks, drive a large screen, or simply speed everything up.

The SE comes in two models: one has two SOOK floppy disk drives; the other has one disk drive and an internal hard disk. In comparison with the Mac Plus, which can accommodate only two input devices (usually the mouse and the keyboard), the SE’s Apple Desktop Bus (ADB) port can accom-
Mac Plus: Basic Setup
A good place to start. The Mac Plus is a capable machine with a lot of advantages—if you have the right type of application. If you shop around, you can get started with a system like this for approximately $1810; list prices total $2800, not including software.

Mac Plus (internal floppy drive, IMB RAM, mouse and keyboard included)

moderate multiple devices, such as digitizing tablets or joysticks, which you daisy-chain together. An 80-watt power supply and an internal fan enable the SE to support this hardware and in general make the SE suitable for heavy use. Because it can take 90- to 220-volt input, the Macintosh SE can be used in any country.

The SE is better suited to business than the Plus because it provides greater speed and durability. The SE is a better long-term investment because you can modify the basic computer and update it as Apple releases new standards. However, as a result of Apple’s recent price hikes the SE now costs an eye-opening $1300 more than a Plus. You might be better off buying a Plus now and selling it when you want to upgrade to a Macintosh II.

The Macintosh II is fundamentally different from its smaller cousins. Because of the difference, some older applications written for the Plus and SE don’t work on the II, and there are some very sophisticated applications that run only on the more powerful machine. The II’s speed and the built-in mathematics coprocessor make it great for spreadsheets and databases, and it’s only four times faster than the Plus.

While the original Macintosh was conceived as a self-sufficient unit, the Mac II was designed to be a platform upon which to build a system. You start with the central processing unit (CPU—the main box), then select a keyboard and a color or black-and-white monitor. The Mac II has six slots for expansion cards, so you can use special networking, video, and data-acquisition devices. The Mac II also has more powerful sound capabilities and can play back in stereo. It can hold up to 8MB of memory without going to an expansion card and works with very large internal or external hard disks.

What can a II do? A Macintosh II research system might include an instrumentation interface card that connects the Mac to lab equipment, a real-time data acquisition card to read sensor data, and a 19-inch color monitor to display temperature variations.

All this power doesn’t come cheap. The Macintosh II CPU, without a monitor, keyboard, or hard disk, lists for $1100 more than an SE with a 20MB internal hard disk.

Hard Disks
A hard disk is a permanent storage device, a super filing cabinet that enables a computer to file and fetch documents and saves you from having to search through a pile of floppy disks. After a printer, most people’s first peripheral purchase should be a hard disk.

Since it gives you quick access to all of your documents and programs, a hard disk speeds up virtually every job. It is essential for some programs: PageMaker 3.0, for instance, can’t run on floppy disks. Hyper-
Macintosh Needs Analysis

Before you plunge into the heady world of Macintosh, we recommend that you answer the following questions to determine your personal computer profile. The main article will help you to interpret your answers. When you start shopping actively, take your completed questionnaire with you and show it to dealers.

1. First things first:

What do you plan to do with your Macintosh? What tasks do you want it to perform?
What do you expect to be doing with it in two years?
How much do you want to spend for the whole system, including hardware and software?

2. Software:

What kind of software applications will help you accomplish the tasks you have in mind? For each application you’re considering, answer the next three questions.
Is the software compatible with all Macintoshes or only with some?
Will it work reasonably quickly on a Plus? Or do you need an SE or a Mac II?
Is the software available now? Does it work with the current version of Apple’s System software?

3. Hardware:

What kind of technology upgrade path do you need? Will you adopt new hardware standards as Apple releases them?
Are you willing to invest more money for extra speed, power, and an upgrade path?
Do you want to customize your computer? Do you need hardware for special functions not provided as part of the standard Macintosh, such as an MS-DOS coprocessor or an Ethernet network card?

4. Output:

Do you need your Mac for high-quality text or graphics? Color? Multipart forms? What page sizes?
Will you frequently need to change paper size or to print letterhead stationery?
Do you need low- or high-volume printing?
Do you want to use the printer with more than one computer?

5. Disk storage:

What do you need to do with your Mac?
A) Word processing; routine spreadsheet calculations; data entry; online searching or other telecommunications; games; occasional use of painting and drawing programs.
B) Use and store sound, graphics, publication or database documents; store and use HyperCard stacks with images and sound; manage large files of any type; use MultiFinder; keep more than one application and related files available for use most of the time.
C) Do you plan to do several of the tasks in B, or set up a file server?
If you answered Yes to A, a 20- to 30-megabyte hard disk, or even floppy disks, may suit your needs. If B, buy a larger hard disk (40MB to 80MB). If you answered yes to C, an 80MB to 160MB hard disk will be necessary.

6. Memory:

What is the minimum memory specified by the publisher for your selected application program or programs? How much memory is required for optimum operation?
To find out how much memory a specific set of programs and MultiFinder need, add up the memory as follows (you can find out the suggested memory for any program by selecting Get Info while running under MultiFinder):

System and Finder 450K to 550K
Suggested memory for first application ________ K
Suggested memory for second application ________ K
Suggested memory for other applications ________ K
Background programs or custom control panel devices such as print spoolers or electronic mail ________ K
Total ________ K

7. Monitors:

Will you be dealing primarily with text and numbers?
Do you need to do full-page design or layout?
Do you want to be able to look at several windows simultaneously in an application? To be able to look at many cells of a worksheet without having to scroll around the window?
Do you want or need color?
Do you want to display and manipulate digitized images, and see them as they will be printed?

8. Networking:

Do you want to connect two or more computers and printers together?
SUGGESTED ADDITIONS

- 40MB-80MB hard disk
- 2MB additional RAM (to a total 4MB)
- 2400-baud modem
- Accelerator card
- Extended keyboard
- LaserWriter II SC

SE: Basic Setup

For the office or home-office. In a multi-Mac office setting, you would probably substitute a LaserWriter for the ImageWriter II. Without the suggested additions, this basic, competent workstation costs $3650 to $5000.

Card, MultiFinder, Helix, FullWrite, and 4th Dimension are impractical. If the program and the System files won't fit on one floppy disk, you'll be frustrated trying to use the program on floppies. So unless your needs are modest (all you want to do is write reports or work simple spreadsheets), buy a hard disk—and buy one bigger than you think you need. Like any filing cabinet, your electronic one will fill up much sooner than you expect.

If you're buying an SE or a II you may be tempted to get an internal hard disk, which is slightly cheaper and will make your entire system more transportable. A Macintosh with an external hard disk is a more reliable system, however. If an internal hard disk breaks down, your whole system will be unusable for as long as it takes to repair the hard disk. If an external hard disk breaks down, you can unplug it and still use your Mac. Another advantage is that external drives are portable from one Mac to another. If a Macintosh is available at your destination, you can carry your applications and data on the hard disk, connect to the computer, and start running immediately.

But what if you can't afford a hard disk? Whether you can survive without one depends on your user profile. If you are unfamiliar with computers, a Plus with an inexpensive third-party external floppy disk drive might be your best investment. Used with programs such as Microsoft Works, FileMaker 4, or WriteNow, this setup will stretch your own capabilities for some time to come. However, if you are planning to write a dissertation, run a business with large customer databases, or do desktop publishing, you might as well start with the hard disk.

Many third-party vendors sell hard drives for the Macintosh; these products vary considerably in price, speed, and features. Even if your budget is limited, you...
Profile: Lisa, Graphic Designer

Lisa has been a free-lance designer for several years. She has a variety of clients, including some who use computers. She knows that using a Macintosh would let her work more effectively with computer-based clients and save her time and money by combining some tasks that she now does mechanically.

She will use the Macintosh to create black-and-white and color line art; prepare presentations and final designs for illustrations, logos, brochures, and annual reports; and send files electronically to a typesetting and graphics service bureau. She would like to see color on the screen and be able to create four-color separations for artwork. To manage her business better, she will computerize client information, billing, and bookkeeping. She is prepared to spend up to $10,000 on software and equipment.

In addition to spending about $2000 in graphics and other software, we recommended that Lisa start with a transportable black-and-white system (Macintosh SE), large hard disk, and LaserWriter IINT ($8000). As profits allow, she could add a two-page monochrome display ($1700). When she wants to upgrade her system she can sell the SE, buy a Macintosh II with 5MB of RAM ($6100), and connect the monochrome display and other hardware to the Mac II. With a second video card, she can use both color ($1200, including card) and monochrome monitors on the Mac II.

should be able to find a hard disk to suit your needs (see next month's issue for an overview of 20MB hard disks—a good size for a first disk).

Memory

If disk space is like paper and a hard disk like a filing cabinet, then RAM is like the memory inside your head. Just as reading puts notes into your head, so reading from the disk puts data into RAM, where the Mac's "brain" can use it.

When the SE and the Mac II were introduced almost two years ago, 1 megabyte was the standard amount of RAM for the three cousins. Commonly used applications run on 1MB or less, although a few applications may run slowly or limit document size. For word processing, spreadsheets, or midlevel databases such as FileMaker 4 or RecordFolderPlus, as well as for home, educational, or entertainment software, 1MB should be enough.

Relational databases, desktop publishing and graphics programs, and programs that manipulate digitized pictures and sound create large document files. If you're working professionally in one of these areas, extra memory will speed up operations, ensure that you have enough memory for disk accessories and print spoolers, and let you open multiple documents simultaneously.

Apple's MultiFinder enables you to switch quickly between applications. For example, if a customer calls while you are word processing, you can switch to your database, consult his record, talk to him, and switch back without closing down your word processor. MultiFinder won't run practically on a 1MB system; see "Macintosh Needs Analysis" for guidance on how much memory is required.

Add-in RAM comes in two forms: as 1MB SIMMs and as 256K SIMMs (SIMM stands for Single Inline Memory Module, for what that's worth). These modules are essentially miniature boards with chips on them. Prices of 1MB SIMMs have been volatile this year, fluctuating between $225 per megabyte to well over $450. As in the stock market, when prices are high, hold off; when they go down, buy. If you need a total of 2 megabytes but no more, you'll save money by buying an upgrade kit that uses four 256K SIMMs. Several vendors offer such kits at prices from $300 to $400.

Using the special capabilities of the Macintosh II requires more memory. For example, to run the Interleaf publishing system you need 5MB of RAM. As a general rule, programs that use color or manipulate digitized images need at least 2MB, and do better with 4MB.

Monitors

A large-screen monitor enables you to look at several open documents simultaneously and see more of each one. It
Mac II: Basic Setup

For the advanced Mac professional. You can create all kinds of exotic configurations for a Mac II; this setup presents only the most typical workstation choices. Without the additions, this basic setup will run you $10,525 to $14,600.

SUGGESTED ADDITIONS

- 4MB additional memory (for a total of 8MB)
- 40MB-120MB extended hard disk
- Extended monitor
- 2400-baud modem
- LaserWriter II NT

speeds and improves the interaction between you and the computer. For professional desktop publishing, graphic arts, or drafting, a full-page monitor will soon pay for itself. A writer or analyst can use the larger working area to keep a spreadsheet visible while writing a report based on it. In many situations a large monitor might be more valuable than an expensive printer.

There are three kinds of monitors: monochrome, gray-scale, and color. All come in portrait (tall) or landscape (wide) models. A monochrome monitor displays only black and white pixels (the screen dots that make up an image). A gray-scale monitor can display different shades of gray directly, just like a television set. These monitors, whose images look more like photographs, are ideal for desktop publishing. Color monitors display images in living color; the number of colors depends upon the expansion kit and video adaptor used to connect the monitor to the Mac II.

Big screens aren't cheap; they're for people who make their living with a Macintosh. Most SE and Plus buyers can use the built-in screen for word processing, data entry, telecommunications, or any task where they work in only one or two windows at a time. Besides the expense, some big screens take memory and processing time from the program you're using, which slows your Macintosh. If you need a big screen, be sure your Mac is powerful enough to support it.

Printers

Almost everyone needs a printer. Two varieties are the most common: dot matrix and laser. The high-resolution output that people associate with the Mac is printed on PostScript-based laser printers like Apple's LaserWriters.

PostScript printers can access hundreds of professional-looking fonts created using Adobe's PostScript page-description language. When used with a Macintosh and PostScript software applications, PostScript printers give users a high level of control and flexibility in manipulating text and graphics. They're ideal for printing page proofs before typesetting final camera-ready copy at high resolution.

A PostScript laser printer is a must for anyone in the graphics or publishing field. Resolutions from 300 to 600 dots per inch...
Profile: Dave, Consulting Engineer

Dave owns a structural engineering firm. He employs two engineers, a secretary, and a bookkeeper. He wants to computerize all operations, but his budget dictates that he purchase equipment over a two-year period. Some members of his staff have used computers before.

Dave wants to save, modify, and reuse drawings; share information and documents; access records easily; prepare more attractive documents; and have his staff work together more efficiently. Specific tasks include word processing and document preparation, preparing client presentations, computer-aided design, project management, and small-business accounting.

For a two-year hardware purchase plan, we suggested the following:

### Phase I: Computerize engineering and some office work

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit Price</th>
<th>No. Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macintosh SE: 45MB–80MB hard disk; extended keyboard (for staff)</td>
<td>$3900</td>
<td>1</td>
</tr>
<tr>
<td>Macintosh II with 5MB; 80MB–140MB hard disk; regular keyboard (for Dave and one engineer)</td>
<td>$7700</td>
<td>2</td>
</tr>
<tr>
<td>Monochrome monitor with video card</td>
<td>$750</td>
<td>1</td>
</tr>
<tr>
<td>Color monitor with video card</td>
<td>$1200</td>
<td>1</td>
</tr>
<tr>
<td>ImageWriter LQ with AppleTalk</td>
<td>$1500</td>
<td>1</td>
</tr>
<tr>
<td>LocalTalk nodes and TOPS software for networking</td>
<td>$250</td>
<td>3</td>
</tr>
<tr>
<td>Multipin color plotter</td>
<td>$4000</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
<td><strong>$27,300</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Phase II: Give each employee a computer

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit Price</th>
<th>No. Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macintosh SE: 45MB–80MB hard disk; extended keyboard (for staff)</td>
<td>$3900</td>
<td>1</td>
</tr>
<tr>
<td>Macintosh II with 5MB; 80MB–140MB hard disk; regular keyboard (for engineer)</td>
<td>$7700</td>
<td>1</td>
</tr>
<tr>
<td>Color monitor with video card</td>
<td>$1200</td>
<td>1</td>
</tr>
<tr>
<td>LocalTalk nodes and TOPS software for networking</td>
<td>$250</td>
<td>2</td>
</tr>
<tr>
<td>LaserWriter IINT</td>
<td>$1250</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
<td><strong>$17,550</strong></td>
<td></td>
</tr>
</tbody>
</table>

(dpi) are available from several manufacturers, and prices range from $3500 to $10,000, with Apple's LaserWriter II series in the middle range. Economically, one thing in PostScript printers' favor is that they all come with the ability to work on a network, so many users can share one print station.

QuickDraw-based laser printers, such as Apple's LaserWriter HSC or General Computer Corporation's Personal LaserWriter, give you 300-dpi output but have limitations. They don't provide the specialized capabilities of PostScript; without modification, they can't be used with more than one Mac; and because more of the print processing is done by the Mac, this type of printer uses more disk space and memory, requires a hard disk for font storage, and takes longer to print. On the other hand, for an individual businessperson or a small office, these printers offer professional-quality printing for street prices as low as $1600.

As their name implies, laser printers use light to produce images. By contrast, dot-matrix printers hark back to typewriter technology: the printer contains a cluster of small rods, which produce images by pressing a ribbon against a piece of paper. Dot-matrix printers like the 72-dpi ImageWriter II provide adequate output for correspondence, rough image proofing, and labels; are the only machines able to print multipart, continuous-feed forms; and can print in color using a color ribbon.

ImageWriters are slower than laser printers, but cheaper to buy and operate. The wide-carrage ImageWriter LQ has optional paper and envelope feeders that are very handy for volume printing, and the print quality at 216 dpi is acceptable even for formal correspondence. (See the May 1988 *Macworld* for a review of the LQ; for more information on laser printers, see "Looking at Laser" in the June 1988 issue.)

Getting your Macintosh to produce attractive copy on a printer that is neither PostScript-based nor specifically marketed for the Macintosh is more complicated than plugging in an Apple or an Apple-compatible printer. Unless you're willing to experiment with different cabling and interface schemes, we recommend that you avoid such printers.

### Modems

Modems enable your Mac to "talk" to other computers over telephone lines. You can send documents instantly to another...
## How Much Does It Cost?

<table>
<thead>
<tr>
<th></th>
<th>Low (all vendors)</th>
<th>High (all vendors)</th>
<th>Apple List</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macintosh Plus (1 floppy drive)</td>
<td>$1250</td>
<td>$1550</td>
<td>$1799</td>
</tr>
<tr>
<td>Macintosh SE (2 floppy drives)</td>
<td>$2297</td>
<td>$2598</td>
<td>$3169</td>
</tr>
<tr>
<td>Macintosh SE (20MB hard disk and 1 floppy)</td>
<td>$2689</td>
<td>$3090</td>
<td>$3769</td>
</tr>
<tr>
<td>Macintosh II (1 floppy drive)</td>
<td>$3445</td>
<td>$3993</td>
<td>$4869</td>
</tr>
<tr>
<td>Macintosh II (40MB hard disk and 1 floppy)</td>
<td>$4365</td>
<td>$5058</td>
<td>$6169</td>
</tr>
<tr>
<td><strong>Hard Disk</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20MB</td>
<td>$500</td>
<td>$1000</td>
<td>$1099</td>
</tr>
<tr>
<td>40MB</td>
<td>$769</td>
<td>$1500</td>
<td>$1699</td>
</tr>
<tr>
<td>70MB-80MB</td>
<td>$969</td>
<td>$1399</td>
<td>$2799</td>
</tr>
<tr>
<td>100MB</td>
<td>$1149</td>
<td>$2295</td>
<td>n/a</td>
</tr>
<tr>
<td>140MB</td>
<td>$1469</td>
<td>$3295</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Floppy Drive</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External 800K 3½-inch for Plus or SE</td>
<td>$200</td>
<td>$375</td>
<td>$429</td>
</tr>
<tr>
<td>Internal 800K 3½-inch for II</td>
<td>$200</td>
<td>$299</td>
<td>$299</td>
</tr>
<tr>
<td><strong>RAM</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two 1MB SIMMs for Plus, SE, or II</td>
<td>fluctuates</td>
<td>fluctuates</td>
<td>fluctuates</td>
</tr>
<tr>
<td>1MB upgrade kits (256K SIMMs) for Plus, SE, or II</td>
<td>$300</td>
<td>$400</td>
<td>$449</td>
</tr>
<tr>
<td><strong>Keyboard</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular</td>
<td>$95</td>
<td>$110</td>
<td>$129</td>
</tr>
<tr>
<td>Extended</td>
<td>$175</td>
<td>$225</td>
<td>$229</td>
</tr>
<tr>
<td><strong>Mac II Monitor (incl. card)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple 12-inch monochrome</td>
<td>$675</td>
<td>$775</td>
<td>$898</td>
</tr>
<tr>
<td>15-19-inch monochrome</td>
<td>$1099</td>
<td>$1995</td>
<td>n/a</td>
</tr>
<tr>
<td>19-inch gray-scale</td>
<td>$1750</td>
<td>$3590</td>
<td>n/a</td>
</tr>
<tr>
<td>Apple 13-inch, 256 colors</td>
<td>$1250</td>
<td>$1425</td>
<td>$1647</td>
</tr>
<tr>
<td>19-inch, 256 colors</td>
<td>$3500</td>
<td>$5295</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>SE/Plus Monitor (incl. card)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-inch monochrome</td>
<td>$1000</td>
<td>$1690</td>
<td>n/a</td>
</tr>
<tr>
<td>19-inch monochrome</td>
<td>$1525</td>
<td>$2590</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Modem</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>300–1200 baud</td>
<td>$100</td>
<td>$500</td>
<td>$279</td>
</tr>
<tr>
<td>1200–2400 baud</td>
<td>$175</td>
<td>$500</td>
<td>n/a</td>
</tr>
<tr>
<td>AppleFax Modem</td>
<td>unavailable</td>
<td>unavailable</td>
<td>$699</td>
</tr>
<tr>
<td><strong>Printer</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ImageWriter II</td>
<td>$360</td>
<td>$488</td>
<td>$595</td>
</tr>
<tr>
<td>ImageWriter II sheet feeder</td>
<td>$182</td>
<td>$245</td>
<td>$299</td>
</tr>
<tr>
<td>ImageWriter LQ</td>
<td>$995</td>
<td>$1147</td>
<td>$1399</td>
</tr>
<tr>
<td>AppleTalk card for ImageWriter II or LQ</td>
<td>$1133</td>
<td>$1144</td>
<td>$1399</td>
</tr>
<tr>
<td>ImageWriter LQ sheet feeder</td>
<td>$249</td>
<td>$299</td>
<td>$299</td>
</tr>
<tr>
<td>ImageWriter LQ envelope adapter</td>
<td>$898</td>
<td>$40</td>
<td>$49</td>
</tr>
<tr>
<td>LaserWriter IISC</td>
<td>$2500</td>
<td>$2799</td>
<td>$2799</td>
</tr>
<tr>
<td>LaserWriter INT</td>
<td>$5915</td>
<td>$4099</td>
<td>$4999</td>
</tr>
<tr>
<td>LaserWriter INTX</td>
<td>$5525</td>
<td>$5599</td>
<td>$6999</td>
</tr>
</tbody>
</table>

For generic items, Low and High prices reflect actual prices of both Apple and third-party products in major metropolitan markets. In the case of Apple-only items, the Low and High prices reflect the range of discount prices we found. Our price estimates don't include university discount prices, which run 15 to 40 percent below Apple's list price.

Mac user, connect to a corporate database or to an online library catalog, leave questions on a software publisher's electronic bulletin board (BBS), or download a utility program from a user group's BBS.

Most modems can communicate at several speeds, measured in baud. In the United States, modems with a maximum speed of 1200 baud, though common, are rapidly being superseded by ones that operate at 2400 baud. The higher-speed modems are more reliable at any speed, will save you time and money if you make toll calls or connect to computerized services, and will serve as the standard for several years to come. They are available with different features from numerous vendors and are priced from $175 to over $500. Unless you're broke, buy a 2400-baud modem.

The communications software you need will depend on the type of computers you want your Mac to talk to, but all Macintosh communication software expects your modem to understand the commands originally employed in Hayes modems. Be sure your modem is Hayes-compatible. (See "Well-Connected" in the March 1988 Macworld for the full story on 2400-baud modems.)

### Upward Mobility

Or, how to keep up with the Apples.

The Plus is cheap but limited; Apple doesn't provide the means to speed up or expand its operation. But because so many people use Pluses, we expect software vendors to supply applications for some time to come. Increasingly, the most sophisticated Macintosh software will take advantage of the power of the Mac II's 68020 processor. Mac Plus owners who want to use these programs can purchase upgrades from third parties, but these upgrades aren't really satisfactory for a variety of reasons. So don't plan on buying a Plus if you think you'll need to upgrade later; go with an SE, which was designed with upgrading in mind.

We expect the number of SE hardware enhancements and special-purpose peripherals to increase steadily for at least a few years, while developers' interest in Plus add-ons will likely wane. The SE's larger ROM and conformity to Apple's current hardware standards will make it easier for Apple to upgrade, and the expansion slot and better power supply will make third-party upgrades easier to buy and use.

If you buy a Mac II, there's no need to fear that you'll be locked out by hardware
Profile: John, the Garage Man

John owns an auto repair service and employs three auto mechanics and a receptionist/cashier. When we first talked to him, he used a pocket calculator and wrote bills and records by hand. Customer and inventory records were stored chronologically and were not always easy to access.

John wanted the Macintosh so he could handle routine record keeping, consult records quickly, and track inventory. He needed to input maintenance records, calculate and print bills, and post the parts used to an inventory record. John had no previous experience with computers, but the growth of his business required him to improve his operations as soon as possible. He had set aside $15,000 for his purchase.

We recommended that John consider a system tailored specifically for his business. We told him about value-added resellers (VARs) who customize database software for specific purposes and sell the programming with Macintosh hardware and technical support.

For about $10,000 John got a custom Omnis 3 Plus application, a Macintosh SE with 2.5MB of RAM, a 20MB hard disk, an ImageWriter II, the regular keyboard, and other software, including Microsoft Word and Front Desk. The Omnis 3 Plus application manages his customer records, billing, and inventory. The VAR set up John's system, showed him how to use it, and provides continuing assistance.

When the parts and estimating catalogs that John needs are available on CD ROM, he will buy a CD ROM player.

Parting Advice

Investigate software first. After selecting the programs that can do the job, find out which hardware will run them. Check for compatibility and then assess RAM and disk-space requirements. If you need special input or output devices, research them at the same time as you look at the Macintoshes.

If you don't intend to expand your computing capabilities, don't need an especially speedy system, have a small budget, or only intend to use the Mac for non-business functions, buy the Plus. It's reasonably priced, quiet, compact, runs a lot of Macintosh software, enables you to telecommunicate with other computers, and can be installed on a network if need be.

If you're going to use your Mac for business, then buy at least an SE. It's customizable, faster than a Plus, more durable, and yet is still transportable. If you must travel with your Mac, the SE is more convenient than the Plus, because you can have a hard disk and a modem or other accessory inside.

Buy a Macintosh II with a color monitor, lots of memory, and a big hard disk to compile and analyze lots of numbers, run CAD/CAM or document-design applications like MGMSIation or Interleaf, or display color.

One good way to get disinterested advice on purchase decisions is to visit a Mac user group. Join a beginner's discussion. You can find a local users group by calling Apple's User Group Directory at 800/538-9696, extension 500, or by consulting "A Guide to Macintosh Users Groups" in the September 1988 issue of Macworld.

Usually there are several different configurations that can reasonably accomplish a given purpose. You might want to consider an SE with extras instead of a Macintosh II. If your budget allows, however, we recommend that you buy the more powerful machine and fewer extras. Your computer is the cornerstone of your system, with a more powerful one you'll be more productive now, and have the foundation for a versatile system later.

The diagrams for this article were prepared with technical assistance from Wally Gegg, Macworld's technical services manager.
SuperStacks

Blue-ribbon stacks from the HyperCard stack contest

by Nancy E. Dunn

Farallon Computing's MacRecorder

Jasmine DirectDrive 45 hard disk

Datacopy Model 730 scanner

National Semiconductor
8/16 Memory Expansion Board

Apple Macintosh SE

The SuperStacks prizes, compliments of the makers.
A

nd the winners

are . . . Not so fast. No awards an-
nouncement would be complete
without a few preliminaries. To start
at the beginning, in May Macworld
announced the SuperStacks contest,
cosponsored by Apple Computer and
Bantam Books. We wanted to see
what stacks people had come up with
in the first year of HyperCard's exis-
tence and to publicly recognize the
excellence of the most outstanding
stacks. We didn't really know what
to expect.
What we got was more than 400 stacks of incredible variety, from annotated tarot decks to medical clinic stacks; from a fieldsurveying application to a Mayan date calculator; from a treatise on Objibwa Indian dialects to a construction estimator. There were even a few checkbook balancers and a couple of résumés. The effect was like opening the windows at *Macworld* and inviting in the world. At a few points we were wading up to our knees in stacks of stacks.

Despite the numbers, looking at the projects was an exciting task. Even stacks that had obvious weaknesses often contained an interesting effect of some sort, or a playful gimmick that kept us in good spirits as we looked through the heap of entries. (For a look at the cream of the crop, keep an eye out for *The Best of Macworld SuperStacks*, to be published by Bantam Books next year.)

The stacks that stood out were those that had obviously been designed with care, and had visual appeal and clear navigation paths. In fact, two of the winners, Don Niven and Pat Lynch, told us they had begun their projects by carefully designing the background card and overall scheme of their stacks.

With a couple of exceptions, the winners also reported that they had little or no programming experience before trying HyperTalk, and they universally praised it as a powerful, easy-to-use tool. And fast, too. Pat Lynch probably summed it up best: "If you had asked me just a year ago whether I would ever be able to do this stuff, I'd have said, 'Yeah, over about a year, with a Pascal programmer by my side.'"

Apparently the actual scripting is not the hardest part, the design is. To restate a theme repeated by many winning authors: A stack ought to be as easy to use as a book, but it should take advantage of what the computer can do that a book can't.

Many thanks to our judges: Bill Atkinson, Doug Doyle, Mike Holm, Kristee Kreitman, Steve Maller, and Mary Planding of Apple, and Raines Cohen of BMUG. Special thanks to Lynn Knerr, Apple's third-party marketing manager, whose unflagging support made the contest possible.

The contest so inspired us that we'll repeat it next year. The deadline for entries will be March 15, so start scripting.

And now, without further ado, the winners.

**Commercial**

Commercial stacks are available through dealers or through mail order (for contact information, see *Where to Buy*).

**Commercial: Development Tools**

*Icon Factory*  
David Gewirtz and James Paul

David Gewirtz, founder of HyperPress, noticed that although HyperCard is icon intensive, it comes with very few icons. And it lacks a built-in tool for creating icons. Until Icon Factory and the public domain XCMD Makelicon came along, "the only way people could create new icons was by taking their System's life into their hands and making icons in ResEdit," says Gewirtz. Icon Factory takes that risk out of creating icons, and it includes a library of more than 2000 icons to use for inspiration or as a starting point for design. In creating Icon Factory, Gewirtz, who designed the interface, and James Paul, who wrote the scripts, focused their attention on what makes an icon effective in a program.

Here are a few of their guidelines: Make icons clearly understandable. Remember that icons never work alone, so icons within an application or within a group must share a consistent style. Reinforce the graphic message with a word that accompanies the icon to avoid miscommunication. And don't get carried away and produce a clutter of icons.
Commercial: Formal Education
A Legacy of Graphic Design
Don Niven

In teaching typography and design history at Saint Lawrence College in Kingston, Ontario, Don Niven has always emphasized the overlapping influence of designers. "Graphic design history really does lend itself to HyperCard's type of nesting and cross-referencing of information," says Niven. "As you move through the stack you see how the designers influenced each other; somebody may have studied at the Bauhaus and then moved to the USA." The stack complements Niven's design history class, but browsing in it would also be a good way for the average person to develop better visual literacy and an appreciation for the fundamentals of design. Niven plans other "legacy" stacks that illuminate the history of other fields.

Honorable Mention Zhonghua

Commercial: Informal Education
National Gallery of Art Laserguide
Bob Stein, Jane Wheeler, Steve Riggins, and Dale Bell

What Bob Stein and his group at the Voyager Company really want to do is create interactive video for consumers, like the Aspen Project work done on mainframes at the Media Lab of MIT. While waiting for the technology to make that possible on personal computers, the company has made a name for itself by publishing definitive editions of classic films, with added commentary and footage.

The National Gallery Laserguide is the company's first HyperCard product, a self-guided tour of the cultural treasures housed in the museum and represented on videodisk by a 1645-image catalog of the museum's collections, a video-guided tour, and a videotaped history of the museum. You can search for images by artist name, time period, nationality, and style of art. And you can mark images to look at later in a series, as a slideshow.

Style/Period Index

- Gothic
- Early Renaissance
- High Renaissance
- Northern Renaissance
- Mannerist
- Baroque
- Rococo
- Neo-classical
- Rococó
- Romantic
- Realist
- Impressionist
- Expressionist
- Cubist
- Abstract
- Futurist
- Naive

Click on the name of a particular style or period above for a brief description. Each description is followed by a list of three representative works. When you get to a style period and the video screen, you then look at the first work. Click on the "Look at" button for the next work. At the end of a style period, the laserguide takes you to the next work in the Gallery from that style. For a representative "tour" of the style, click "This Style Order Find More."
Though the stack is a vast improvement over hand-sorting slides, Stein thinks this is just the beginning. "What we're doing now is still quite trivial: people can only search and retrieve at a very basic level. We can't ask questions, we can't ask it to explain the difference between a Monet landscape and a Renoir landscape, though we can ask to see both."

**Commercial: Information Management**

**Focal Point**

Danny Goodman

This was the first HyperCard product to reach the market, and it's still outstanding, particularly in its ease of use and its graphic design. Focal Point is the desktop organizer that Danny Goodman had always dreamed of having on a computer—a combination phonebook, scheduler, note-taker, client-and-vendor database, phone dialer and call-length monitor, billing program, and all-around right arm. If you have enough memory to keep it open on your desktop all the time, Focal Point could help you track expenses you might otherwise forget to bill for, clear your desk, and remember your mom's birthday. What else could you want from an information manager?

**Commercial: Information Publishing**

**Copyrights, Trademarks & Patents**

Kelly Hayes

At first glance, this text-heavy stack may not appear to be the ideal HyperCard application. But the information—guidelines for how to protect your material by copyright, trademark, or patent—is presented clearly and effectively. When Kelly Hayes and her husband started their software-development business, Aardvark Development Labs, they found that either they had to pay attorney's fees to find out about copyrights, trademarks, and patents or they had to spend hours on hold in an attempt to ferret the information out of the federal bureaucracy. Once the Hayeses gathered the information, people kept asking for advice, and so she produced this stack. It comes complete with blank HyperCard versions of the application forms to fill out in the stack. Designing HyperCard-size views of the ordinarily full-page forms proved a challenge that Hayes solved by using lots of fields and condensed type, which look fine in the
laser-printed final output. Updates are planned for the stack, as necessary, and the Hayeses are working on a similar guide to exporting.

**Honorable Mention Business Class**
Danny Goodman. Domestic and international travel information, singled out by the judges for its simplicity and ease of use.

**Commercial: Wild Card**
**The Manhole**
Rand Miller and Robyn Miller

The opening screen of The Manhole shows a manhole cover with a fringe of vines trailing out onto the road surface. When you click the cover, a beanstalk shoots up quicker than you can say *fee, fi, fo, fum*, and you’re off exploring a fantasy world “peopled” by talking animals and dancing sea horses, accompanied by digitized sound effects. There’s enough detail and variety in the environment to keep a child occupied for hours discovering all the hidden pleasures (such as a keyboard you can use to plunk out tunes, once you find it).

There’s no goal in this adventure, and that’s just the point. Years ago artist Robyn Miller wished for a game that didn’t involve killing off bad guys or capturing booty, just exploring for the fun of discovery. When HyperCard came out, his mainframe-programmer brother thought it was the obvious way to make Robyn’s dream come true. Robyn worked up the detailed drawings; Rand added the sounds and scripted it all together. Now the two are at work on another adventure, using Macromind’s VideoWorks HyperCard driver to produce 30-frame-per-second animation; it’s due out in early 1989.

**Honorable Mention Your Faithful Camel**
Amanda Goodenough. A story stack about a noble and playful camel.

**Custom**

Custom stacks were developed to be used in a particular setting and are therefore not for sale.

**Custom: Formal Education**
**The Shakespeare Project**
Larry Friedlander

The Shakespeare Project is one of two SuperStacks winners that make abundant use of videodisk technology; this stack’s audio and video capabilities make it stand out as the type of multimedia project that lights the path to the future. Stanford University English professor Larry Friedlander developed a videodisk that contains filmed performances of contemporary theater on one side and scenes from Shakespeare’s plays on the other side. Each scene from *Hamlet*, *Macbeth*, *King Lear*; and other plays is presented in two versions by different companies to provide a variety of interpretations.

The stacks that access the filmed performances on the disk teach students about theater—from the construction of a play to staging and theatrical history. One section lets students watch Shakespeare performances; as they watch they can either choose a study aid or switch to the other version of the scene—arriving automatically at the same point in the drama. A Camera button lets students record parts of a scene to make notes about it, or to later include it in a report to support a point—this expands on the read-only format of the videodisk so it’s much more valuable than a mere collection of film clips. “The idea,” says Friedlander, “is to let you use the visual material as flexibly as you would use text material in your database.” There’s also a special audio track linked to the performances that contains the interior mono-
logues of the actors; students can choose to hear a character's thoughts instead of lines of dialogue, thereby understanding what motivates the character's words and behavior.

**Custom: Informal Education**

**Honorable Mention Alphabet for Adults** Michael Gianno. A teaching tool for Drexel University's adult literacy program.

(A) Alphabet for Adults

(B) Magna System: The '88 Vote

Executive producer, he immediately saw there was something there. Though it was a challenge to get the Macs in the door at ABC, Bohrman ultimately produced an 18-megabyte HyperCard application of nearly 200 stacks with thousands of detailed cards on candidates, convention delegates, convention seating arrangements, past conventions, and so on, that are immediately accessible—a big improvement over the couple of hundred typed cards that was the practical limit of the old system.

Bohrman fixed up one Mac with a touch screen so anchor Peter Jennings could merely touch the screen to pull up the information he needed during the live coverage of the conventions. Reporters on the convention floor took with them eight-to-a-page printouts of cards covering the delegations in their territory.

**Custom: Information Publishing**

**Summit Toronto**

Patrick Lee, Murray Battle, Robin Mahon, George Bures Miller, Darrell Orth, and Brian Richmond

When the city of Toronto was preparing for the onslaught of 5000 journalists arriving to cover the June 1988 economic summit conference, it erected a tent-city media center where the international media pack would work, eat, and be entertained. Amid the tents was an information center to help the out-of-towners find their way around. In the information booth, the human attendants got an assist from four Macs running this winning HyperCard application.

Equipped with a trackball instead of a mouse and keyboard, the Macs helped the lost, or merely curious, browse around maps and a skyline panorama of downtown Toronto, figure out the transit system, decide which restaurant to try, and so on. To make the stack simple to use for people unfamiliar with the point-and-click routine, the stack volunteers information if the trackball cursor merely passes over particular areas on some cards.

Remarkably, the team at Interaxis Visual Systems brought the entire 7MB stack into being in only two weeks. Robin Mahon, the graphic designer for the project, recalls, "We had quite an assembly line going. Someone did the sound, somebody else did the graphics, and we made templates for the different sections so one person would be working on the restaurants while another was working on the transit system, and then the last day we put it all together."
Honorable Mention Celestial Wind Carillons HyperCard Catalogue

Nathan Farber. Descriptions of wind chimes, with clear digitized sounds and outstanding graphic design. Distributed as freeware in noncommercial channels.

Custom: Wild Card

Dave’s Stack
Doug Gilbert, Dave Pollard, and Sue Pollard

Doug Gilbert designs hardware for the Mac. In fact, he was one of the founders of Levco, a company that started out by producing memory upgrades for the original 128K Macs. He met Dave and Sue Pollard through their children’s school; and the Pollards had heard about Dave Harding, a young man who was seriously injured in a bicycling accident. Harding can’t speak, and he has very limited mobility. Could a computer help Dave communicate? wondered the Pollards. Gilbert set to work with HyperCard. With the Pollards’ assistance on the graphics, Gilbert produced Dave’s Stack. One screen of the stack shows an alphabet that lets Dave spell out words by squeezing the button on the mouse. On another screen, Dave can select common phrases that a digitized voice utters for him. Still other parts of the application let Dave control his lamp and portable fan through a HyperCard interface with the XIO Powerhouse controller.

Gilbert recalls, “When we were working in Dave’s room one day, the speech therapist for the care facility came in, saw what we were doing, and then wheeled in one of her other patients to try out the stack. She said, ‘This is great, I know 20 other people who could use this.’” So now Gilbert is at work improving the stack, and the three have formed Abilities Unlimited (619/943-7321), which plans to make the enhanced stack available commercially.

Noncommercial

The noncommercial category includes free stacks and shareware (programs distributed without cost, with the provision that people who like them after trying them out pay a fee to the author). Unless otherwise noted, the noncommercial stacks are available through user groups, such as BMUG (415/849-9114), BCS (617/625-7080), and the Apple Corps of Dallas (214/357-9185), or through online information services.

Noncommercial: Development Tools

Honorable Mention Developer Stack

1.2r Steve Drazga, Stack Starter Rob - erson Reed Smith. Both of these stacks serve as libraries of public domain and shareware goodies to use as tool kits for building stacks. They are replete with buttons, XCMDs, XFCNs, and so on, and both are designed to allow you to expand on their collections.

Steve Drazga’s Developer Stack 1.2r has a button you can copy to a stack-in-progress that links directly to the Developer Stack. It works like a neighborhood convenience store; you can run out and quickly pick up one of its dozens of...
Physics professors Robert Fuller and David Winch share a history: In the past academic year they were distinguished visiting professors at the U.S. Air Force Academy. Years ago, when the two were on sabbatical together, they created an award-winning physics-education application in Pascal on a Terak computer. This time the idea for their winning stack was a spin-off of their work with HyperCard as a videodisk driver. They drafted Air Force Lieutenant Karl Armstrong to help with the scripting, and Fuller’s son Andrew contributed graphics. Guilty or Innocent? teaches principles of physics to high school students or beginning-level college students by having them investigate an auto collision to figure out whether the driver was speeding and then present their cases in court. Built-in randomness varies the situation each time the cartoon sports cars smash into each other, so the problem is different for each student. The two professors have returned to their home campuses at the University of Nebraska at Lincoln, and at Kalamazoo College, in Michigan, where they have integrated the stack into their classes. They have been distributing the stack informally at academic conferences; now it’s available for $15 from the American Association of Physics Teachers, Publications Dept., 512 Berwyn Rd., College Park, MD 20740, 301/345-4200.

Noncommercial: Informal Education

Honorable Mention Zoo David Combs
Games that help teach facts about animals to children.

Noncommercial: Information Management

Curve Fit-Plot
Jean-Claude Auguste

Jean-Claude Auguste is a mechanical engineer whose work at the Polyloom Corporation of Dayton, Tennessee, requires him to plot the properties of plastics used in the design of plastic extrusion devices. Auguste developed versions of Curve Fit-Plot in BASIC and Pascal; he finally switched to HyperCard when it came out so he could include charts.
Curve Fit-Plot isn’t for everyone, but people in some fields will find it’s the sort of stack they’ll want to paste right onto the Home card. Auguste explains how it works: “In the engineering field you pretty much solve all problems through mathematical models that simulate behavior. Curve-fitting is a way to obtain a mathematical model from a set of data.” For example, if you don’t remember how to convert degrees Fahrenheit to degrees centigrade, you could enter some data (0° C, 32° F; 37° C, 98.6° F; 100° C, 212° F; and so on) and then press a formula button to get the conversion formula.

Auguste is working on a new version that speeds the calculations and adds some statistical features. To obtain a copy of Curve Fit-Plot, send a blank disk, return postage, and an envelope to Jean-Claude Auguste, P.O. Box 621, Dayton, TN 37321.

Noncommercial: Information
Publishing
Bird Anatomy
Pat Lynch

“At first I thought HyperCard was a cute little list manager that you could stick pictures in, and that was it,” says Pat Lynch, medical illustrator and director of media production at the Yale School of Medicine. During a rainy weekend a couple of months later, he stumbled upon an idea stack that included some simple animation, and that got him going. First he created an animated beating heart. That led to collaborating with Carl Jaffe to create a HyperCard front end for Jaffe’s cardiac-imaging videodisk. “I realized there were a lot of things you could do in HyperCard that I wasn’t getting a chance to do in the cardiac project,” says Lynch. And so, he scanned his drawings of birds onto the Mac, designed a good background card, and started plugging in the illustrations. Lynch explains one of the strengths of his stack: “I wanted to make the cards as dense as possible. One of the things that bothered me about early stacks I’d seen is that they were so shallow. I wanted my stack to be the HyperCard equivalent of a really good chapter on the subject.” Although the cards have lots of options and information, the design is very clean and uncluttered throughout, making it easy to find your way around.

Noncommercial: Wild Card
Inigo Gets Out
Amanda Goodenough

This freeware stack is a brief interactive story that centers around the antics of Inigo, a fluffy blur of a black cat. Designed for children, the stack’s simple charm appeals to grownups as well. In each drawing, the “reader” clicks wherever it seems likely that something will happen, advancing the action through trial and error. Sound effects accompany Inigo’s stunts, whether he’s frightening birds or fleeing from a snake. The drawings and animation are simple, but somehow Goodenough manages to convey a distinctly feline personality in the spray-paint blur of her character. Goodenough thinks her stackware characters seem lifelike because she bases them on her very real cat and the people she knows. The camel in her commercial stack Your Faithful Camel, for example, is modeled after her husband. Other camels in the opening screen of that stack are based on Mr. Spock of “Star Trek” and on Goodenough herself. The secret of her drawing technique? “I put my hand on the mouse and form a picture in my mind, and then just do it,” she says. “Every time I produce a drawing I’m surprised, frankly.”
The Great Write-Off

Which is the best powerhouse word processor: Microsoft Word, FullWrite, or WordPerfect?

by Jim Heid

As publications director for the Forest Society, a fictitious organization charged with saving fictitious forests, I get put through the mill in December. I'm responsible for producing the society's year-end report—a 50-page document containing a table of contents, a mix of single- and multiple-column text pages, graphics, footnotes, tables, and an index.

In previous years I used Microsoft Word for the job because no other program had the features I needed. But for Word's power, I endured a program with an often-confusing operating style. And then there was the infamous version 3.0, which had more bugs than a stand of old oaks. Yes, if Phil Donahue ever does a program on love-hate relationships, I'll be on the stage.

With the arrival of WordPerfect Corporation's WordPerfect and Ashton-Tate's FullWrite Professional, I have a choice. To find the best of the bunch, I produced a program with an often-confusing operating style. And then there was the infamous version 3.0, which had more bugs than a stand of old oaks. Yes, if Phil Donahue ever does a program on love-hate relationships, I'll be on the stage.

With the arrival of WordPerfect Corporation's WordPerfect and Ashton-Tate's FullWrite Professional, I have a choice. To find the best of the bunch, I produced the same report with Word 3.02, FullWrite 1.0, and WordPerfect 1.0.

Why don't I use a desktop publishing program for such a complex document? For one thing, no general-purpose publishing program can automatically generate tables of contents or indexes or tie footnotes to the text that references them. For another, I don't have time to paste up reports with a publishing program. A program that handles everything from first drafts to final output gives me a better chance of meeting my deadlines. And finally, word processors are better tools for making and keeping track of revisions. Editing text in a publishing program means extra work to keep the original files current.

With that, The Great Write-Off begins—seven events, each designed to test different aspects of the three programs. (For more background on these and other programs, see "Getting Started with Word Processing," Macworld, October 1988.) For a preview of Word 4.0, which was scheduled to ship in October, see "Word 4.0: Improving the View."

EVENT #1: TYPING AND EDITING TESTS: Responsiveness to fast typing; basic editing, selecting, and scrolling; keyboard shortcuts.

Because a document begins at my fingertips, a word processor's typing and editing features play a large role in determining the program's usefulness. Indeed, when I'm doing more writing than fancy formatting, these basic features are the most important ones.

On a Mac II with 2 megabytes of memory, all three programs responded well to fast typing, but Word and FullWrite had the smoothest feel. On a 1MB SE, Word retained its spunk, but FullWrite slowed dramatically, showing a slight delay between each keystroke and the appearance of its character. With WordPerfect, when I inserted text in the middle of a paragraph, the program waited until I stopped typing before it adjusted line breaks; in the meantime, the text to the right of the cursor marched off to the right edge of the screen. Very distracting.

Only Word lets you divide a single window into two panes, each with its own scroll bar (see "Splitting Windows"). These split windows let you view different sections of a document independently. This feature made editing my report easier, since I could display a key section in the top window pane while scrolling throughout the document in the bottom.

With all three programs, you can scroll using the numeric keypad or the enhanced keyboard's scrolling keys, but FullWrite drops the ball by not moving the cursor as you scroll. When you scroll to a given point and begin typing, FullWrite returns to where the cursor was before you scrolled. FullWrite's designers seem to
The winner is: WORD. Regardless of which Mac it runs on, Word responds smoothly to fast typing; its keyboard cursor-movement and editing shortcuts are the most complete, and its split-window option is handy in large documents. FullWrite’s smart-quotes feature, which turns the Mac’s straight quotes into opening and closing quotes (single or double) as you type, earns it second place.

EVENT #2: BASIC FORMATTING

TESTS: Specifying font, style, margins, and line and paragraph spacing; creating tables, hanging indents, headers, and footers.

An important part of creating nearly any document is specifying its fonts, margins, and line spacing. The Forest Society’s report has a simple design with just a few twists: different spacing between different paragraphs, a list of bulleted items with hanging indents, and some financial tables.

All three programs use on-screen rulers for adjusting margins and tabs, but each program stores those and other formatting attributes differently. Word uses an attached-to-paragraph approach: formatting changes you make apply only to the paragraph containing the cursor, or to currently selected paragraphs.

Word’s approach made it easy for me to vary formatting from one paragraph to the next, but it made creating the tables more complicated. Since Word treats any line ending with a hard carriage return as a paragraph, I had to remember to select all the lines in a table before adjusting tabs (see “On the Tables”). If I didn’t, one line’s tabs would change, but the others wouldn’t.

FullWrite uses a ruler-to-ruler approach, in which the ruler preceding the cursor controls margin and tab formats; to change those formats, insert a new ruler and alter it. This approach eliminates worries about where the cursor is and what is or isn’t selected when you adjust a margin or move a tab stop, and this method makes creating tables a breeze.

However, FullWrite fell flat when it came to inserting extra space between paragraphs. The only way you can do this is by altering the base style, which is controlled by the first ruler in the document. I resorted to a variation of an old MacWrite workaround: I added a blank line between paragraphs, and then selected it and chose a smaller type size.

Codes

WordPerfect uses a code-oriented approach to formatting that shows this program’s IBM PC heritage—and that occasionally frustrated me. When you issue any formatting command—from changing to bold to creating multiple text columns—the program inserts a code at the cursor’s position. With many commands, including ones governing line spacing, margins, and tabs, if you don’t explicitly select the text you want the format to apply to, WordPerfect applies it to all text from the cursor’s position to the end of the document. Thus,
Event #2: Basic Formatting

<table>
<thead>
<tr>
<th>Feature</th>
<th>Word</th>
<th>FullWrite</th>
<th>WordPerfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text Formatting</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>provide font, size, style dialog boxes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>provide style icons in document window</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>provide keyboard shortcuts for common styles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>provide keyboard shortcut for changing font size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>provide keyboard shortcut for changing font</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Margins and Spacing</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>formatting attaches to paragraphs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>last ruler governs formatting</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>codes govern formatting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>menu commands for line spacing</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>ruler icons for line spacing</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>menu commands for justification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ruler icons for justification</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>allow extra space before or after paragraphs</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>allow overriding of paragraph spacing setting</td>
<td></td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Tab and Table Creation</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>tab types</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ease of creating complex tables</td>
<td>easy</td>
<td>very easy</td>
<td>difficult</td>
</tr>
<tr>
<td>Headers, Footers, Page Numbering</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>separate left/right page headers and footers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>page numbers independent of headers and footers</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>separate header/footer editing windows</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>headers, footers, page numbers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>appear on screen</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

On the Tables
This financial table uses a leader tab. Leader dots guide the eye across each line. Because Word (top) attaches tab settings to paragraphs, you must select all the lines whose tabs you want to be the same. When the tab or margin settings of the selected lines differ, Word shades the ruler. (They differ here because the last line in the selection lacks a leader tab.) FullWrite (middle) uses a ruler-to-ruler approach that makes creating tables easier. Here, a different ruler before each subtotal line disables the leader dots for those lines. WordPerfect (bottom) inserts Tab Set codes when you create or adjust a tab. Because an adjustment affects only the text after the cursor’s position, be sure the cursor is at the beginning of the table to adjust all of its columns. Here, the Show Codes command has been chosen to reveal the formatting codes WordPerfect inserts.

when I specified single-spacing for the report’s introductory letter, WordPerfect single-spaced the entire report. I quickly learned that selecting text is the first step in formatting it. This rule of thumb applies to tables, too—in spades. WordPerfect’s tab-formatting approach makes Word’s look wonderful. Because WordPerfect inserts a tab set code at the cursor’s position, you can maintain a table by adjusting tabs with the cursor in the middle of a line. Your changes will apply to the part of the table following the cursor, leaving the preceding part unchanged.

Headers and Footers
Creating headers or footers and numbering pages in WordPerfect is less traumatic than creating hanging indents, though Word and FullWrite are more straightforward. When you create or edit a header, WordPerfect disconcertingly empties the
Event #3: Advanced Editing

### Boilerplate Text Entry

<table>
<thead>
<tr>
<th>Feature</th>
<th>Word</th>
<th>FullWrite</th>
<th>WordPerfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glossary feature</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Allow editing of glossary entries</td>
<td>no</td>
<td>yes</td>
<td>n/a</td>
</tr>
<tr>
<td>Allow graphics in glossary entries</td>
<td>yes</td>
<td>no</td>
<td>n/a</td>
</tr>
<tr>
<td>Allow reformatting of glossary entries</td>
<td>no</td>
<td>yes</td>
<td>n/a</td>
</tr>
<tr>
<td>Macro feature</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>

### Spelling Checker and Thesaurus

<table>
<thead>
<tr>
<th>Feature</th>
<th>Word</th>
<th>FullWrite</th>
<th>WordPerfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Words in spelling checker</td>
<td>80,000</td>
<td>100,000</td>
<td>110,000</td>
</tr>
<tr>
<td>Checker ignores words in all capitals</td>
<td>optional</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Checker detects multiple occurrences of same word</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Thesaurus shows definitions</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

### Hyphenation

<table>
<thead>
<tr>
<th>Feature</th>
<th>Word</th>
<th>FullWrite</th>
<th>WordPerfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allow manual insertion of soft hyphens</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Hyphenate automatically as you type</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Prompt you to hyphenate as you type</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>

### Search and Replace

<table>
<thead>
<tr>
<th>Feature</th>
<th>Word</th>
<th>FullWrite</th>
<th>WordPerfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search and Replace for text attributes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Undo single-change operation</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Undo change-all operation</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

1 Registered users receive a separate macro utility program.

---

Event #3 Scorecard

Advanced editing features let you store and recall repetitive text, check spelling, search for synonyms, automatically hyphenate text, and search for and replace text. FullWrite takes first place; WordPerfect finishes second.

Glossaries Compared

Word's glossary window (top) shows the text in each glossary entry, but doesn't show its font or style. Moreover, Word doesn't let you change the formatting of a stored entry. With FullWrite (bottom), you can alter a glossary entry using the program's formatting commands. FullWrite's glossary can store a graphic, however WordPerfect lacks a glossary feature, but you can store and recall repetitive text using macros.

The document window, turning it into a header-editing window. Type the header text, choose the Close command or click on the window's close box, and the document reappears. The steps are the same for footers. Word's and FullWrite's separate header and footer windows are more convenient; you can switch between them and the main text with a mouse click. All three programs let you insert page-number codes in the header or footer.

Only FullWrite can display headers, footers, and page numbers in place on every page as you work. Word and WordPerfect show them in page preview mode only. (Word 4.0 will show them in position.) Word's page preview display also lets you adjust margins and page breaks, making it more useful than WordPerfect's Print Preview and FullWrite's Show Pages display.

The winner is: **FULLWRITE.** Its ruler-to-ruler approach makes complex tab and margin adjustments easier, and the program's ability to display headers and footers in position gives you a better feel for a document's appearance. But FullWrite's severe paragraph-spacing limitations and its lack of keyboard shortcuts for changing fonts and type size make its margin of victory over Word small. WordPerfect's quirky codes and the way it commandeers the document window to display the header and footer earn it third place.

**EVENT #3: ADVANCED EDITING**

TESTS: Storing and recalling repetitive text; checking spelling; using an online thesaurus; hyphenating; searching and replacing.

The Land Holdings Report highlights the plant and animal species found in the Forest Society's preserves. I don't like typing "Catawba rhododendron" once, much...
less 36 times, so I used each contestant's ability to store and recall repetitive text. Word and FullWrite have glossary features that hold any number of phrases in a single disk file. (You can also create separate glossary files, each for a specific task.) FullWrite's glossary can't store pictures, but otherwise, it beats Word's hands down. You can edit and even reformat text in FullWrite's glossary window; when you create a glossary entry in Word, the program saves the current font, size, and style (see "Glossaries Compared"). To edit a glossary entry, you must insert it into a document, change it, and then store it again.

FullWrite also lets you create variables, which differ from glossary entries in that when you change a variable's text, the program updates each usage of that variable in the document. Variables can also hold pictures.

WordPerfect lacks a glossary feature, but you can store and retrieve phrases by creating macros, which record and play back mouse movements and keystrokes. This process requires more steps than Word's or FullWrite's glossaries, but it has pluses. Macros are separate disk files; you can copy single phrases to other disks more easily. On the downside, because each phrase is a separate disk file and because the Mac allocates disk space in 1K chunks, WordPerfect uses more disk space to store the same amount of text than the glossary functions of the other word processors. Other drawbacks are that you can't capture a phrase you've already typed to store in a macro, you can't change a phrase's formatting without rerecording the macro, and you can't undo any events a macro plays back.

Spelling Checkers and Hyphenation

All three programs contain spelling checkers, and each has its strengths. Word's is the only one that lets you optionally ignore any word in all capital letters, preventing delays with documents containing acronyms, appendix names, or middle initials. WordPerfect's spelling checker has the largest dictionary and is best able to ferret out correct spellings based on phonetics. FullWrite's checker is the only one that lets you return to questionable words you skipped earlier in the document.

Interestingly, FullWrite's checker showed an IBM PC bias: it offered to change LaserWriter into Laserjet (the IBM PC world's best-selling laser printer), and MultiFinder into Multimate (Ashton-Tate's PC word processor). A more serious problem surfaces if you use two consecutive hyphens with no space around them as a dash. FullWrite flags that common combination as a misspelling; Word and WordPerfect don't. And unlike Word and WordPerfect, FullWrite doesn't let you undo the effect of a Change All command.

WordPerfect can search for and replace text attributes and formatting codes, but it's a cumbersome process that requires using a scroll box listing 90 cryptic codes. And WordPerfect can't undo a global change, either, but it doesn't warn you of that ahead of time. In fact, WordPerfect can't even undo a single change operation.

The winner is: FULLWRITE. This program wins for its superb glossary and variables features, its strong spelling checker and thesaurus, for having the most versatile and reliable hyphenation features, and for its capable (though slow and buggy) search-and-replace function. Word lin-
ishes second, despite its inability to search for and replace attributes. WordPerfect's lack of a glossary feature helps earn it last place; macros just aren't as versatile or convenient. WordPerfect's spelling checker is better than Word's, but its hyphenation feature is quirky. And scrolling through droves of codes to search for and replace attributes is often more trouble than it's worth.

EVENT #4: TRACKING REVISIONS

TESTS: Marking text for deletion; adding nonprinting notes to documents; marking changed text; tracking a document's editing history.

In my office, reports endure an evolutionary process that would scare Darwin. A word processor with revision-tracking features helps me keep tabs on a report's journey through the approval loop.

With Word, you can indicate changed text by placing a vertical bar adjacent to paragraphs that have changed. You can also insert a nonprinting comment or note by formatting it in Word's hidden-text style, and mark text for deletion by formatting it in the strikethrough style (see "Tracking Changes"). In WordPerfect, choosing the Redline command places a vertical bar adjacent to a range of selected text, but there is no hidden-text style, so keep the Post-it Notes handy.

Then there's FullWrite. Click the change bars icon and FullWrite automatically creates a change bar whenever you alter a line. You can indicate doomed text with the strikethrough style, and you can type comments in "posted note" windows, which coworkers can open by double-clicking an icon in the left margin.

The winner is: FULLWRITE. In this event, Word and WordPerfect stand as much chance against FullWrite as Guam's ski team would against Switzerland's. FullWrite's automatic change bars and its Get Info command are the keys to its victory. Its posted notes are excellent, although you can add notation features to most any application by using Deneba Software's Comment DA.

<table>
<thead>
<tr>
<th>Event #4 Scorecard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revision-tracking features let you add nonprinting comments to documents and mark passages that have changed since the last revision. FullWrite beats the others easily.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Event #4: Keeping Track of Revisions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revision Tracking</strong></td>
</tr>
<tr>
<td>Automatic change bars</td>
</tr>
<tr>
<td>Manual change bars</td>
</tr>
<tr>
<td>Strikethrough text style</td>
</tr>
<tr>
<td>On-screen notes attached to text</td>
</tr>
<tr>
<td>Hidden text</td>
</tr>
<tr>
<td><strong>Document Information</strong></td>
</tr>
<tr>
<td>Word count</td>
</tr>
<tr>
<td>Character count</td>
</tr>
<tr>
<td>Line count</td>
</tr>
<tr>
<td>Document history</td>
</tr>
</tbody>
</table>

**Tracking Changes**

FullWrite has the best revision-tracking features of the three programs. FullWrite automatically places change bars next to altered text. And you can attach time- and date-stamped posted notes to text. In Word and WordPerfect you can create change bars, but you must do so manually for each change by choosing a command.

**Style Sheets Compared**

In FullWrite (top), you create a style sheet by issuing formatting commands to alter the appearance of a sample sentence. In Word (bottom), you can define a style by issuing formatting commands while the Define Styles dialog box is open, or you can select some existing formatted text and store its formatting in a style. As shown here, Word lets you create abbreviations (following the style name) for style sheet names—useful for summoning style sheets from the keyboard.
**Word 4.0: Improving the View**

Competition is the mother of invention. Feeling the heat from FullWrite and WordPerfect, Microsoft last summer unveiled the first major Word upgrade in almost two years. While a formal review will have to wait until the final version ships, a preview of Word 4.0, due out in October, reveals some significant new features.

- A new viewing mode, called Page View, that shows how a document will appear when printed—with headers, footers, and multiple columns in position (see “Page View”). You can type, edit, and reformat the document while using Page View. For fastest performance, Word’s traditional viewing mode, now called Galley View, remains.

- A spreadsheetlike table-editing feature that simplifies creating complex tables. Text wraps within each tab cell, allowing you to create and revise multicolumn tables without laboriously adjusting tabs and editing text. You can add borders and rules to tables and use different fonts, sizes, and styles within each cell.

- An all-new outlining mode. Word 3.0’s outliner probably helped sell many copies of Acta. Word 4.0’s outliner is easier to use and provides more visual feedback when you’re moving items within the outline.

- Electronic mail support. On networks that use Microsoft Mail (formerly InterMail), you can send and receive mail within Word. Instead of writing a note, saving it, then sending the disk file, you simply write the note and choose the Send Mail command.

- Complete customizing. You can literally redesign Word 4.0’s menu bar, adding and removing commands, moving them to different menus, and assigning keyboard shortcuts. You can save and load different customizing settings, too: if several people use one copy of Word, each can have his or her own custom settings.

- Goodies galore. Smart quotes, background repagination, word count, line numbering, color support, a style sheet pop-up menu in the ruler, and more. And Microsoft claims it all runs on a 512K Mac.

---

**EVENT #5: ADVANCED FORMATTING**

Tests: Automating repetitive formatting; creating multicolumn pages; viewing and controlling page breaks; mixing text and graphics; creating rules; kerning.

I may not want to use a publishing program, but I do want my report to look good. A few simple techniques give it a professional look without forcing me to grapple with on-screen pasteup.

One technique involves using several different sizes and styles of the same font to give the text some typographic diversity while retaining the report’s graphically simple design. To avoid countless trips to the formatting menus, I used Word’s and FullWrite’s style sheet features and WordPerfect’s macro recorder to automate switching between these different sizes and styles.

Word lets you create a style sheet in two ways. Choose the Define Styles command, name the new style, use the ruler and the Font and Format menus to specify the style’s characteristics, and then click Define to save the style (see “Style Sheets Compared”). Or, create styles by example: format text as desired, and then choose Define Styles, type a name, and click on Define. I found the second method more
Columns in Word
To mix column widths on the same page in Word, insert a section break (see pointer) by pressing ⌘-Enter, then choose Section from the Format menu, click No Break, and specify the number of columns. Use the Page Preview command to see how the page will look when printed.

Convenient: it allowed me to experiment until I got the look I wanted and then save the results.

Because each land preserve's description follows the same format, I used the Define Styles dialog box's Next Style box to tell Word to automatically switch from one style to another when I pressed Return to end a paragraph. Doing so allowed me to type and format each description without having to manually summon each style.

FullWrite can't automatically switch from one style to another, and it lacks a style-by-example feature, but creating style sheets is still easy. Choose Custom Styles from the Style menu, click New, and then use the Format, Font, Size, and Style menus to change the appearance of the sample sentence in the dialog box.

Unlike Word, FullWrite applies styles cumulatively; when you choose a style for text you've already formatted using a different style sheet, FullWrite applies the second style to the text, but retains the formatting attributes that went unchanged from the first style. Thus, reformattting text from one style to another is often a two-step process: restore the text to its base style by pressing Option and choosing Base Style from the Style menu, and then choose the new style.

Besides allowing faster formatting, style sheets allow easier updating. When the director decided she didn't want the preserve names to appear in italics, I simply changed the appropriate style sheet, and Word and FullWrite reformatted the names throughout.

WordPerfect lacks style sheets, so you can't quickly update the appearance of all text formatted in a given style. You can record and play back macros that choose various formatting commands. Because macros can't be altered, however, I didn't use them for formatting until the document's design was finalized.

Columns and Sidebars
Another way I spruced up my report was to use a mixture of one-column and multicolumn pages. Most of the report is formatted in one column. Some sections of the report have two- and three-column pages and begin with a headline spanning the columns.

Creating multicolumn pages was easy with all three programs, but when I mixed full-width text and multiple columns on the same page, things got tricky. With Word, mixing column widths means using the Section command. First, position the cursor where you want the new column setup, then insert a section code by typing ⌘-Enter. Next, with the cursor in the new section, choose Section, click on the No Break button, and specify the number of columns. Finally, use the Page Preview command to check your work (see "Columns in Word").

FullWrite makes you work harder, but gives you more in return. Mixing column widths on the same page means creating a sidebar—a kind of footnote or column in which you can use a separate window with its own rulers and independent formatting (see "FullWrite Sidebars"). Using the Sidebar menu's Place command, you can position a sidebar anywhere on the page by simply dragging its outline.

On the downside, you can't edit or reformat a sidebar's text directly on the page; you must open the sidebar window. As the number of sidebars in my report grew, this extra step slowed me down. And when creating and fine-tuning a sidebar, you can't adjust its position by dragging it directly on the page. You must choose the Place command, make an adjustment, and return to the page—again and again, until the sidebar is where you want it.

WordPerfect's code-oriented style makes mixing column widths surprisingly easy. Using the Columns Options command in the Columns submenu causes WordPerfect to insert a column-definition code at the cursor's position. So, to change from one column to two, position the cursor where the two-column text will begin, choose Column Options, specify two evenly spaced columns, and click on OK. To return to one-column text, position the cursor where the single-column text will begin and choose Columns Off from the Columns submenu.

The biggest problem with WordPerfect's columnar features is that you can't create footnotes or adjust margins on multicolumn pages. If you want footnotes, you
can't have columns, and vice versa. That squiggly design quirk forced me to turn a few footnotes into parenthetical comments.

Widows and Images
An important part of polishing my report's appearance was verifying that no page ended with a *widow*—the first line of a paragraph separated from the rest of the paragraph by a page or column break. Word's and WordPerfect's widow-control features prevent widows by moving the stranded line to the next page or column. Word offers the most control over where and when paragraphs break. FullWrite lets you control widows, although it calls them *orphans*. (A true orphan is the last line of a paragraph appearing by itself on a page.)

Controlling paragraph breaks, however, involves manually inserting page breaks or carriage returns, which means more work when editing changes alter the page length.

The Forest Society report contains some charts and scanned map images. All three programs let you paste graphics from the Clipboard and resize them, although WordPerfect doesn't display or allow you to specify a precise percentage of enlargement or reduction. And only FullWrite lets you draw graphics from scratch. Its built-in drawing tools let you create object-oriented graphics. I didn't think I'd find a use for built-in drawing, but then I thought of modifying the Mountain County building permit chart to resemble a mountain (see "Drawing with FullWrite"). I'm an old hand...

---

### Event #5: Advanced Formatting

<table>
<thead>
<tr>
<th>Feature</th>
<th>Word</th>
<th>FullWrite</th>
<th>WordPerfect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Automatic Styling and Formatting</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Style sheets</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Macros</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Styles can apply within paragraphs</td>
<td>no</td>
<td>yes</td>
<td>n/a</td>
</tr>
<tr>
<td>Style or macro names appear in menu</td>
<td>optional</td>
<td>optional</td>
<td>no</td>
</tr>
<tr>
<td>Keyboard access to styles or macros</td>
<td>very easy</td>
<td>fairly easy</td>
<td>fairly easy</td>
</tr>
<tr>
<td>Style by example</td>
<td>yes</td>
<td>no</td>
<td>n/a</td>
</tr>
<tr>
<td>Next style feature</td>
<td>yes</td>
<td>no</td>
<td>n/a</td>
</tr>
<tr>
<td>Current style name appears in document window</td>
<td>yes</td>
<td>no</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Multiple Column Controls</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Newspaper (snaking) columns</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Parallel (side-by-side) columns</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Mixing column widths on same page</td>
<td>easy</td>
<td>fairly easy</td>
<td>easy</td>
</tr>
<tr>
<td>Multiple columns and footnotes on same page</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td><strong>Page and Paragraph Controls</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forced page breaks</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Option for keeping paragraphs together</td>
<td>no</td>
<td>yes</td>
<td>n/a</td>
</tr>
<tr>
<td>Option for keeping lines together</td>
<td>no</td>
<td>yes</td>
<td>n/a</td>
</tr>
<tr>
<td>Widow control</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Orphan control</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Typographic Controls</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic kerning</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Smallest kerning unit</td>
<td>0.25 point</td>
<td>0.5 cm</td>
<td>1.00 point</td>
</tr>
<tr>
<td>Gray-scale text</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Fractional character widths</td>
<td>optional</td>
<td>yes</td>
<td>optional</td>
</tr>
<tr>
<td>Can print sidebars with white text on black</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td><strong>Importing and Creating Graphics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accept graphics from Clipboard</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Resizing graphics</td>
<td>very easy</td>
<td>easy</td>
<td>very easy</td>
</tr>
<tr>
<td>Provide built-in drawing tools</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Can print picture in page background</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Wrap text around irregular graphics</td>
<td>no</td>
<td>optional</td>
<td>no</td>
</tr>
<tr>
<td>Create borders and boxes around paragraph</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Size graphics by percentage</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Create column rules</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

---

1 Registered users receive a macro utility.
2 Paragraphs appear alongside each other only in Page Preview mode and when printed.
3 FullWrite calls a *widow*—the first line of a paragraph appearing by itself at the bottom of a page—an orphan.
4 In FullWrite, creating a box or border around a paragraph is a cumbersome process.
5 Using vertical-bar tabs.
Broken Rules

FullWrite's column rule feature would have been ideal to produce the vertical rule on these pages, except that the rule doesn't extend into the footer, page number, or header areas. In Word you can use a vertical rule tab to produce a vertical rule, but again, it's impossible to get the rule to run the entire height of the page. WordPerfect can't produce a vertical rule at all.

at MacDraw, so I caught on to FullWrite's drawing features quickly, although I missed having on-screen rulers and a freehand drawing tool.

Desktop Publishing

My closest brush with desktop publishing came when I added a vertical line, or rule, to each page. The column rules in FullWrite's Layout dialog box did the job with a single mouse click. But column rules don't appear in headers or footers, so my rules didn't extend the full height of the page (see "Broken Rules"). Word was no better; I used vertical rule tabs to create rules, but I couldn't get the rule in a header or footnote to meet the rule in the body of the text. WordPerfect has no rule-drawing features at all. It's surprising that none of these highfalutin formatters can draw a simple line from the top of the page to the bottom.

Ah, but they can kern. You can improve the appearance of large type by reducing the amount of space between each character. FullWrite allows the most precise kerning, using increments of .05 cm; that is, five hundredths of the width of the current font size. Word finishes second, with a minimum spacing increment of .25 point. WordPerfect lets you add and subtract space in 1-point increments—too large for precise spacing control.

The winner is: It depends. For importing and creating graphics and for the most precise kerning, it's FullWrite. FullWrite also offers tremendous flexibility in mixing different formats and column widths on the same page; although its sidebars can be cumbersome. For the best style sheets and the ability to control where and whether paragraphs can divide, it's Word. WordPerfect tackles multiple columns well, but its lack of style sheets, crude kerning, and inability to print footnotes on multicolored pages place it last.

EVENT #6: DOCUMENT ASSEMBLY

TESTS: Creating a table of contents and an index

One of the last steps in preparing my report was to add the table of contents and index. All three word processors made the job of preparing these vital sections far easier than doing it by hand. In each program, creating a table of contents and creating an index involve nearly identical steps, so I'll concentrate on the table-of-contents process here.

With all three programs, the first step in creating a table-of-contents entry is to place the cursor at the start of the section to be referenced, and then specify how you want the contents entry to read. In Word, you can mark an existing headline or chapter title: type the characters e.(period, c. period) before the headline and then format the characters as hidden text (see "Word Contents Page"). You can also designate up to nine levels of subentries (sections within sections) by placing numerals 1 through 9 after the contents code.

Occasionally, you need a contents entry for a page that doesn't contain a chapter or section title. In such a case, I typed the entry as I wanted it to appear in the table of contents, added the e. code, and then formatted the entire line (not just the contents code) as hidden text.

To generate the table of contents, choose Table of Contents from the Document menu, choose the C. Paragraphs button, and click on OK. Word churns through the document and creates a new table-of-contents section at the beginning of the document. You can edit and reformat the text in that section and move it elsewhere (I moved it to follow my report's title page). If typing codes seems too primitive, you'll love FullWrite's approach. FullWrite stores contents entries in small windows, or panels, similar to its posted notes. Place the cursor where a section starts and choose Contents from the Notes menu. Type the contents entry and use the Format, Font, Size, and Style menus to format it as desired (see "FullWrite Table of Contents"). If all entries should look similar, use the Base Styles command to define a new base style for contents entries. After you close the panel, FullWrite adds that entry to the contents page. Unfortunately, you can't directly edit or reformat the entries in the table of contents. Instead, you must open the entry's panel and modify the text therein. That two-step process gets old quickly.

FullWrite's indexing features have one significant limitation: each index entry's page number always appears aligned against the right margin. You can't change that to have the entry and its page number separated by a comma and a space, which is how indexes are supposed to appear.

WordPerfect nicely straddles the fence between Word's cryptic codes and FullWrite's on-the-fly approach. First, place the cursor where you want the contents page and choose Table of Contents from the Define Lists submenu. Next, select a heading or chapter title and choose Table of Contents from the Mark Text. Choose a level for the entry, and click OK. You must select some existing text on the page to create a contents entry for that page. To create a
Word Contents Page
To create a table-of-contents entry in Word, type \ before the text and an "end" code—here a semicolon (;)—after it, then format both codes in the hidden-text style. For sections within sections (up to nine), add the appropriate numeral to the end of the code. Creating index entries is a similar process. Before compiling the table of contents or index, be sure to hide the hidden text using the Preferences command. Otherwise, visible hidden text may affect page breaks, making the contents page and index inaccurate.

FullWrite Table of Contents
In FullWrite, you create a table of contents or index entry by typing its text in a table of contents or index panel. FullWrite updates a table of contents and index as you edit your document, a process that often leads to formatting delays.

Event #6: Document Assembly

<table>
<thead>
<tr>
<th>Table of Contents Generation</th>
<th>Word</th>
<th>FullWrite</th>
<th>WordPerfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Require typed codes for contents entry</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Require on-page text for contents entry</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Maximum levels of contents</td>
<td>9</td>
<td>1K</td>
<td>5</td>
</tr>
<tr>
<td>Generate and update contents on the fly</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Allow on-page editing of contents</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Ease of use of contents features</td>
<td>fair</td>
<td>easy</td>
<td>very easy</td>
</tr>
<tr>
<td>Flexibility of contents format</td>
<td>good</td>
<td>good</td>
<td>very good</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Index Generation</th>
<th>Word</th>
<th>FullWrite</th>
<th>WordPerfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Require typed codes for index entry</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Require on-page text for index</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Generate and update index on the fly</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Allow on-page editing of index</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Page numbers appear aligned right</td>
<td>optional</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Page numbers appear next to reference text</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Ease of use of index features</td>
<td>fair</td>
<td>easy</td>
<td>very easy</td>
</tr>
<tr>
<td>Flexibility of index format</td>
<td>good</td>
<td>good</td>
<td>very good</td>
</tr>
</tbody>
</table>

Contents entry for the director's letter, I selected the letter's salutation, then edited the resulting entry, changing it from Dear Member: to A Letter from the Director:

The winner is: WORDPERFECT. FullWrite's contents and indexing features are the easiest to use, but Word's and WordPerfect's are the most flexible. Only FullWrite updates the contents page and index as you work. That's convenient, but it slows the program, especially as a document grows. An option for disabling automatic updating would be useful. FullWrite's rigid indexing and formatting styles are another strike against it, and opening panel after panel to reformat an index or table of contents is too much work.

Event #7: PROGRAM DESIGN AND PERFORMANCE
TESTS: Quality of documentation: ease of use, program-customizing features; performance; hardware requirements; reliability.

It's time to step back from specific features to assess the program's overall design and the quality of its documentation. In the latter category, Word and WordPerfect finish first. Both include fat manuals containing tutorial sections that walk you through basic tasks, and reference sections organized according to specific tasks. Both also offer excellent online help. FullWrite's documentation is dismal. The FullWrite Professional Learning Guide lacks a hands-on tutorial, and repeats—often word-for-word—passages from the skimpy reference manual, which is organized according to menu commands. The reference manual lacks a glossary, and many of the graphic and publishing terms used in the program's dialog boxes go undefined. FullWrite's online help screens list some basics and some shortcuts, but aren't as informative as the other programs' help screens.

As for ease of learning, FullWrite has the edge. Its basic formatting features are straightforward, thanks largely to its MacWrite-like ruler-to-ruler approach. Word finishes a close second. Its attached-to-page format may be confusing, but you can get used to it, and remember, it helps make possible Word's advanced paragraph-spacing and paragraph-breaking options. And beginners can hide Word's advanced formatting commands by using the program in its short menus mode. WordPerfect is not an easy program to learn, especially if you've used any other Mac word processor. However, if you've used WordPerfect on a PC and if your Mac has an enhanced keyboard, you'll catch on quickly: WordPerfect replicates most of its PC cousin's function key commands.

A program should help novices, but it's more important that it respond to you once you've climbed the learning curve. Here, Word excels. Its myriad keyboard
On the Test Track

In most cases, a program's overall design and ease of use are more important than how quickly it performs certain tasks. Still, if you're going to spend a lot of time with a given program, it's helpful to know how much of that time will involve drumming your fingers.

I ran seven tests on each program, on a 2MB Mac II and on a 1MB Mac SE.

- **Start from Finder**: How long each program took to load. **Winner**: Word.
- **Open document**: How long each program took to open a 75K tile containing several bitmapped graphics and four different fonts. The file's text was double-spaced and filled roughly 43 pages. I created the file in Word, exported it to the other two programs, saved it in each program's native format, and then used the native-format files for the remaining tests. **Winner**: Word.
- **Save to new file**: The time required to save the 75K file as a new file. With FullWrite and WordPerfect, the results of this test also indicate how long a standard Save would take. Word, however, has a Fast Save feature that saves only the edited portions of a document, saving from scratch only after a great deal of editing or reformating. Thus, a Save command in Word is generally much faster than with FullWrite and WordPerfect. **Winner**: WordPerfect, but remember most saves in Word will be roughly as fast as WordPerfect.
- **Jump to end of document**: How long each program took to move the cursor from the beginning of the file to the end. With Word and FullWrite, you press the End key to do so. With WordPerfect, you press Enter three times, and then press the down-arrow key. **Winner**: Word.
- **Manual scroll to end**: The time required to scroll through the document by pointing to the vertical scroll bar's down arrow and holding down the mouse button—a real tendon buster. **Winner**: WordPerfect.
- **Search-and-replace attributes**: How long the programs took to turn all occurrences of the word *the* (whether within a word or not) from plain text into bold. Word's Change command can't alter text attributes, however, so I changed all occurrences of *the* to three pound signs (**##**). **Winner**: WordPerfect.
- **Check spelling**: How long the programs took to run the document through the spelling checker. Each time the spelling checker encountered an unknown word, I told the program to ignore it in the rest of the document. On my 1MB SE, FullWrite bowed out of this event, telling me there wasn't enough memory to perform the operation. **Winner**: WordPerfect.

And the overall performance champion? Based on an averaging of the Mac II results, WordPerfect comes out on top with a time of 41.8. Word finishes second with a time of 58.3. FullWrite, with a time of 107.0, comes in last, hunched over and gasping for breath.
shortcuts and its fast performance make it a responsive writing companion. You can customize Word’s menus to show your most-often-used fonts, formats, and documents. FullWrite offers many keyboard shortcuts, too, and its oddly named Walk-Down menu feature lets you choose any menu command from the keyboard. But you can’t customize its menus, and direct \#\#-key equivalents for many often-used commands—including Close, Thesaurus, and New Ruler—are missing. Opening and closing panels and sidebar windows can be cumbersome. WordPerfect bury too many commands in submenus, but it’s fast and responsive once you master it, and you can customize the keyboard and create macros to automate the formatting and document-management tasks you perform.

Another way for a program to earn its keep is to perform basic tasks quickly. Here, Word and WordPerfect leave FullWrite behind (see “On the Test Track”). FullWrite doesn’t run on a 1MB SE or Mac Plus; it moses. If you plan to use this program extensively, consider a memory upgrade and an accelerator board.

Speaking of hardware, Word is the only program of the three that runs on an unenhanced 512K Mac. (Word 4.0 will retain this admirable trait.) WordPerfect runs on a 512KE; FullWrite needs a Plus and a hard disk.

Most important is reliability. Whatever quirks a program might have, it should never crash and take your work with it. In the many hours of work and testing that went into my report, Word 3.02 never did. FullWrite 1.0 crashed a few times and destroyed the report document once. Word-Perfect 1.0 crashed regularly. It is not a reliable program for creating complex documents. WordPerfect Corporation has an excellent track record for customer service and support, however, so I’m hopeful that a future version will be more reliable.

### The Envelope, Please

So what’s the score? I confess that, at the outset, I expected FullWrite to clean Word’s clock. That didn’t happen. FullWrite has more features, but some are cumbersome, many are gimmicky, and nearly all are slow. All in all, Word wins. True, it lacks FullWrite’s drawing features, it can’t update a table of contents or index as you work, its revision-tracking talents are sparse, and it’s harder to use at times. But it’s fast. Its editing and paragraph-formatting features are superior. It formats indexes correctly. And it doesn’t take up memory like a sumo wrestler takes up an airplane seat.

Word also has the edge over FullWrite in areas that my report didn’t cover. Its mail merge feature, which lets you print “personal” form letters, is more powerful than FullWrite’s. Word lets you create and format complex equations (albeit by typing codes that are almost as complex). And far more programs, from outliners to publishers to presentation programs, can directly read its files.

FullWrite tries to do everything, but no program can. Its drawing features can’t replace a drawing program, nor can its page-layout features supplant a desktop publishing program. In day-to-day work, many of FullWrite’s features go unused—but they still take their toll on performance and hardware requirements. In short, FullWrite is a flashier program, but Word is a better word processor.

As for WordPerfect, it’s very powerful, but it needs more interface polishing and a strong dose of Raid. Version 1.0.1, released in August, fixed many of the bugs I found, but I still can’t recommend it, unless perhaps you already use WordPerfect on the IBM PC. But even the ability to exchange files easily and to use the same function key commands may not offset this program’s quirksiness.

Word’s victory taught me that the best program for the job might not always be the flashiest or even the easiest to learn. You know: don’t judge a book by its cover. Or as we say at the Forest Society, you have to see the forest and the trees.

See Where to Buy for contact information.

---

### Event #7: Professional Design and Performance

<table>
<thead>
<tr>
<th>Documentation</th>
<th>Word</th>
<th>FullWrite</th>
<th>WordPerfect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hands-on tutorial</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Task-oriented reference guide</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Quick-reference card</td>
<td>yes</td>
<td>fair</td>
<td>yes</td>
</tr>
<tr>
<td>Quality of online help</td>
<td>excellent</td>
<td>fair</td>
<td>excellent</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overall Design</th>
<th>Ease of learning</th>
<th>Ease of use</th>
<th>Performance</th>
<th>Reliability</th>
<th>Compatibility with other programs</th>
<th>Ability to be customized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>easy</td>
<td>easy</td>
<td>very good</td>
<td>excellent</td>
<td>very good</td>
<td>fair</td>
</tr>
<tr>
<td></td>
<td>very easy</td>
<td>easy</td>
<td>poor to fair</td>
<td>very good</td>
<td>fair</td>
<td>good</td>
</tr>
<tr>
<td></td>
<td>fairly easy</td>
<td>easy</td>
<td>very good</td>
<td>good</td>
<td>very good</td>
<td>poor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Minimum hardware requirements</th>
<th>512K, two</th>
<th>1MB, 400K drives</th>
<th>hard disk, 512KE, two</th>
</tr>
</thead>
</table>

1 Basic typing and editing performance is acceptable but most other operations are slow.
Why Say No to Backup?

Here are 50 drives that can help you recover from a crash.

by Rob Hahn

As you unpack your new hard disk, it’s difficult to believe that you’ll never again have to deal with floppies. But no matter how careful you are, your hard disk will eventually crash. And in the time-honored tradition, it will crash at the worst possible moment. Trust me. I wish I had $5 for every person I know who has neglected to back up a hard disk.

Backing up is not fun. But losing critical files can be catastrophic. The best backup solution should offer reliable, fast, convenient, affordable storage of data. So you can rule out another hard disk. Using a hard disk as your sole backup is not a backup solution. That’s because the secondary hard disk will never be far away from the primary one—in fact, they’re probably attached to the same Mac and online simultaneously. What if the power goes out and both hard disks die? What if a virus contaminates the hard disk? If the backup hard disk gets infected, it’s useless. The farther away from your Mac you keep the backed-up data, the better off you are.

Backup Options

Luckily, there are a number of backup solutions now available for the Macintosh that will keep your data safe and secure. Using floppies with backup pro-

Rob Hahn is a Macworld contributing editor, feature-film camera operator, and beta tester. He took his Mac II along on location while shooting Midnight Run.
grams like DiskFit or Redux is the cheapest solution. Unfortunately, floppies have their problems. Although reasonably reliable, they are very slow and hold relatively little data compared with other media. Feeding the Mac disk after disk during backup sessions can frustrate even the most avid backup evangelist.

I had a chance to evaluate various alternative backup solutions: tape drives, removable cartridge drives, optical disks, and even 8mm videotape. All were SCSI devices.

I tested each product using a 330-megabyte Priam hard disk filled with 65MB of files. With the removable drives, I used the manufacturer's supplied backup software (if any) as well as DiskFit from SuperMac Technology. After doing a global backup (see "What's a Backup?"), I added a 7MB folder to the Priam and changed a few existing files. I then performed an incremental backup.

Keep in mind that this is an overview of different backup technologies; you won't see every backup product represented here. My tests, however, should give you a general idea of how products within each category perform.

**Tape Your Time**

Tape cartridge drives have become the most popular form for backup, and there are several good reasons why. Tapes are reasonably inexpensive and phys-

---

**What's a Backup?**

There are actually two kinds of backup. Backing up all the data on a hard disk is called a **global backup**. Backing up only data that has changed or been added to the hard disk since the last backup (or since a specific date and time you set) is called an **incremental backup**. The best overall backup solution is to do a global backup once a week and an incremental backup every day.

Different backup programs perform globals and incrementals differently. The methods depend on the software you use and sometimes on the storage media as well.

You can use tape to globally back up a hard disk two different ways. **File-by-file** allows you to back up and restore files selectively from a hard disk. You can back up just one file, several files, or every file on the disk. **Mirror-image** backups copy every sector on a hard disk, making an exact duplicate of the entire disk. This is not always desirable. A mirror-image backup also backs up any flaws on the disk, such as a disk that is badly fragmented.

Applications like DiskFit and Redux reuse space on backups by erasing old versions of files from the backup disks and replacing them with newer versions—taking a "snapshot" of the hard disk at any given time. This method works only with random-access devices like floppies, hard disks, and removable media. The upside is that you don't keep adding disks to the backup set. The downside is that if a hard disk has a virus, chances are the backup will contract it.

Because tape drives aren't random-access devices, they need another kind of incremental backup software. **Audit trail** backups append incremental backups to the original global backup. Although restoring a hard disk from all those incremental backups isn't as easy to do with tape as it is with random-access devices, you can access older versions of the hard disk because they are never deleted. This kind of backup is good for office environments where it's important to keep old versions of files around for future reference. It is also helpful in case the hard disk gets hit by a virus.
cally small, but they still hold a lot of information—anywhere from 40MB to 300MB. This combination of small physical size and large storage capacity makes tape an ideal solution for storing the contents of a hard disk in a safe place. But there are drawbacks.

With few exceptions, backing up to tapes can be painfully slow (though not as slow as to floppies). Some tape drives let you mount the cartridge on the desktop, just as if it were a hard disk. But you’d be hard-pressed to use a tape drive as a stand-in for a hard disk that’s gone into the shop for repair. Tapes are designed for backing up data, not for using backed-up data in real time, so running an application from tape will try your patience.

Tape cartridges come in several different forms. Each type of cartridge has its own particular drive. While you may be able to interchange tapes among similar drives, you won’t be able to do so among drives that use different tape formats.

I looked at two drives that use the 40MB DC-2000 QIC (Quarter-Inch Cartridge)—Apple and Tecmar. I also tested an Everex tape drive that uses a 60MB tape made by Teac.

DC-2000

Apple’s tape drive has the dubious distinction of being the slowest backup option I looked at. It took over four hours to back up 66MB. Most tape drives copy files to the tape at high speed, without stopping and usually without verification, a process called streaming. Apple’s drive doesn’t stream. As a result, the speed of this unit is not really competitive.

On the other hand, Apple’s drive was one of the most reliable tape drives I tested. When it writes data, it does so in 8K blocks. Each 8K block is broken up into two 4K blocks. A third block, containing data from both the 4K blocks, is written as well. If you ever lose information from one of the 4K blocks, you can reconstruct it from this third block.

Tecmar offers a reasonably fast 40MB DC-2000 tape drive in a nice small package. It has the best software of the bunch; using MultiFinder, you can back up or format tapes in the background with little or no degradation. You can also format Apple-compatible tapes (which use a 2:1 interleave) in addition to Tecmar’s normal 1:1 interleave tapes.

Interleaving refers to how many sectors a tape skips when it reads or writes information. It allows manufacturers to compensate for differences between a drive’s transfer rate and the Mac’s SCSI-port transfer rate. (For more information on interleaving, see "The Disk Shopper’s Guide to Storage," Macworld, December 1987.)

I can’t confirm that a Tecmar “Apple-compatible” formatted tape will always read properly in an Apple drive. The first time I tried to restore a hard disk using Tecmar’s Apple-compatible tape in an Apple drive, it didn’t work. I had to reformat the tape and try the whole process again.

Nor was I able to restore my disk from a Tecmar mirror-image backup, with a tape formatted in Tecmar’s 1:1 interleave, using Tecmar’s drive. To date there hasn’t been a fix. According to Tecmar, this error occurs only on a mirror-image restore, and may occur only with very large volumes. File-by-file backups and restores worked for me without a hitch.

Teac Tape

The Teac-based systems are generally much faster than the DC-2000 systems. Another advantage is that each Teac tape (which is the size of an audiotape) holds 60MB of data instead of 40MB, as DC-2000 car-
## Tapes

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Product</th>
<th>Type of Tape</th>
<th>Capacity per Unformatted Tape</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADIC</td>
<td>APL-40T</td>
<td>DC-2000</td>
<td>40MB</td>
<td>$1495</td>
</tr>
<tr>
<td>Alpha Micro</td>
<td>Videotrax</td>
<td>VHS, Beta, 8mm videotape</td>
<td>80MB–240MB, depending on length of tape</td>
<td>$499*</td>
</tr>
<tr>
<td>Apple</td>
<td>Apple Tape Backup 40 SC</td>
<td>DC-2000</td>
<td>40MB</td>
<td>$1499</td>
</tr>
<tr>
<td>Blackhole Technology</td>
<td>MacTape/SCSI</td>
<td>1/2 inch 9-track reel-to-reel</td>
<td>160MB</td>
<td>$10,500</td>
</tr>
<tr>
<td>CMS Enhancements</td>
<td>TapeStack</td>
<td>CT-600H</td>
<td>60MB</td>
<td>$995</td>
</tr>
<tr>
<td>Everex</td>
<td>EMAC-60T</td>
<td>CT-600H</td>
<td>60MB</td>
<td>$1395</td>
</tr>
<tr>
<td>First Class Peripherals</td>
<td>The Sider T6</td>
<td>CT-600H</td>
<td>60MB</td>
<td>$895</td>
</tr>
<tr>
<td>General Computer</td>
<td>HyperTape</td>
<td>DC-2000</td>
<td>40MB</td>
<td>$1399</td>
</tr>
<tr>
<td>Genius</td>
<td>2Gig</td>
<td>8mm videotape</td>
<td>2.3 gigabytes</td>
<td>$4995</td>
</tr>
<tr>
<td>Giga Cell Systems</td>
<td>DataFile 40</td>
<td>DC-2000</td>
<td>40MB</td>
<td>$1225</td>
</tr>
<tr>
<td>Giga Cell Systems</td>
<td>DataFile 150</td>
<td>DC-600</td>
<td>150MB</td>
<td>$2070</td>
</tr>
<tr>
<td>IBM</td>
<td>IBNC 60MB tape drives</td>
<td>CT-600H</td>
<td>60MB</td>
<td>$895</td>
</tr>
<tr>
<td>Irwin Magnetics</td>
<td>5040</td>
<td>DC-2000</td>
<td>40MB</td>
<td>$1395</td>
</tr>
<tr>
<td>Irwin Magnetics</td>
<td>5080</td>
<td>DC-2000</td>
<td>80MB</td>
<td>$1695</td>
</tr>
<tr>
<td>Jasmine</td>
<td>DirectTape</td>
<td>DC-2000</td>
<td>40MB</td>
<td>$1099</td>
</tr>
<tr>
<td>Laser Optical Technology</td>
<td>LD-T50</td>
<td>CT-500H</td>
<td>50MB</td>
<td>$1095</td>
</tr>
<tr>
<td>Laser Optical Technology</td>
<td>LD-T60</td>
<td>CT-600H</td>
<td>60MB</td>
<td>$1115</td>
</tr>
<tr>
<td>MacPeak Systems</td>
<td>ST-60</td>
<td>CT-600H</td>
<td>60MB</td>
<td>$1095</td>
</tr>
<tr>
<td>MacPeak Systems</td>
<td>ST-150</td>
<td>CT-1200H</td>
<td>150MB</td>
<td>$1595</td>
</tr>
<tr>
<td>Micah Storage Systems</td>
<td>XTP 40</td>
<td>DC-2000</td>
<td>40MB</td>
<td>$999</td>
</tr>
<tr>
<td>Micah Storage Systems</td>
<td>XTP 60</td>
<td>CT-600H</td>
<td>60MB</td>
<td>$999</td>
</tr>
<tr>
<td>Microtech</td>
<td>Nova T60</td>
<td>CT-600H</td>
<td>60MB</td>
<td>$899</td>
</tr>
<tr>
<td>NovaStor</td>
<td>NST150</td>
<td>DC-600</td>
<td>150MB</td>
<td>$2495</td>
</tr>
<tr>
<td>NovaStor</td>
<td>MacStreamer</td>
<td>1/2 inch 9-track reel-to-reel</td>
<td>130MB</td>
<td>$3995</td>
</tr>
<tr>
<td>PCPC</td>
<td>PCPC Tape Backup</td>
<td>8mm videotape</td>
<td>250MB–2048MB, depending on length of tape</td>
<td>$4995</td>
</tr>
<tr>
<td>Peripheral Land</td>
<td>MacBack 60</td>
<td>CT-600H</td>
<td>60MB</td>
<td>$1295</td>
</tr>
<tr>
<td>Qualstar</td>
<td>Ministreamer Model 1054</td>
<td>1/2 inch 9-track reel-to-reel</td>
<td>130MB</td>
<td>$3995</td>
</tr>
<tr>
<td>Qualstar</td>
<td>Ministreamer Model 1260S</td>
<td>1/2 inch 9-track reel-to-reel</td>
<td>250MB</td>
<td>$7995</td>
</tr>
<tr>
<td>Relax Technology</td>
<td>Tape 60 Plus</td>
<td>CT-600H</td>
<td>60MB</td>
<td>$995</td>
</tr>
<tr>
<td>Spectra Micro</td>
<td>Spectra 60</td>
<td>CT-600H</td>
<td>60MB</td>
<td>$795</td>
</tr>
<tr>
<td>SuperMac</td>
<td>DataStream</td>
<td>DC-2000</td>
<td>40MB</td>
<td>$1295</td>
</tr>
<tr>
<td>Tallgrass</td>
<td>TG-1040</td>
<td>DC-2000</td>
<td>40MB</td>
<td>$1195</td>
</tr>
<tr>
<td>Tecmar</td>
<td>QT-Mac40</td>
<td>DC-2000</td>
<td>40MB</td>
<td>$1395</td>
</tr>
</tbody>
</table>

*Contact vendor for specific information on warranties.

*Removing termination requires opening up drive.

*$499 includes only controller and software for use with any VCR; computer-controlled VCR subsystem available for $1299.

*Drive has only one DB-25 pin connector; T-type connector necessary for daisy-chaining.

*Thirty-day money-back guarantee.
<table>
<thead>
<tr>
<th>Warranty</th>
<th>Service</th>
<th>Included</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year</td>
<td>toll-free phone support</td>
<td>DB25-DB50 terminator only</td>
<td>internally terminated; compatible with Apple tape drive can also be used to broadcast data over television systems</td>
</tr>
<tr>
<td>1 year</td>
<td>toll-free phone support</td>
<td>all cables and terminator</td>
<td>externally terminated can be used to transfer data with minicomputers and mainframe computers</td>
</tr>
<tr>
<td>90 days</td>
<td>authorized dealer</td>
<td>none</td>
<td>externally terminated</td>
</tr>
<tr>
<td>1 year</td>
<td>phone support</td>
<td>all cables and terminator</td>
<td>externally terminated</td>
</tr>
<tr>
<td>1 year</td>
<td>authorized dealer</td>
<td>DB25-DB25 SCSI terminator</td>
<td>externally terminated</td>
</tr>
<tr>
<td>1 year</td>
<td>phone support; authorized dealer</td>
<td>DB25-DB50 terminator</td>
<td>externally terminated</td>
</tr>
<tr>
<td>n/a</td>
<td>n/a</td>
<td>DB50-DB50 or DB25-DB50</td>
<td>externally terminated; can read Apple tape drive but can’t write to them</td>
</tr>
<tr>
<td>1 year</td>
<td>toll-free phone support</td>
<td>DB50-DB50 or DB25-DB50</td>
<td>externally terminated; internally terminated</td>
</tr>
<tr>
<td>1 year</td>
<td>toll-free phone support</td>
<td>DB25-DB25</td>
<td>externally terminated; uses Irwin’s Accutrak nonsandard recording format data interchange with MS-DOS, AIX, A/UX, OS/2 computers; network-wide backup possible externally terminated; uses Irwin’s Accutrak nonstandard recording format; data interchange with MS-DOS, AIX, A/UX, OS/2 computers; network-wide backup possible externally terminated; compatible Apple tape drive internally terminated</td>
</tr>
<tr>
<td>1 year</td>
<td>toll-free phone support; 48-hour exchange, in or out of warranty</td>
<td>DB50-DB50 or DB25-DB50</td>
<td>internally terminated</td>
</tr>
<tr>
<td>2 years¹</td>
<td>phone support</td>
<td>DB50-DB50 or DB25-DB50</td>
<td>internally terminated</td>
</tr>
<tr>
<td>90 days</td>
<td>phone support</td>
<td>DB50-DB50 or DB25-DB50</td>
<td>internally terminated</td>
</tr>
<tr>
<td>1 year</td>
<td>toll-free phone support; 48-hour turnaround service</td>
<td>DB50-DB50 or DB25-DB50</td>
<td>externally terminated</td>
</tr>
<tr>
<td>2 years¹</td>
<td>toll-free phone support</td>
<td>n/a</td>
<td>internally terminated</td>
</tr>
<tr>
<td>2 years¹</td>
<td>toll-free phone support</td>
<td>n/a</td>
<td>externally terminated</td>
</tr>
<tr>
<td>2 years¹</td>
<td>DB50-DB50 or DB25-DB50</td>
<td>internally terminated</td>
<td></td>
</tr>
<tr>
<td>1 year</td>
<td>phone support</td>
<td>DB25-DB50</td>
<td>internally terminated can be used to transfer data with minicomputers and mainframe computers</td>
</tr>
<tr>
<td>1 year</td>
<td>phone support</td>
<td>DB25-DB50</td>
<td>internally terminated</td>
</tr>
<tr>
<td>1 year</td>
<td>phone support; authorized dealer</td>
<td>DB25-DB50</td>
<td>internally terminated</td>
</tr>
<tr>
<td>1 year</td>
<td>phone support</td>
<td>DB50-DB50 or DB25-DB50</td>
<td>externally terminated can be used to transfer data with minicomputers and mainframe computers</td>
</tr>
<tr>
<td>90 days</td>
<td>phone support</td>
<td>DB50-DB50 or DB25-DB50</td>
<td>externally terminated</td>
</tr>
<tr>
<td>1 year</td>
<td>toll-free phone support; 48-hour turnaround service</td>
<td>DB50-DB50 or DB25-DB50</td>
<td>externally terminated</td>
</tr>
<tr>
<td>1 year</td>
<td>phone support; authorized dealer</td>
<td>DB25-DB25</td>
<td>internally terminated</td>
</tr>
<tr>
<td>1 year</td>
<td>phone support</td>
<td>DB25-DB25</td>
<td>internally terminated</td>
</tr>
<tr>
<td>3 years</td>
<td>authorized dealer</td>
<td>DB25-DB50</td>
<td>externally terminated</td>
</tr>
<tr>
<td>2 years</td>
<td>toll-free phone support; 48-hour turnaround service for first 6 months</td>
<td>DB50-DB50 or DB25-DB50</td>
<td>externally terminated; compatible Apple tape drive</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Product</td>
<td>Type of Drive</td>
<td>Price</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>ADIC</td>
<td>APL-800WD</td>
<td>WORM (write-once, read-many) optical drive</td>
<td>$4995</td>
</tr>
<tr>
<td>Bering</td>
<td>Totem II</td>
<td>Bernoulli removable media</td>
<td>$1195</td>
</tr>
<tr>
<td>DPI</td>
<td>44 removable</td>
<td>Winchester removable hard disk</td>
<td>$1795</td>
</tr>
<tr>
<td>Giga Cell Systems</td>
<td>FlexiDrive 10</td>
<td>high-density floppy</td>
<td>$1495</td>
</tr>
<tr>
<td>Giga Cell Systems</td>
<td>DataWorm</td>
<td>WORM (write-once, read-many) optical drive</td>
<td>$5525</td>
</tr>
<tr>
<td>Iomega Corporation</td>
<td>Bernoulli Box II</td>
<td>Bernoulli removable media (5/4 in.)</td>
<td>$2550</td>
</tr>
<tr>
<td>Iomega Corporation</td>
<td>Bernoulli Box II</td>
<td>Bernoulli removable media (5/4 in.)</td>
<td>$1650</td>
</tr>
<tr>
<td>Jasmine</td>
<td>MegaDrive 10</td>
<td>removable cartridge</td>
<td>$699</td>
</tr>
<tr>
<td>Jasmine</td>
<td>MegaDrive 20</td>
<td>removable cartridge</td>
<td>$999</td>
</tr>
<tr>
<td>Laser Optical Technology</td>
<td>800MB WORM</td>
<td>WORM (write-once, read-many) optical drive</td>
<td>$3995</td>
</tr>
<tr>
<td>Mass Micro</td>
<td>Data Pak</td>
<td>Winchester removable hard disk</td>
<td>$1775</td>
</tr>
<tr>
<td>MicroDynamics</td>
<td>MicroDynamics Mars</td>
<td>WORM (write-once, read-many) Sony optical drive system</td>
<td>$19,000</td>
</tr>
<tr>
<td>MicroDynamics</td>
<td>MicroDynamics Mars</td>
<td>WORM (write-once, read-many) LMSI optical drive system</td>
<td>$14,000</td>
</tr>
<tr>
<td>Mirror Technologies</td>
<td>Mirror 20MB removable</td>
<td>WORM (write-once, read-many) removable cartridge</td>
<td>$955</td>
</tr>
<tr>
<td>Peripheral Land</td>
<td>Infinity 10</td>
<td>high-density floppy</td>
<td>$1395</td>
</tr>
<tr>
<td>Peripheral Land</td>
<td>Infinity 40 Turbo</td>
<td>Winchester removable hard disk</td>
<td>$1795</td>
</tr>
</tbody>
</table>

* Contact vendors for specific information on warranties.
* Removing termination requires opening drive.
* 30-day money-back guarantee.
<table>
<thead>
<tr>
<th>Mean Time Between Failures</th>
<th>Media Shelf Life</th>
<th>Included SCSI Cables</th>
<th>Warranty</th>
<th>Service</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>30,000 hours</td>
<td>10 years</td>
<td>DB25–DB50</td>
<td>1 year</td>
<td>phone support</td>
<td>internally terminated</td>
</tr>
<tr>
<td>5000 hours</td>
<td>5 years</td>
<td>DB25–DB50</td>
<td>1 year</td>
<td>5-day turnaround service, plus shipping time (loaners may be available)</td>
<td>1:1 interleave; externally terminated</td>
</tr>
<tr>
<td>15,000 hours</td>
<td>n/a</td>
<td>n/a</td>
<td>1 year</td>
<td>24-hour turnaround service; toll-free phone support</td>
<td>user-configurable 1:1, 2:1, 3:1 interleave; internally terminated</td>
</tr>
<tr>
<td>10,000 hours</td>
<td>1 year</td>
<td>DB50–DB50 or DB25–DB50</td>
<td>1 year</td>
<td>toll-free phone support</td>
<td>1:1 interleave; externally terminated</td>
</tr>
<tr>
<td>n/a</td>
<td>10–20 years</td>
<td>DB25–DB50</td>
<td>1 year</td>
<td>phone support; authorized dealer</td>
<td>multiuser network server for image processing system</td>
</tr>
<tr>
<td>n/a</td>
<td>10–20 years</td>
<td>DB25–DB50</td>
<td>1 year</td>
<td>phone support; authorized dealer</td>
<td>multiuser network server for image processing system</td>
</tr>
<tr>
<td>10,000 hours</td>
<td>lifetime warranty</td>
<td>DB25–DB50</td>
<td>2 years</td>
<td>9 a.m.–6 p.m. phone support</td>
<td>Bernoulli cartridges</td>
</tr>
<tr>
<td>20,000 hours</td>
<td>30 years</td>
<td>DB25–DB50</td>
<td>2 years</td>
<td>9 a.m.–6 p.m. phone support</td>
<td>internally terminated</td>
</tr>
<tr>
<td>20,000 hours</td>
<td>7 years (10,000 insertions)</td>
<td>DB25–DB50</td>
<td>1 year</td>
<td>24-hour phone hotline; service contracts available</td>
<td>internally terminated</td>
</tr>
<tr>
<td>10,000 hours</td>
<td>100 years</td>
<td>none</td>
<td>6 months</td>
<td>phone support; Sony services drives</td>
<td>multiuser network server for image processing system</td>
</tr>
<tr>
<td>12,000 hours</td>
<td>30 years</td>
<td>none</td>
<td>6 months</td>
<td>phone support; Control Data services drives</td>
<td>multiuser network server for image processing system</td>
</tr>
<tr>
<td>10,000 hours</td>
<td>n/a</td>
<td>n/a</td>
<td>1 year</td>
<td>toll-free phone support</td>
<td>3:1 interleave; internally terminated</td>
</tr>
<tr>
<td>10,000 hours</td>
<td>n/a</td>
<td>DB25–DB50</td>
<td>1 year</td>
<td>phone support</td>
<td>internally terminated; can read IBM 5½ in. 560K and 1.2MB floppies for data exchange</td>
</tr>
<tr>
<td>15,000 hours</td>
<td>7 years (10,000 insertions)</td>
<td>DB25–DB50</td>
<td>1 year</td>
<td>phone support</td>
<td>dynamically caching software utility included</td>
</tr>
</tbody>
</table>
tridges do. Everex's drive is ideal for doing global backups because it is fast: it took me about 20 minutes to back up 66MB.

Incremental backups, however, are another story. The big problem? You can't append to an existing tape. To do an incremental backup of only 3MB, you have to use an entire 60MB tape.

Nuvo Labs, which writes the backup software bundled with the Everex drive, says that a new version of its software should correct this problem. The new software should also address another problem with the Everex's drive setup, namely files and folders not being placed in their proper positions after a restore.

I also had two additional problems with the tape drive. First, when a 7MB folder was copied to the hard disk, the files inside weren't automatically tagged as needing backup. As a result, none of the files were included in the incremental backup. Second, the Everex drive intermittently caused all globally restored applications, when launched, to give me the "Busy or missing application" dialog box. Everex couldn't reproduce the problem, though, and thought it might have been related to the large hard disk I was using.

Taking It with You

Imagine having a huge floppy on which to back up a hard disk, and you'll know what it's like to own a removable-cartridge drive. Encased in a hard shell, a removable cartridge measures about 5¾ inches—the size of an old IBM floppy, but thicker. The beauty of these systems is that you can use them like a temporary hard disk if your regular hard disk goes in for service. Unlike tape drives, removable cartridge drives are random-access devices and can be mounted on the desktop just like a floppy (see "Drivers Explained").

I tested three removable units: Jasmine's MegaDrive (the 10MB version), Bering's Totem II, and Mass Micro's 45MB removable cartridge drive.

High-Density Floppies and Bernoullis

The MegaDrive works just like a regular floppy, with its drive heads touching the media. Because it

Drivers Explained

Once the Mac recognizes the volume, the system can properly mount the disk on the desktop. But what about disks that aren't inserted until after you start the Mac? Remember, the system is only instructed to get a drive and copy it to memory at start-up.

For floppies, Apple built a watchdog (located in the read-only memory, or ROM) that instructs the system to check constantly for a floppy insertion. When one occurs, the system loads the driver into memory just as it would at start-up. That's why a floppy appears on the desktop whenever you insert a floppy into a drive.

On the other hand, there isn't a watchdog in the Macintosh ROM for a removable hard disk. If you insert the cartridge after start-up, the Mac simply ignores it; it hasn't the foggiest idea, for example, what a Mass Micro 45MB removable cartridge is.

That's where an INIT comes in. The INIT (which gets temporarily copied into memory at start-up) tells the system to recognize and look for not only floppies but also removable hard disks. As a result, the system—because of the INIT—that's instantly knows what a cartridge is when you insert it after start-up. Then the Mac can get the driver and mount the 45MB cartridge.

Except for floppies, most removable media—Bernoullis, MegaDrives, 45MB cartridges, even CD ROMs—use watchdog INITs. (Floppies don't have to, because they already have special recognition from Apple's ROM.) Other types of removable media don't get recognition from Apple's ROM, so they need INITs. It's nice when you give the party; you have control over whom you invite.
Global backups were performed on a 330MB Priam hard disk. There were 2548 files on the Priam, for a total of 65,905K of data. Incremental backups were performed after adding a 7MB folder to the Priam and changing some MacWrite and Word files on the hard disk. All removable drive backup benchmarks were performed with 92K of RAM cache.

*DiskFit benchmarks performed with Faster Copying and Verify Writes selected.

**Global benchmarks for Mass Micro removable drive performed with the drive's bundled backup software, do not include write verification.

Removable Drive Benchmarks for Mac II

Global backups were performed on a 330MB Priam hard disk. There were 2548 files on the Priam, for a total of 65,905K of data. Incremental backups were performed after adding a 7MB folder to the Priam and changing some MacWrite and Word files on the hard disk. All tape backup benchmarks were performed with the RAM cache off.

*Mirror backup and restore not performed on a 330MB disk because software wanted to back up the entire disk, not just the 66MB of data. Mirror backup performed for a 40MB hard disk had no problems.

**Benchmark times include write verification. (Benchmark times performed for Apple, Everex, and Tecmar tape drives do not include write verification.) Mirror backups and restores are inapplicable with Genius drive.

***Drive could not complete mirror restore.

doesn't come with an external SCSI terminator, you have to open the drive and fiddle with a bunch of small resistors. Although the MegaDrive is fairly inexpensive compared to the other removable cartridge drives, it's slower than even the Tecmar tape drive. And though the drive is bundled with the superb Redux software, the cartridges are relatively expensive—one MegaDrive cartridge holds just 9.5MB and costs $40.

The Totem, which is a Bernoulli-type drive, works by floating its drive heads over sectors, picking up data via electrically charged particles; the heads never touch the media's surface. The drive runs at speeds comparable to Everex's tape drive and uses 20MB cartridges that cost $85 apiece. I was confused by Bering's backup software—it has a nonintuitive interface with virtually incomprehensible online help. I suggest you buy DiskFit or Redux. I also found some problems when I tried using a Totem cartridge as a start-up disk; if there's another System on a connected hard disk, the drive can't get started in time to boot from the cartridge. A phone call to Bering confirmed this problem.

Removable Hard Disks

The Mass Micro 45MB cartridge is actually a removable Winchester hard disk. When you insert a cartridge, air blasts the medium, creating positive air pressure in the chamber that houses the medium. Pressure (caused by the centrifugal force of the rotating disk) blows all particles off the medium. Air is then
filtered as it comes into the drive. The medium itself is plated with a hard carbon overcoat that prevents anything from sticking to it.

Mass Micro, Peripheral Land, and DPI are currently the only manufacturers of 45MB removable drives for the Mac. All use the same drive mechanism, so they can read each other’s disks. The primary difference is in packaging and software. For example, Mass Micro uses an INIT to let the Mac "know" about its cartridge, while Peripheral Land doesn’t. That means you must have a Peripheral Land cartridge in the drive at boot time, or it won’t show up on the desktop if you later insert a cartridge.

The 45MBremovables were among the fastest backup solutions I tested. In fact, they’re so fast that it is tempting to use them as hard disks—which is what they are. You can do this, of course, but then you’ll have to find a backup solution for them.

If you can restrain yourself and use the 45-meggers as backup devices only, you will be overjoyed at how painless backing up can be. They offer the ultimate in flexibility, speed, and reliability, albeit at a relatively steep price for the drive. At the same time, the medium offers better value for your money ($125 per cartridge) than the MegaDrive or the Totem cartridges.

Because 45MBremovabless are so fast, doing incrementalsevery night is a breeze. And because of their data capacity, you don’t have to babysit these drives so much during backups. Two cartridges will hold an 80MB hard disk; that’s one disk swap—sure better than shoving in 98 floppies.

There has been some concern over the reliability of removable media—with some justification. Syquest, the company that manufactures the 45MB cartridges, has had a shaky past in the IBM world. However, Syquest seems to have solved its production problems; I’ve had good luck with the many cartridges I’ve been using. Bernoulli cartridges have also had some reliability problems. Some users claim that, over time, sectors go bad just sitting on the shelf. These problems also seem to have been solved. And although Jasmine has enhanced its software’s error-correction technology, and Verbatim (which makes the MegaDrive cartridges) has improved the media, some users report that Megafloppies have been fairly unreliable.

**The Future Is Here**

I had a chance to peruse the latest in backup storage technology: Laser Optical Technology’s WORM (write-once, read-many) optical drive and Genius’s 8mm videotape backup system. AlphaMicro’s VideoTrax, which uses a regular VHS recorder and VHS tape to back up 80MB, was not ready at the time of this writing.

WORM drives use lasers to etch data permanently onto nonerasable disks; once you back up data to a WORM, it’s there for good. The cartridge I tested held 800MB, 400MB on each side. Since I could back up only the entire mirror image—all 330MB—of my hard disk, the benchmarks are not really applicable here. However, you should know that it took a little under five hours to back up my Priam filled with only 66MB. Needless to say, at this time I can’t recommend this WORM drive for daily backups, although it has enormous utility for archiving permanent data.

Genius’s 2Gig 8mm video tape drive is another story. Along with the 45MBremovables, it was the fastest backup solution I looked at. Using a regular 8mm videotape ($8), I backed up my 66MB hard disk in ten minutes (that includes verifying the writes). Theo-

---

*Laser Optical Technology’s WORM-800, and Custom Memory Systems’ CM-45 (no longer available), and a 45MB cartridge.*
EMAC-60T, by Everex; QT Mac 40, from Tecmar; the Apple Tape Backup 40SC; the 2Gig, from Genius; and a DC-2000 tape cartridge.

Theoretically, if the drive didn’t have to use the Mac SCSI port, it could transfer data at a whopping 15 MB per minute.

Tape capacity is a strong point, too. One 120mm videotape can hold 2.3 gigabytes of data—equal to 2300MB. Needless to say, I hope Apple is looking into this technology.

What about digital audio tape (DAT)? DAT and 8mm videotape both use helical scan technology to read and write data (see “Strip by Stripe”). The difference is that DAT is only 4mm wide. It is half as fast as 8mm, holds half the capacity; and is much less expensive. Can you say laptop, boys and girls?

A Question of Speed

Benchmarks can be deceiving because they usually don’t show the whole picture. If backups take too long, though, you simply won’t take the time to archive your data, so in this case benchmarks are helpful.

Because of the way they work, tape drives aren’t usually affected by the processor speed or the Mac interleave factor. In most cases more memory helps, but generally the tape devices just “stream away” at their own rate. On the other hand, the performance of random-access devices—the 45MB removable and the Bernoullis—is very much affected by processor speed and interleave. For example, the Tecmar and a 45MB removable take about the same time to back up 66MB on the SE; on a Mac II, however, a removable unit beats the Tecmar.

When comparing benchmarks, you should also take into account whether or not the writing of data to the backup is being verified. A Mac SE with an Everex drive actually takes less time (20 minutes) to back up a hard disk than does a 45MB removable using DiskFit (30 minutes), but DiskFit’s 30-minute time includes verifying writes, and the Everex’s 20-minute time doesn’t. If you could verify the data with the Everex, DiskFit and the removable would be faster.

Back to Earth

With the advent of larger capacity disks, every computer will need a built-in backup solution. The DC-2000 and Teac tape systems are acceptable for low-capacity hard disks, but they won’t cut it in a world of erasable, optical, gigabyte storage devices. And that world is closer than you think.

One thing’s certain: backing up is drudgery, plain and simple. But it is a necessary evil. I must say I was very disappointed in general with tape drives; none of them offered an efficient backup solution, especially for incremental backups. Almost all the software has problems in some respects, especially when performing incremental backups, and the drives (except for the 8mm) are too slow. No matter how nifty a product is or promises to be, if it ain’t easy and fast, you won’t bother to back up. Period.

For convenience, flexibility, and speed, the 45MB removable is the clear winner. For global backups, the 8mm tape is the future and you can buy it today. If money is a limitation, any of the Teac systems will do. For the user of small-capacity hard disks (10MB to 40MB), a DC-2000 unit like Tecmar’s has a lot going for it.

See Where to Buy for contact information.
FileMaker II


One of the best-selling Macintosh flat-file managers, Nashoba's FileMaker Plus incorporated an impressive set of virtues. This forthright approach continues in the upgraded version, FileMaker II (now marketed by Claris). If your database needs don't absolutely demand a relational structure (automated posting in accounts and multiple-linked files are examples of applications that do demand it), FileMaker II is your best choice. FileMaker II's networking capabilities further increase its scope so that it can handle the tasks facing most midsize businesses.

Distinguished Ancestry
Since the main differences between FileMaker II and FileMaker Plus are the addition of networking capabilities and an upgrade of standard features, it's worth reviewing the points that make FileMaker, in any incarnation, a solid product.

First, it's fast. Since this program indexes all possible fields—it does this as a background task—FileMaker offers the fastest searches and sorts in its class (see "Data Basics," Macworld, June 1988). Second, its files (and records and fields and field sizes) are limited only by disk space: This means that you can attach long text fields to data records, which is often helpful for storing client notes or inventory descriptions. Third, FileMaker aims to please. The documentation is clear, it comes in a convenient book format, the tutorial is easy to follow, and there are templates for ten standard business/organization applications. The program offers a respectable set of tools for designing forms (called layouts) for use in data entry, reporting, or viewing file contents.

Nice small touches, such as keyboard shortcuts, and large touches, especially an autosave feature, make FileMaker a favorite for day-to-day use. A lookup feature enables you to pull data from other files into your currently opened file automatically, according to specified criteria. While this feature works somewhat like a key field in a relational database, FileMaker is not a relational database. If you want to set up a full-featured accounting system that will serve several connected branch offices, or set up manufacturing inventories that will track different stages of partially finished goods, you'll need to step up in power (see "A Full House," Macworld, October 1988). But for small businesses, FileMaker's streamlined lookup, managed through dialog boxes rather than a programming language, may be all the file-to-file relational connection you need.

Play It Again

This example of script choices under the new Custom menu not only demonstrates the facility but also shows FileMaker II's prodigious attempts to anticipate most organizational needs (this example comes from the prepared Mailing List templates).

Three Points about II

Although FileMaker II provides many improvements that make designing layouts more convenient, adds a file-compression...
option, and reorganizes font and style choices into hierarchical menus, the three biggest performance-oriented additions are networking, automated scripts, and data field characteristics.

As database application developers often remark, multiuser capability really means the ability to have several people slogging away at data entry at once. FileMaker II assumes that you will be sharing files—when you toggle the Exclusive menu item on the current work file, you grant access to multiple users. In business applications, as soon as you have multiple users you need to worry about data integrity, so FileMaker II offers a simple password scheme in which you set passwords and access levels from a dialog box (see "What's the Word?"). As the host (the first person to open a file in a work session) you must open lookup files associated with the work file. And when using MultiFinder, the host must be careful to run only applications that support background processing. Other than those caveats, there are no special precautions—FileMaker II automatically performs updates and modifications across a network.

With a file server such as TOPS or AppleShare, FileMaker II can be multilaunched, meaning that more than one person can use a single copy of the FileMaker II application simultaneously on a network. In this case, FileMaker II is installed either on a Macintosh used as a file server or on a TOPS-equipped Mac. However, with the street price of a four-user FileMaker II system running between three and four hundred dollars, you may find it makes better economic sense to get the full system rather than suffer the performance degradation associated with multilaunch mode.

FileMaker Plus had a scripting facility, but it was buried in the File menu and given a mere four pages of documentation. In FileMaker II, the new Custom menu item is used for quick access to named scripts, and documentation and examples have both been augmented (see "Play It Again"). Since scripting works in record mode directly from keystrokes and requires no programming, scripting's new prominence in the FileMaker menu may encourage beginners to automate a few common sequences and may inspire advanced users to develop libraries of scripts.

Finally, database field capabilities have been enhanced. Users can now specify data entry options that force field data to match a list of values or to fit within a user-specified range of values. Summary fields (fields used to produce totals or other computations from numerical data in a specified set of records) now include new types of total, subtotal, and average, thus streamlining report production. Field-type conversions (text to numeric, date to text, and others) are also supported.

Summary

FileMaker Plus was already at the head of its product class. FileMaker II now offers networking and an assortment of major and minor improvements, many of them user-suggested, without compromising the original program's simplicity and ease of learning. It's easy to see why Claris wanted to acquire this product, and you should think seriously about FileMaker II if you have files to manage.—Charles Seiter

See Where to Buy for contact information.
In general, features simplify drawing, redrawing is twice as fast as original MacDraw’s, very customizable. Cons: Limited number of drawing tools, user must create color patterns.


You’ve probably heard the standard equivocation about a prospective blind date’s looks: “He is/she’s got a great personality.” Well, MacDraw II also is a joy to spend time with even though it lacks some of the sexier features found in other draw programs. Although MacDraw II does not have Cricket Draw’s special effects, MacDraft’s measurement functions, or SuperPaint’s dual paint and draw layers, the program incorporates an extensive list of features, many of which make it so easy to use that other draw programs, including MacDraw, seem stilted by comparison.

MacDraw II has most of the standard features that are lacking in MacDraw. For example, you can set pen sizes from 1/2 inches to 1/100000 of an inch. You can use 256 pen sizes on a page, and you can customize arrows and dashed lines. Font sizes and line spacing range from 1 to 127 points. Different styles and sizes of text can coexist in the same paragraph. And you can create an unlimited number of fill patterns.

MacDraw II also offers all of the standard control functions found in other draw programs. In addition, you can rotate objects in increments of 90° as in MacDraw. You can zoom in up to 32 times (the enlargement percent doubles each time) and zoom out till the page takes up just 3 percent of the screen. Rulers are also customizable.

Pleasant Surprises
While people now expect many of these features to be in a drawing program, MacDraw II adds a number of pleasant surprises. For example, some draw programs automatically deselect tools after each use; in others, tools remain active until you deselect them. With MacDraw II, you choose whether tools automatically become deselected or remain active by either single- or double-clicking on the tool’s icon. It’s also easy to select objects in MacDraw II. For example, to select all instances of one kind of object, say every rectangle, you click on the rectangle tool and choose Select All. And if you hold down the Esc key while drawing a selection box, MacDraw II selects any object that the box touches, rather than just those contained within the box.

A number of features make creating and editing a drawing easier. For example, MacDraw II automatically draws lines at almost any user-specified angle. When editing stacked objects, you’re not limited to sending all objects to the back or front; you can send them backward or forward one at a time. The program can also automatically distribute objects evenly across a page.

MacDraw II makes navigating around large documents easy because it lets you specify up to nine views of a document. Each view defines not only a portion of the document but also a zoom percentage, a ruler type, and other settings.

Although you can’t change the default values in MacDraw II, you can create Stationery documents that contain settings or graphics, such as a logo, that you want to reuse. A Stationery file differs from regular files in that each time you use it, the program forces you to save the changes as a document with a new name. That way the Stationery settings are protected.

Some Larger Features
Two major features increase efficiency. The Library offers a handy way to store and access clip art. In most programs, you paste clip art into a document from another file. If that file contains a lot of clip art, however, it can take you a while to find the objects you want. With MacDraw II you can give an object a library name such as “logo,” “counter top,” or “window.” When you want to retrieve the object, you open the document using the Open as Library menu option. MacDraw II then displays a

Specifying Scale
The Rulers dialog box lets you specify a drawing scale. Six preset scales range from 1 inch = 1 inch to 1/2 inch = 1 foot. But you can create custom scales. You can also specify the number of divisions per inch. Changing the scale box no effect on objects already drawn, so you can use different scales within the same document. When pasting an object, you can force it to convert to the scale in effect when it is pasted.

(continues)
Only Clearpoint can offer an unconditional lifetime warranty, 24-hour-a-day service and delivery from stock. Call today and ask for the MC2RAM, the fully-compatible Macintosh memory.

Choose either Version S1 (megabit SOJs, identical to the Apple SIMM) or the cost-effective Version D* (megabit DIPs). Coming from the largest manufacturer of workstation memory, the MC2RAM SIMMs are guaranteed to provide optimal performance with either state-of-the-art design.

Order your Clearpoint MC2RAM memory today and get the only Macintosh memory that won't leave you in the lurch. With Clearpoint you know you're buying everything that memory should be.

* Does not fit in Mac IIs with full-height disk drives or SEs with CPU Accelerator boards.

The Clearpoint Difference

- **Lifetime Warranty**
  With the strictest dynamic and thermal testing in the industry, Clearpoint confidently offers a lifetime warranty—then backs it up with a 24-hour Repair/Replacement policy and an 800 service number for a warranty with teeth.

- **Superior Memory Design**
  Across the board, Clearpoint brings the workstation marketplace better memory design. Whether it's higher density or state-of-the-art DRAM technology—Clearpoint designs it better.

- **Guaranteed Buyer Satisfaction**
  Long-term satisfied customers is Clearpoint's goal. With comprehensive, user-friendly documentation, trade-up credits and competitive pricing, Clearpoint guarantees buyer satisfaction.

Other Clearpoint Workstation Memory

- **COMPAQ 386**
  COMRAM (compatible with the Compaq DESKPRO 386/20 and /25) 4 MB boards.

- **SUN FAMILY**
  SNXSM (compatible with Sun 3/60): Available in 1 MB SIMMs, four in a set.
  SNXSC (compatible with Sun 4/110 and 386i): 1 MB SIMMs.

- **DEC**
  MV2000 (compatible with the MicroVAX 2000): 8 and 16 MB boards.

- **APOLLO FAMILY**
  DNXRAM (compatible with the DN3000 and DN 3500): 1 and 2 MB boards.

Call or write for an MC2RAM Product Marketing Update, a free catalog, and our Memory Pointers newsletter.

- **Dealer Inquiries Invited.**

Clearpoint Research Corporation, 99 South Street, Hopkinton, MA 01748
1-800-CLEARPT (1-800-253-2778) or 508-435-2000
Reviews

window with all of the library names in alphabetical order. When you click on a name, a 2-inch-square picture of the object appears. You can then copy the object from the library window and paste it into another document; MacDraw II can rescale an object to match the current ruler settings.

A second important feature is layers that work much like acetate overlays. MacDraw II enables you to create, display, hide, rearrange, or print any combination of layers. Although you can draw only on the active layer, you can edit anything you can see on screen. Except for the Paste, Group, and Lock commands and those that change the stacking order, most commands work in the multilayer mode. The Paste command does, however, enable you to place objects copied or cut from other layers into the active layer.

MacDraw II displays color and supports color printing, but it comes with only black-and-white patterns. Creating color patterns using MacDraw's eight basic colors takes some work. If, like me, you were scratching with the kid next to you when your elementary school teacher explained how to mix colors, it can take a few hours to create all the colors that come in a big box of crayons. In addition, color patterns attach to particular documents, so you'll have to store patterns that you want to reuse in Stationery. The only problem with MacDraw II is that it has a limited number of tools and special-effects functions. For example, the program lacks a parallel-line tool, a starburst tool, and a diamond tool. Although you can create a diamond by rotating a square, that's more work than simply drawing a diamond with a tool. Also, you cannot create fountains or shadows in graphic images, nor can you fill text with a pattern or string it along a curved path.

If you need those sorts of effects, you need another package—but then you'll lose out on MacDraw II's wonderful ease of use. For the general user, MacDraw II is the best graphics program to date. Even architects, graphic artists, and other graphics professionals will find it a good choice for many jobs. It doesn't have everything, but it does a lot with what it has.—Lawrence Stevens

See Where to Buy for contact information.

AppleCD SC

**CD ROM drive.** **Pros:** Easy to install and use. **Cons:** Expensive; no external audio button; no SCSI cables provided. **Company:** Apple Computer. **List price:** $1199. **Requires:** 1MB; SCSI cables; SCSI terminator.

It's a disk drive. It's a stereo component. No, it's both—it's the AppleCD SC. The AppleCD SC compact disk read-only memory (CD ROM) drive marks Apple's first step into the world of optical memory. Like all such drives, the AppleCD SC uses lasers to read information from prerecorded, unerasable disks that look exactly like audio compact disks (CDs). The only difference between the two types of disks is that CD ROM disks can contain applications, graphics, animation, and sound (both computer-generated and digital audio), whereas an audio CD holds only digital audio sound.

**Get Ready for Optical**
The AppleCD SC is as easy to install as any SCSI hard drive, but you'll need to buy SCSI cables and a terminator. You must also add an INIT to the System so that it recognizes the disks and drive (Apple provides an Installer script to do this). If you want to use the AppleCD SC, you must use Font/DA Mover to install a DA called CD Remote.

Before inserting a CD ROM disk or CD in the AppleCD SC, you must put the disk into a plastic case that acts as a protective cartridge. One case comes with the drive, but you may want to buy more if you plan to swap disks often.

To insert the disk, just pop the case into the slot in the front of the drive. The CD ROM disk then appears on the desktop as a special CD ROM icon. To eject a disk, you either drag its icon to the trash, or choose Eject from the Finder menu (I couldn't find a keyboard command to eject it, though).

A CD ROM acts just like a write-protected floppy and performs in about the same way: You open applications on the CD ROM by double-clicking on them. (Of course you must save the newly created files to a floppy or a hard disk.) You can also copy applications or files by dragging them to a regular drive. Like CD ROM drives in general, the AppleCD SC is slow—especially when it has to search around blocks on the disk to find the information you want. For example, the performance lag is very noticeable when you use the Find File DA to search the CD ROM.

**Music to Your Ears**
Because the AppleCD SC uses basically the same internal components as audio CD players, you can actually listen to CDs with the drive. You can plug headphones into a minijack located on the front panel of the drive; the same minijack lets you attach a set of battery-powered speakers to the AppleCD SC. Or you can attach the drive to a stereo system via two standard RCA jacks in the back of the drive. Doing this, however, requires either a long SCSI cable or a pair of very long RCA cables because AppleCD SC audio CD functions are completely controlled by Apple's CD Remote DA. There is no external play button on the drive; the Mac must be on for you to play a CD. Apple has wisely put a volume knob on the drive's front panel.

An inserted CD does not appear on the desktop like a CD ROM. Instead, tracks (continues)
FileMaker II displays all the traits you look for in a great manager.

What do you look for in a great manager?

The ability to make your entire operation run smoother, faster, better is a must. You could use instant total recall. Plus the talent to make managing complex tasks incredibly easy.

A real team player. With great presentation skills. And a proven performer with impeccable references.

All for less than $75K, a window office and a company Porsche.

Because FileMaker II™ is the one database manager that does everything you really want a database to do.

FileMaker II™ was formerly marketed as FileMaker® Plus. For FileMaker II™ or FileMaker® Plus upgrade information, call 800-544-8554.

© 1988 Claris Corporation. Claris is a trademark of Claris Corporation. FileMaker is a registered trademark of Claris Corporation. Macintosh™ is a registered trademark of Apple Computer, Inc. Radius is a registered trademark of Radius Corporation. For more information in Canada, call 800-668-8948.
appear in the CD Remote DA. The DA, which is very well designed, includes almost all the functions you’d see on a regular CD player. You can jump from track to track, fast forward or fast reverse through tracks, shuffle tracks, and set beginning and end markers to play specific sections (see “Strike Up the Band”).

The AppleCD SC is easy to set up and use, and it seems very reliable. However, it is by no means a replacement for a hard disk, because you can’t write information to CD ROM disks. If you need a drive for CD ROM disks, you should definitely consider buying the AppleCD SC. Unfortunately, there’s one problem: without the exception of clip art, public domain software, and some vertical applications like medical databases, there just aren’t that many CD ROM disks available for the Mac yet. In addition, CD ROM disks can be expensive up front. Current prices for disks range from $99 for single disks to several thousand dollars for yearly updated subscriptions.

I expect this situation to change next year. CD ROM technology has tremendous potential, especially for distribution of information; it’s nice to see Apple taking the lead in this type of advanced storage technology. But until more CD ROM disks are published, $1199 is a lot of money to spend for an audio CD player that only works when the Mac is on.— Brita Meng

See Where to Buy for contact information.

**Super 3D 1.0**

*Three-dimensional drawing program.*

**Pros:** Intuitive interface for a 3-D program; lots of tools and options. **Cons:** Redrawing is slow. **Company:** Silicon Beach Software. **List price:** $295. **Requires:** 512KE; hard disk recommended.

For tasks that involve designing on paper, programs like MacPaint, MacDraw, and SuperPaint (and their advanced CAD cousins) have automated and streamlined drawing. For many design problems, though, there’s nothing building a three-dimensional model to really help visualize the final design. With Super 3D you can create representations of solid objects in a simulated three-dimensional space and get much of the visual, intuitive feel of a model, without sacrificing the speed, simplicity, and flexibility of designing on a computer.

**Electronic Clay**

Representing three-dimensional space on two-dimensional media is a difficult undertaking. Add the complication of creating three-dimensional shapes with a two-dimensional input device (the mouse), and there’s the potential for a really confusing user interface. Super 3D avoids many of those complexities by allowing you to create the outline of a shape using familiar two-dimensional graphic primitives like rectangles, ovals, polygons, lines, and arcs. You can even import a conventional two-dimensional image to use as a template.

Once you’ve created a shape in two dimensions, a variety of tools allow you to rotate, extrude, sweep, and transform the shape into three dimensions. Following an example that Silicon Beach provided, I created a model of a wood screw by making a simple outline of a single thread, then rotating it around the axis of the screw while simultaneously reducing its size and moving it along the desired axis (see “Sweeping Changes”). Though the techniques for successfully creating a model weren’t immediately obvious to me, reading a few pages of the excellent manual clarified the program’s operation.

Super 3D lets you display solid objects (a process called *rendering*) with a variety of options. You can select a gray level for each surface (grays are achieved by dithering black dots and white dots; true grays and colors won’t be supported until Silicon Beach releases Super 3D Enhanced, supposedly by the time you read this). You can choose the position and intensity of up to four light sources. Super 3D then automatically creates highlights and shadows, giving your models the appearance of depth and solidity. Super 3D can also display models with computer-like, but much faster, wire-frame rendering.

You view the Super 3D model space through a simulated camera that can be rotated, zoomed, dollied (moved toward or away from a model), and placed at any coordinate in three-dimensional space. You can quickly move the camera to one of several preset views (Front, Back, Top, Bottom, Left, Right, or Home) in case you get lost in your three-dimensional universe. Another viewing option simultaneously displays the front, top, and side views in the same window as your selected view.

Only 11 primitives are available in Super 3D’s drawing palette, and they’re all two-dimensional. Instead of providing a fixed set of three-dimensional primitives, Super 3D allows you to store shapes in files and import them while you create a model. Once imported, shapes can be modified (continues)

**Sweeping Changes**

Using a single Sweep Surfaces command, you can transform a simple 2-D outline of a single thread (top) into the 3-D body of a left-handed wood screw.
Soon or later your Macintosh is going to crash. And unless your Mac's been backed up, it'll probably take your data with it. That's why you need the TG-4000 high performance tape backup system from Tallgrass. It features the tape format that Apple endorses, QIC-100. We invented it, and now it's the industry standard.

**The Fastest Backup in the Business.**
The TG-4000 backs up your data twice as fast as our closest competitor, with over 40 Mb of fully-formatted space. So you won't waste time rotating diskettes in and out of drives.

**Backup's Never Been So Easy.**
You won't ever have to use the manual. The TG-4000 is icon-interfaced, so you can get the system up and running in no time. From novice to power user, the TG-4000 offers the total flexibility you need and expect from a backup system. Plus, it's compatible with Apple's 40 SC™, AppleShare™, and A/UX™. And since its backup operations are automatic and unattended, you can just set it and forget it.

**Nobody Backs Their Backup System Like Tallgrass. Our Exclusive 3-Year Warranty Proves It.**
Check for yourself. Only Tallgrass has enough confidence to offer a three-year exclusive warranty on their backup system.

**Tallgrass Protects Your Company's Bottom Line, Too.**
The TG-4000 protects your valuable data at a price much lower than you'd expect, and lower than any of our competitors.

**Protect Your Apple Before It Falls.**
Call 1-800-TAL-GRAS or write to:
11100 West 82nd Street, Overland Park, KS 66214

Dealer circle 320 on reader service card
End Users circle 6 on reader service card
and manipulated along with the rest of the model. Silicon Beach provides a library of 23 shapes with Super 3D, along with two model alphabets for creating three-dimensional text as part of the model (text created with Super 3D's text tool is for labeling only and doesn't rotate in three-dimensional space with the model).

Super 3D also allows you to construct models from objects. You create and edit such objects in their own separate window, then include them in a model or another object. Unlike shapes, objects retain a separate identity. You can't group objects with shapes and primitives in a model, and if you edit an object all occurrences of that object will reflect the editing changes. Not only does using objects save memory but it also allows you to edit only component pieces, thus speeding up redraw time.

Making It Move
To help you view and display a model, Super 3D can record an animation sequence (a series of frames showing the model in different phases of motion) and play it back as a high-speed movie of the model at work (see "MacMotion"). Super 3D generates simple animations automatically, or you can move a model manually and take frame snapshots where appropriate. In addition, Super 3D can create complex animations by importing a text file that specifies operations to be performed on objects in the model. Generating an animation text file isn't for the faint of heart, but the process is well documented. Animation text files can be generated manually; with a spreadsheet, or through a programming language (I used HyperTalk).

Though animations can take a great deal of machine time to create, and they consume massive amounts of disk space, they are quite impressive.

The set of commands available in Super 3D is rich and extensive. Keyboard shortcuts abound, and the included quick-reference card is a real time-saver. Intelligent use of hierarchical menus and a short-menu mode helps keep the choices from overwhelming the beginner. There are a couple of annoying but otherwise minor quirks in the interface: you can't click on the titles of radio buttons and check boxes (you must hit the button itself), and Super 3D's implementation of pop-up menus doesn't always conform to Apple's user interface guidelines. One feature that's conspicuously missing is a dimensioning/scaling tool; a coordinates window reports dimensions in pixels, but there's no automatic conversion to a real-world scale.

These problems are minor, however. In general, the interface is superb.

Slow on the Redraw
Though Silicon Beach is to be commended for ensuring that a product as complex as Super 3D is accessible to users of Macintosh Plus and Macintosh SE computers, performance remains a snail in this three-dimensional Garden of Eden. Redrawing a complex model is painfully slow, and redrawing occurs after almost every drawing or rendering change. The company has gone a long way toward alleviating the problem by allowing a mouse click to interrupt redrawing so that another command can be executed immediately; by providing an option that eliminates automatic redrawing, and by allowing you to break down complex models into smaller objects (that redraw more quickly). Still, what would otherwise be an extremely smooth and intuitive interface is often marred by the delay between performing an operation and seeing the results. Running Super 3D on a Mac II helps, though it's remarkable how quickly you can build up to very complex models. Redrawing a single frame of the animation model shown here (see "MacMotion") takes about 6 seconds on a Mac II and about 12 seconds on a Plus.

There's a special thrill to creating realistic, space-filling models directly on a computer. Though modeling in Super 3D demands more patience than drawing with a 2-D graphics program, in many cases the results will easily outweigh the added time and effort. If you've ever felt a desire to reach inside your Mac's screen and play with the objects you've created, Super 3D is for you. —Ron Risley

MacMotion
In this sequence of frames from a text animation, three-dimensional objects materialize one after another in the Macintosh, emerge to swirl around the Mac, then disappear back into the screen.

See Where to Buy for contact information.
Why You Need Cricket Draw

Not For Professionals Only  When you need to create good-looking professional quality graphics you don't have to struggle with a program designed for professional artists. Cricket Draw is the PostScript drawing program for everyone.

Make It Easy  With Cricket Draw, professional effects like tints, shadows, and rotated text are easy. Clear, understandable menus combined with a powerful set of tools help simplify even the most ambitious drawing projects.

Do It In Color  Work in color, even on a black and white Macintosh! And with Cricket Device Drivers you can produce dazzling color hard copy with a variety of popular non-PostScript devices.

From The First Family of Graphics  Depend on the Cricket Software Family for all of your graphic needs—Cricket Presents, Cricket Draw, Cricket Paint, Cricket Graph, Cricket Pict-O-Graph, and Cricket Device Drivers.
PC Viewer Model
PCV 6448C+2

LCD projector and interface. Pros: Slide shows with special effects can be displayed by remote control without computer; compatible with a variety of computers. Cons: Requires fine-tuning and a cool projector for optimal image. Shows can’t be saved outside projection unit; complete package is expensive. Company: In Focus Systems. List price: Projection unit $2795, Mac Plus.SE interface $219; Mac II interface $199; carrying case $69.95. Requires: SCISI interface.

Because they’re built around liquid crystal display (LCD) plates, the same kind found in laptop computers, panels that display computer screens via overhead transparency projectors are compact, lightweight, and eminently portable. But while a 4-pound flat-panel display might be easy to tote, it’s no small load when combined with a 20-pound Macintosh. The latest PC Viewer from In Focus Systems allows you to leave the Mac home but take your presentation with you in the viewer. The PCV 6448C+2 includes a megabyte of CMOS RAM, which can be used to capture screens from a computer and arrange them into shows. With the PC Viewer, you can display presentations automatically or manually, as often as you like.

LCD Details
Optically, the PCV 6448C+2 is identical to the less expensive model 6448AV—that is, it has high contrast and a crisp, clear display (see Reviews, August 1988). Both units are built around a super twist LCD plate that displays output from a wide variety of computers, including the complete line of Macintoshes as well as IBM PCs and compatibles. The Mac needs a special display adapter to provide a video signal that the PC Viewer can display. Installation of the adapter is simple and straightforward.

The standard 512-by-342-pixel Macintosh screen doesn’t fill the whole 640-by-80 LCD display, so In Focus provides a removable frame to mask the extraneous light. The black-on-white Mac screen image is projected as blue on yellow (or yellow on blue); Mac II colors and gray scales can’t be displayed. When the controls are adjusted properly and viewing conditions are optimal, the PC Viewer produces a reasonably high-contrast, easy-to-read image. But finding the proper settings requires practice and patience. If the sync control isn’t set properly, parts of the image flutter. Contrast often drifts as a projector warms up, making text difficult to read. You can adjust the viewer to correct the drift, but if the projector warms up too much, no amount of adjustment will make the screen readable. Most modern projectors stay cool enough to work with the viewer; older projectors with 300-watt (or higher) bulbs don’t.

You Can Take It with You
When not displaying a live copy of a computer screen, the PC Viewer presents a series of menus across the top of its screen for controlling its memory. These work much like Macintosh pop-up menus, except that you control them with an 18-button infrared remote device rather than a mouse. It’s easy to capture screens, organize them into slide shows, rearrange and edit the shows, and customize the transitions between slides. Menu commands allow you to control the delay and dissolve between slides. It’s possible, albeit a little tedious, to create professional-looking shows, complete with random dissolves, window shade effects, and even one-frame-per-second “animation.” The PC Viewer’s user interface is less intuitive than Mac users might like, but it’s fairly straightforward once you play with it for a while.

The PC Viewer can store between 60 and 120 screens in up to ten shows. Currently, however, there’s no way to store shows outside of the unit. The addition of a device for off-loading shows would make the 6448C+2 much more practical—especially in situations that require a wide variety of presentations. In the current version, the high-priced PC Viewer is probably worthwhile only for those people who value portability over flexibility.—George Beekman

See Where to Buy for contact information.

Extend 1.05


Effective simulation tools are valuable for decision support in complex business, science, and engineering systems. Extend is one of a growing number of programs that enable Macintosh users to construct and run sophisticated simulations that required powerful mainframes just a few years ago. STELLA, for example, offers an array of high-level modeling tools, and Simul (see Reviews, Macworld, July 1988) provides unique animated simulations for mechanical models. Extend will probably appeal to

(continues)
There's No Reason To Look Beyond

PC TOOLS
For The Macintosh

Data Recovery • Fast Hard Disk Backup • Disk Management

Now the world's best-selling utilities are available for the Mac. From the people who brought you Copy II Mac comes a collection of utilities that gives you everything you need to keep your data safe and secure. Only PC Tools™ Deluxe delivers all this for just $79:

• HARD DISK BACKUP
  Fast and reliable, backs up your data to disks or tape and is completely compatible with MultiFinder. • DISK OPTIMIZER
  Unfragments your files and improves hard disk performance. • DISK RECOVERY
  Recover data from magnetically damaged diskettes and hard drives. • The best UNDELETE available. Instead of merely guessing, it recovers data even from fragmented files. • SMART LOCATE D.A.
  Find files fast. Search by filename or up to three key phrases. Transfer data from the located file into your word processor or spreadsheet. • FILE ENCRYPTION AND COMPRESSION
  Encrypt and shrink individual files and entire folders. Save disk space and keep your sensitive data secure. • TRACK/BLOCK EDITOR
  Examine virtually any disk and even repair bad blocks.

Before you buy any other utility program for your Mac, take a look at PC Tools Deluxe. Like hundreds of thousands of users, you'll find there's no reason to look any further. For the dealer nearest you, or to order direct, call (503) 690-8090, M–F, 8 a.m.–5 p.m. (West Coast time).

PC Tools is a trademark of Central Point Software. All other product names are trademarks of their manufacturers.

Circle 357 on reader service card

Central Point Software
INCORPORATED
15220 N.W. Greenbriar Pkwy. #200
Beaverton, Oregon 97006
(503) 690-8090
people who need to construct complex models that require programming flexibility and low-level control over model details.

Building a Simulation

Whether you use Extend to simulate an electronic circuit, stock market performance, or the populations of competing organisms, you construct your simulation model out of a set of connected blocks. Each block is represented by an icon that you can design with Extend’s built-in tools or import from a graphics program. The drawing tools are limited but sufficient for most modeling purposes.

Each block icon has connectors through which it can communicate with other blocks in the model. Creation of communication paths between blocks is simple and intuitive. A block may also accept input directly, via its own dialog box. Extend features dialog box construction tools like HyperCard’s, which make it easy to customize messages, buttons, and other interface details.

Unfortunately, completing a simulation may not be so easy. Beneath each icon lurks a script that tells the block what to do, using information it receives from other blocks and from user input. It’s possible, in principle, to create models without writing scripts, provided you can build the models out of standard blocks included with the program or written by somebody else. But the block libraries that come with the program are limited to just a few examples from each discipline, so most model builders will have to create at least some of their own blocks, including the underlying scripts.

Extend’s scripting language, ModL, is similar to C, and C code may often be imported and used in blocks. But even proficient C programmers may have to master some object-oriented programming concepts before writing ModL scripts. While object-oriented programming is not particularly difficult to understand (thousands of novice HyperTalk hackers do it regularly), it sometimes requires conceptual reeducation for traditional C, Pascal, or BASIC programmers. Unfortunately, much of the manual fails to give sufficient information for either beginners or power users. If you’re comfortable with C, object-oriented programming, and the principles of system simulation, you may find the Extend Manual’s 30 pages on ModL adequate. Otherwise, you won’t.

Running a Simulation

Running a completed simulation can be entertaining and instructive. Extend includes a plotter block that receives input from other blocks and displays changes in any or all of those values in a line graph (see “Plot That Block”). You can easily change system parameters to see differences in a simulation’s outcome and to modify display variables and other graphic output details.

ModL scripts are compiled, so Extend performs most simulations relatively quickly—faster than in Simul’s standard interpreted mode but slower than in Simul’s Playback option. You can run long, computation-intensive simulations in the background under MultiFinder.

Playing with Blocks

The current version of Extend comes with functions for engineering (Fast Fourier Transform, math, trig, integration), business (present value, future value, interest rate), discrete event simulation (basic queue operations, random, statistical), and plotting. You can incorporate these low-level primitives into an endless variety of high-level simulation tools. Other important mathematical functions have not been included in this release, so users who need functions beyond those found on a good scientific/business calculator should be prepared to create their own custom blocks.

Fortunately, Extend’s library facility enables model builders to reuse blocks in other simulations. Imagine That sees the product as continually maturing, and the developer incorporates new functions and new block libraries at users’ request. A planned newsletter will allow Extend users to exchange blocks and scripts in the same way that HyperCard users exchange stacks.

Who Needs Extend?

Extend is not likely to replace Excel as the favored crystal ball in Macintosh business circles, since its interface lacks the familiarity of the classic spreadsheet and calls for more programming ability. But for scientists and engineers who take most of their “what-if” questions to mainframes, Extend provides an attractive desktop alternative. Although competing simulation systems are easier to use in basic situations, Extend’s powerful programming language gives it an edge over STELLA for nonstandard models, and Simul can’t match Extend’s support for discrete event simulations. With a promise of large libraries of building blocks, Extend is particularly attractive to anyone who needs maximum flexibility and who isn’t afraid to work for it. —George Beekman and Michael Johnson

See Where to Buy for contact information.

MacTell 3.4

Terminal emulator. Pros: Unique in Minitel emulation; has a very strong host mode; excellent macro language. Cons: Can’t take advantage of more than 1MB of RAM; weak manual; requires insertion of master disk once every 35 times the program is launched. Company: Baseline. List price: $97. Requires: 512K.

MacTell is a telecommunications program with two distinct personalities. It operates well as a standard ASCII terminal program, with most of the features that we’ve come to take for granted. But MacTell can also operate in a completely different—and unique—mode, turning a Mac into a Minitel videotex terminal.

Minitel is a French videotex service for some 3 million users. Operated by the French phone company, Minitel offers more than 6000 services and online products, ranging from banking services to news, en-

(continues)
ClickArt

ClickArt EPS Illustrations
Professional PostScript® Art for Macintosh® or PC
Picture this: Computer art crisp and clear enough for even the most discriminating designers. Introducing ClickArt EPS Illustrations, the new standard for high-quality computer art.
ClickArt EPS Illustrations is a portfolio of PostScript® art created by professional artists. PostScript allows EPS Illustrations to be resized to any dimension without loss of detail or sharpness. And, the resolution of the images is limited only to the resolution of your PostScript printer. That means that EPS images print at 300 dots per inch on your LaserWriter or Personal Page Printer, and at 2,540 dpi on your Linotronic™ 300!
EPS Illustrations are ideal for use in publications demanding only the highest quality art. Images include business-oriented art, maps, food & drink, travel & transportation, maps, sports, musical instruments, seasons, states, people & lifestyles, and more.
Macintosh and IBM PC versions: $129.95. Must be used with applications that read Encapsulated PostScript and printers that output PostScript.

ClickArt Business Images
Serious Business Art
Guaranteed to give your business reports that professionally designed look. Includes presentation art, office equipment, industrial & communication images, people, states, map symbols, flags, food, arrows, logos, and more.

Macintosh $49.95  PC $69.95

ClickArt Personal Graphics
Personal Images
Add that personal touch to your printed materials. Includes cars, famous people, cartoons, animals, sports, statues, billboards, Americana, dingbats, borders, arrows, political figures, Skylines, and more.

Macintosh $49.95  PC $69.95

ClickArt Publications
Published Results
Give your publications a professional flair. Includes borders, cartoons, maps, illustrated headlines, dingbats, desk items, seasons, street signs, sports, MC and Visa symbols, decorative alphabets, and more.

Macintosh $49.95  PC $69.95

ClickArt Holidays
Seasonal Symbols
Lend seasonal flair to your announcements, newsletters, and party invitations. Includes art for Christmas, Hanukkah, Thanksgiving, Easter, Valentine's Day, New Year's Eve and many other festive occasions.

Macintosh $49.95  PC $69.95

ClickArt Christian Images
Heavenly Art
Enlighten your Christian-oriented publications. Includes crosses, Christian lifestyles, services & ceremonies, images of Jesus, churches, old testament, stations, religious holidays, and more. For the wide range of Christian denominations.

Macintosh $59.95  PC $69.95

And now when you buy ClickArt you get the best of both worlds: ClickArt ships in Stackware and MacPaint files! To receive your Free ClickArt Catalog, filled with image portfolios, font collections, and graphic accessories for your personal computer, contact:
T/Maker Company • 1390 Villa Street • Mountain View, CA 94041 • 415-962-0195
© 1988 T/Maker Company. All rights reserved. T/Maker and ClickArt are registered trademarks of T/Maker Company. All other products are trademarks of their respective holders. Circle 190 on reader service card

Send for FREE Catalog!
reviews

Online the French Way
With its unique keys, such as Index, Guide, and Send, Minitel mode gives you an on-screen representation of a Minitel terminal. You can assign all of the screen's Minitel keys to keys on the Mac keyboard, or you can use the mouse to click on the screen keys. Minitel operation is inherently somewhat slow. It connects to Baseline at 1200 and 2400 baud, but the faster speed makes little difference in drawing the screen. Another drawback to the Minitel system is its reliance on pages; you must view each page as a whole, and you cannot scroll backward to see what's gone before.

MacTell will save a session in memory and play it back using the Display Pages function after you've disconnected. You can also print sessions, or save them to disk. While you're online, MacTell stores the session in a RAM buffer; unfortunately, MacTell seems unable to recognize when you have more than 1MB of RAM. On my 4MB machine, the program reported only 198K of buffer space free when running under MultiFinder with no other programs loaded. With MultiFinder switched off, the program allocated 398K to the buffer.

MacTell's ASCII terminal mode provides the familiar large terminal window and supports the expected features of most terminal programs. Included are Xmodem transfers (including 1K blocks and MacBinary), Kermit protocol file transfers, text capture and printing, and ten programmable function keys. MacTell handles communication speeds from 300 to 57,600 baud, and can emulate VT52, IBM 3101, and Televideo terminals, among others. An on-screen clock shows the current time, and switches to display the elapsed time online. Although MacTell has an automatic dialing feature, I was unable to make it work with my Prometheus Promodem 2400. This only occurs with the old version (1.0) ROM—current models of the modem have no problems autodialing with MacTell.

MacTell has a robust macro facility. You save macros as files; you can configure them to run automatically when you start MacTell, or you can double-click them from the Finder. Creating macros is easy and involves little typing. You build macros by choosing commands from menus, if a command requires information (such as a text string you want the program to send), MacTell presents a dialog box that you fill in. Virtually all of MacTell's commands and functions are available to the macro creator, and more than one macro can be chained to perform complex automated sequences. There is also a Learn mode that watches a session and creates a macro on the fly. Although MacTell's macro functions resemble the AutoPilots in Smartcom II, MacTell adds the ability to use subroutines in macros, gives you control over speed and communications settings, and has several other features that make its macros more complete than Smartcom II's.

The slim MacTell manual lacks an index and never explains what Minitel is. Considering that most Americans are not familiar with the Minitel system, this is an unfortunate oversight.

An Almost Perfect Host
Another MacTell feature shared by only a few other programs is an outstanding host mode, which turns MacTell into a mini-BBS. After activating this File Server feature (a somewhat misleading name for the host mode, as the term file server is generally used in the context of a local area network), MacTell sets up your modem to receive a call. Callers make menu choices to upload and download files to and from your computer, get a listing of available files, leave messages for you, or read text files while connected. There's even a command that sends a caller's message to your printer. You choose which folders on your hard disk are accessible, and you can lock out unwanted callers with a password. The File Server mode alone is worth the program's price if you want to provide a simple mini-BBS to selected callers without the hassle of setting up a large system like Red Ryder Host. Although MacTell is clearly not as powerful as these other programs, it would suffice for many users.

MacTell is a very good value if you need to provide a low-cost file-transfer facility, and it's the only game in town for connecting to a Minitel service. The program's excellent macro language and host mode rank it with such fine programs as Smartcom II, MicroPhone, and Red Ryder. MacTell's low cost and wide range of functions make it well worth considering if you're shopping for a telecommunications program.—Tom Negriño

See Where to Buy for contact information.
Now Dac-Easy Light is available for the Macintosh! Ideal for the Mac environment, Dac-Easy Light is fun, easy to use software for your personal or office accounting. It's more than a check-writer or a personal finance manager. Light is a less filling complete system that requires no accounting knowledge whatsoever!

Simply, select the predefined Home chart of accounts, and immediately you're set for writing checks, posting credit card receipts, entering bank deposits and budgeting for the entire year. Debits and credits are transparent to you since Light does the work. Write a check and Light's intuitive pull-down menu structure takes you step by step from entering the amount to which category you expense. Valuable information such as personal net worth statements are a snap, and the Variance Report gives you a bottom line for each month on expenditures versus budget.

For the sole proprietor, Light functions as a complete General Ledger system with invoicing and statement capabilities. The predefined Office chart of accounts lets you instantly begin invoicing customers, tracking net worth, printing balance sheets and budgeting for the year. All with the ease synonymous to the Dac-Easy name. Plus, a line of forms including checks, invoices and statements are available with a sharp, professional design.

If you're looking for an accounting system for the home, office or both, the pick is easy. Dac-Easy Light. Fast installation, a bushel of extra features such as context-sensitive help and password protection, and the first complete "light" accounting program for the Macintosh home and office.

See your Local Dealer or Call 1-800-992-7779 for more details. Or use the coupon below to order.
TeleNode 1.0

Network communications hardware and software. Pros: No programming for supported modems; compatible with several network applications including AppleShare, Microsoft Mail, Timbuktu, TOPS, and InBox; provides necessary nonstandard cables; password protection for local network. Cons: Programming required for non-supported modems; difficult to cancel connect/disconnect procedure; awkward disconnect procedure. Company: DataSpace Corporation. List price: $695. Requires: 1MB; LocalTalk network, two modems, one Mac-to-modem cable.

DataSpace’s TeleNode enables dial-in (remote) access to a LocalTalk network. With it, a stand-alone Mac and modem can use E-mail and file servers running on a local office network from the comforts of home, a field office, or even a hotel room.

Like other remote-access products (Shiva’s NetSerial and Solana’s R-Server, for example), TeleNode has two parts. The first, a hardware device, connects a modem to the LocalTalk network. The second is an asynchronous AppleTalk driver, called RemoteTalk, that replaces the built-in AppleTalk driver in the remote Mac. The remote Mac must use System 3.2 and Finder 5.3 or later.

Who’s Calling Whom?

This dialog box appears when you click on the RemoteTalk icon. You can set up RemoteTalk to remember the phone numbers of several dial-in networks. Just highlight the one you want and click Connect.

Network Attachments

DataSpace includes special Mac-to-TeleNode and modem-to-TeleNode cables to configure the hardware, which makes setting up the TeleNode on a network relatively straightforward.

The TeleNode needs a .dmd (DataSpace modem description) file to establish modem connections. But because various modems do things differently (especially control protocols), each type of modem needs a .dmd file for Hayes SmartModem 1200 and 2400 (and true Hayes compatibles), Hayes V-Series 2400 and 9600, Telebit’s Trailblazer, and US Robotics’ 2400 modems. If you plan to use one of these modems, you’re home free. Just select the file you need.

On the other hand, if you’re not using one of these modems, you’ve got some work ahead of you. Namely, you may be stuck creating your own .dmd file with DataSpace’s .dmd Compiler.

Writing a .dmd file is not something I’d recommend doing unless you’re comfortable with programming and very familiar with modems. DataSpace does say that it’s creating more .dmd files for you, and see if it has written one for your modem before diving into the compiler.

After you’ve selected a .dmd file, disconnect the TeleNode from your Mac and connect it to your LocalTalk network and modem. DataSpace provides the modem-to-TeleNode cable. If you don’t turn the TeleNode on before the modem, the modem won’t get programmed correctly and the network connection won’t work.

Remote Connections

You install the RemoteTalk AppleTalk driver on your Mac with Apple’s Installer. You also must select a .dmd file for RemoteTalk to use; the .dmd file RemoteTalk uses is the same one needed to set up the TeleNode. Again, if DataSpace doesn’t have a .dmd file for your modem—or if you haven’t already written one for the same type of modem—you’ll have to write one. To dial the network, open the Control Panel, select the Network option, and click on RemoteTalk.

I did have some problems with RemoteTalk. I was unable to disconnect by just clicking on the AppleTalk Built-in icon. This seemed slightly awkward to me. In addition, clicking on the Built-in icon brings up an “Are you sure you want to change the AppleTalk connection?” dialog box, even though TeleNode has no intention of disconnecting. To disconnect, you must click on the RemoteTalk icon again and select Disconnect from the RemoteTalk dialog box.

Other problems are more significant. First, you don’t have much of an opportunity to cancel the dial-in or disconnect procedure. A “Type # to cancel” message appears for a split second during the sequence, after which it disappears. When I did try to cancel the dialing, either RemoteTalk kept on dialing, or my Mac crashed and froze.

Second, should your Mac crash while you’re connected, RemoteTalk won’t automatically try to redial to the network when you restart. In fact, the dialog box still thinks you’re connected. To manually redial, you have to disconnect first. Oddly enough, if you choose Restart or Shut Down from the Finder or MultiFinder without disconnecting, RemoteTalk maintains the connection.

While I’d like to see DataSpace clean up some of these RemoteTalk inconsistencies, the TeleNode did work like a champion once I was connected. It’s very stable. I tested the TeleNode with AppleShare, Microsoft Mail, and Farallon’s Timbuktu, and had no problems with any of them using various Hayes modems. DataSpace’s documentation is well organized, and the company does offer excellent toll-free phone support. At $695, the TeleNode offers a pretty good deal for your money. I’d just advise that you check on the availability of .dmd files for your modems before you buy.—Brita Meng

See Where to Buy for contact information.
Springboard Publisher™ makes desktop publishing so easy, you'll choose it over word processing for just about everything you do, every day.
SupraModem 2400

2400-baud modem. Pros: Small, cheap; Hayes-compatible; faster than 1200-baud modems. Cons: Tiny speaker. Company: Supra Corporation. List price: $179.95; $239.95 with Mac-compatible cable and software (SupraModem 2400MC).

The SupraModem 2400 is a 2400-baud, Hayes-compatible external modem that hooks up to your Macintosh (or any other computer) via a serial cable. It comes with systems running at 300, 600, 1200, or 2400 baud. It works just fine. The End.

Ugh, wait a second, Bruce. I asked for a 900-word review. You still owe me about 830. What gives?

Well, I’m not sure what more you can say about a modem. It’s probably one of the most undemanding, uncomplicated, and unexciting computer appliances around—provided it is “Hayes-compatible” and actually works. You just plug it in—to a power outlet, to a phone line, and to a computer—and run whatever communications software you have. I’ve used the SupraModem 2400 with six different tele­com programs on two different computers (a Mac II and a Compaq 286). It works just fine. The End.

But how does it compare to other modems? What makes it different, unique even?

That’s just the point: modems don’t want to be unique. A modem that is not completely compatible with the Hayes Smartmodem series is just asking for trouble. There may be some way in which the SupraModem 2400 isn’t Hayes-compatible, but I sure haven’t been able to find it. In fact, with one software package, it worked better than my old trusty Hayes Smartmodem 1200.

As for how it compares to other modems out there . . . well, send me some, and I’ll let you know. All I know is that it works just fine. The End.

But what about the 2400-baud stuff? What difference does that make?

Well, without getting too technical, the baud rate of a modem is the maximum speed at which it can send and receive information. Divide the baud rate by 10, and you get a rough estimate of how many characters can be sent each second. The actual speed of transmission depends on the maximum baud rate of the modems at each end of the phone line.

All this makes the SupraModem 2400 roughly twice as fast as a 1200-baud modem—provided the system on the other end also supports 2400 baud. Unfortunately, not all bulletin boards and conferencing systems support 2400 baud, and the commercial ones that do usually charge more for calling at 2400 baud. Top of that, there are fewer 2400-baud access numbers for services such as Tymnet and TeDeNet, which means that you may have a toll phone call on top of higher conferencing rates. Remind me to send you an expense report.

Of course, a higher baud rate may not really save that much time or money. When I call into BIX or CompuServe, I spend most of my time reading and composing messages while charges pile up. On the other hand, the SupraModem lets me download (or upload) files nearly twice as fast—unless, of course, the conferencing system is bogged down, in which case I’m probably better off calling at 1200 baud.

But you can’t blame a modem for a bogged-down conferencing line. The SupraModem just does what it’s asked to do. And it does it well. The End.

But is there any reason why someone might buy this over, say, a Hayes Smartmodem 2400?

Yeah: price. I don’t know what the current list is for a Hayes Smartmodem 2400, but I suspect it’s probably about double that of the SupraModem 2400. (It’s $599.

—Ed. There are other inexpensive 2400-baud modems out there, but I haven’t used them. I’ve used this one.

Supra will probably want to sell you the SupraModem 2400MC, which comes with the necessary Mac-to-modem cable and some kind of communications software, and costs $60 more. My advice is to get the regular SupraModem 2400, buy a cable from a dealer, and order the telecom package of your choice by mail: Micro­Phone, Red Ryder, or whatever. There are even some good public domain and shareware packages out there; check around.

What does the modem look like?

Sort of like a shrunken, slightly mutated Hayes Smartmodem. The power switch is in the front (another advantage over the Hayes), the indicator lights are in the same order as on the Hayes but are just letters that light up, and the speaker sounds cheap—but what do you expect?

The innards are pretty nice, though. It’s got nonvolatile RAM to store your configuration, even when the power’s off. It can even store a phone number, which it can dial with a single command. Of course, it supports all the Hayes commands and registers. And it has some built-in diagnostic tests, too.

Is there any technical info that readers might want?

Yeah. It’ll work with the following asynchronous modem types:

- CCITT V.21 at 300 bps (bits per second)
- CCITT V.22 at 600 and 1200 bps
- CCITT V.22 bis at 1200 and 2400 bps
- Bell 103 at 500 bps
- Bell 212A at 1200 bps
- Bell 212A at 2400 bps

Also, it has a 40-character command buffer, and nonvolatile RAM for the user configuration.

So, your bottom-line assessment is . . .?

It’s inexpensive, Hayes-compatible, and works fine. Just like I said. —Bruce Webster

See Where to Buy for contact information.
BOOST THE CALIBER OF YOUR PRESENTATIONS.

Most slide presentations don't get banged out until the 11th hour.

With Montage FR1, yours can come together faster than ever.

The Montage FR1 features High Definition Digital Imaging technology. Translated, Montage FR1 creates brilliant, fully saturated slides with 16 million colors, in 2-3 minutes. That's much faster than other slidemakers.

You can use Apple Macintoshes, IBM's or compatibles, because Montage FR1 supports them all. At the same time. And Montage FR1 supports far more graphics and presentation software packages than any other system.

Giving you the firepower to create high impact presentations.

We've planned your investment's future, too, with an arsenal of Montage Presentation Series upgrades coming soon. They'll let you generate color overheads. Let you print color hardcopies. Work with PostScript software applications. All networked from your own desk.

It's the highest caliber color output in town. For presentations that are right on the money.

Call for free facts kit with sample slide: 800-255-4574, ext. 355. In California, (714) 545-2774.

Montage and High Definition Digital Imaging are trademarks of Presentation Technologies, Inc. All other brand or product names are trademarks of their product holders.

©1988 Presentation Technologies, Inc.

PRESENTATION TECHNOLOGIES
743 N. Pastoria Avenue, Sunnyvale, CA 94086

Visit us at Booth C824 at COMDEX in Caesar's Hotel

Circle 434 on reader service card
Kurta IS/ADB, Penworks 1.0

Tablet input system for use with Apple Desktop Bus (ADB). Pros: Connects to ADB, doesn't tie up serial port, well constructed; lifetime electronics warranty. Cons: Penworks software has bugs and needs improvement; poor documentation. Company: Kurta Corporation. List price: Kurta IS/ADB with Penworks, an ADB cable, a brief 14 pages of inadequate documentation, plus a separate sheet describing the Penworks driver installation.

The tablet itself blends in very well with the Mac from an appearance standpoint and has a ribbed design similar to that found on standard Mac cases. The box slopes at a comfortable angle of approximately 9 degrees and has a working area 8½ inches high and 11 inches wide, with a clear plastic overlay; the tablet measures 13½ by 12 by 2 inches overall.

The pen pointers are lightweight and sturdy. The corded pen is about the same size as a mechanical drafting pencil. The cordless version has a larger diameter (about ¼ inch) because it must accommodate three batteries.

The four-button cursor has a clear plastic target with built-in cross hairs and is especially useful in accurately locating points on items to be digitized.

Hardware installation is as simple as connecting a keyboard to the Mac's ADB. The back of the tablet has three connectors, one for the stylus cable, the other two for daisy-chaining to the ADB. Kurta warns that because of ADB power supply limitations, the tablet should be the only device besides a keyboard on the ADB, a warning that I found to be almost correct. If you insert the Kurta tablet between the Mac and other ADB devices such as the keyboard, it can cause problems other than excessive power drain. For example, my Mac II power-on switch (located on the keyboard) wouldn't operate in this configuration, nor would an ADB software protection module used by one European CAD developer. (In Europe, copy protection is commonly accomplished by requiring the use of a piece of proprietary hardware. Without this "magic box," you can't run the software.)

When I juggled the cable connections around and made the tablet the last device in the ADB daisy chain, all the problems disappeared. The Apple mouse worked just fine when connected on either side of the tablet.

Installing the Penworks software is painless, requiring only the running of a script under the usual Apple Install application. This places the driver in the System Folder. Then you restart the Mac and go on your merry way. After you reboot the Mac, the mouse still works in the usual way and you can still adjust it from the Control Panel. The tablet is ready to go and requires no Control Panel settings.

Problems

Some problems surfaced, however. My Mac II has multiple monitors. I quickly discovered that the tablet only works on the start-up screen; I couldn't move the cursor to another screen. Kurta is already aware of this, and the documentation instructs you

(continues)

Tablet Input System
The Kurta tablet is ideal for drawing irregular lines and arcs. Here a paper drawing has been placed on the tablet to be traced and transmitted to the Macintosh screen.
Put 100MB into a Macintosh SE...

and keep both floppy drives.

25ms average access time, low power consumption, 100g non-operating shock rating, easy to install and quiet operation.

40 MB Subsystems also available.

CMS offers a complete family of fast internal and external hard disk and tape backup subsystems for Macintosh computers.

Call today for the name and number of your nearest CMS dealer.
to call Kurta under these circumstances. In my case, the company responded by mailing me a new disk containing a "fix," which supposedly handles multiple screens. According to one of its programmers, Kurta is still enhancing the Penworks software.

The new disk enabled me to use multiple screens on my Mac II, but with severe limitations when using the setup facilities in the Monitors portion of the Apple Control Panel. If the start-up screen (the one with the menu bar) is the rightmost or lowest screen on the Control Panel diagram, the program assigns the full tablet area to just that one screen. If the start-up screen is leftmost on the Control Panel, the tablet area gets subdivided so that one portion is dedicated to the left screen and another portion is dedicated to the right screen. How much of the tablet gets dedicated to any screen is a function of the screen's resolution—the more pixels, the more of the tablet devoted to it—and the total number of screens on the Mac II. While it's good to be able to use the tablet with multiple screens, there are also problems, such as being unable to digitize anything that doesn't fit within the area of the tablet now dedicated to a particular screen.

Using alternative pointing devices reveals yet another problem. It is nearly impossible to double-click with the corded stylus. Apparently the software looks for two clicks at exactly the same x-y location; the highly glossy tablet surface makes it nearly impossible to keep the stylus from moving just a hair between clicks. The four-button cursor device fortunately doesn't exhibit this problem.

Do Mice Face Total Extinction?

From a hardware standpoint, the Kurta IS/ADB is excellent. It is well made and its electronic components carry a lifetime warranty. Pointing devices, software, cables, and accessories are warranted for a full year. Connection via the ADB is a big plus. But there is still much room for improvement with the Penworks program. While it didn't corrupt my system files, as the earlier serial port version of Penworks did, there are still some bugs and shortcomings.

Assuming Kurta comes through with the software improvements it's promised, a good hardware product will become even better.—David L. Peltz

See Where to Buy for contact information.

Lunar Rescue 1.0

Arcade-style graphics game. Pros: Rescue strategy makes the game more than just a shoot-'em-up. Cons: Mouse sometimes refuses to drag an icon during cargo loading; game needs more convenient revert function; key disk required.

Company: PCAJ. List price $59.95.
Requires: 512KE.

The premise of Lunar Rescue is that a murderous automated defense network has been installed to protect traffic along canals connecting the Moon's 26 cities. This weaponry and other lunar utilities are serviced by ICE (Independent Computerized Ecosystem), which is in hot water. Its defense network has been sabotaged by antisocial lunatics who have hidden the ICE crystals that control all the cannons, lasers, missiles, and floating mines. This has caused the automatic defense network to go berserk, shooting at everything indiscriminately and threatening to end your career as a free-trading lunar pilot.

"Action Displays" shows the view screen and below it (center) the radar screen and icons representing fuel, weapons, and other information. Guided missiles, lasers, and floating mines are shown attacking as the craft's space cannon destroys a gun turret. The bottom portion shows four open cargo pods with icons in two of them representing oil, robots, animal protein, and other items, plus the craft's empty dump chamber and the contents of a nearby wreck. You can open cargo pods only on the lunar surface, not during flight or combat. You use trading profits to buy weapons, fuel, cloaking devices, and shields for your spacecraft, and you receive additional credits for each cannon, laser, or missile turret you destroy. But there is also a strategic element that creates maddening demands on the player and transcends the tricky task of piloting a lunar cargo vehicle through jagged, unpredictable canyons and volleys of projectiles.

Rescue Strategies

In Lunar Rescue, combat is secondary to the greater task. Cut off from each other, the Moon's 26 cities will perish if you don't move essential goods from city to city. As you supply one city, you learn that two other cities are dying. Success in Lunar Rescue requires that you make sharp trading decisions based on developing commodities needs, weigh the challenges involved in traveling to one destination versus another, and become skillful enough as a pilot to fly an overloaded cargo craft through combat situations and still search out the missing ICE crystals. When you have restored five of the seven missing crystals, the ICE network will be back in business and you can retire from cargo piloting as a hero.

You start a game of Lunar Rescue at Data Central, the point of arrival at any new city. The main feature of Data Central is a map of the lunar colonies and interconnecting canals. You can get information about any city by clicking on the appropriate map button. Information about the needs of the different cities often determines your next destination.

(continues)
At Sun Remarketing, we offer you a no-risk guarantee. Plain and simple. That means a full refund if you are unhappy with any of our products. For any reason. All you have to do is send the product back to us. Every new, used and out-of-production product we sell comes with this 30-to 90-day money-back warranty. It's the best you'll find anywhere on reconditioned and out-of-production computer products. And some of our products offer even longer guarantees through the manufacturer.

The reason we're so confident in the quality of our products is that we test them thoroughly before we sell them to you. Then we back them up with complete service and support from our skilled technicians.

In fact, as the world's largest independent dealer of reconditioned and out-of-production Apple products, Sun Remarketing is the only company authorized by Apple Computer Inc. to sell and service their out-of-production equipment.

All of this means Apple performance and Apple reliability. Without the Apple price tag.

So if you want great prices with no risk, call Sun Remarketing today. To place your order or receive a complete listing of our products, call 1-800-821-3221.

*Customer responsible for all shipping costs. © 1988 Sun Remarketing Inc. P.O. Box 8159 Logan, Utah 84321, 1-800-821-3221. FAX #801-753-3225.

Circle 186 on reader service card
Trading Strategies

When you select Trade from the Data Central menu in any city, you arrive at Trade Central. The number of credits you have is prominently displayed. Symbols represent different commodities and items. When you click on a commodity, the program displays the amount available plus its sale and purchase prices. However, you need to retain enough credits to purchase a whole new vessel, as well as fuel, weaponry, and cargo, in the likely event of losing the vessel you have. In addition to assuring yourself of enough profit for survival, you must also plan your cargo carefully, carrying only what is essential while leaving pod space for valuable items you salvage from wrecks along the way, and for the missing ICE crystals you hope to find.

Craft Control

Moon-hopping in Lunar Rescue has purposely been kept appropriately simple (other orbital flight simulators are more realistic). The mouse controls the orientation of the spacecraft and fires propulsion rockets, while keyboard commands fire weapons. To shoot, you stop firing the propulsion rocket, take aim by rotating the spacecraft, fire weapons by keyboard command, then rotate the craft to its original orientation for more propulsion. The techniques become instinctive after two or three hours of play.

Flight controls show distances, amount of fuel and munitions remaining, the condition of shields, and a lunar clock ticking off precious hours. The radar screen gives you a wider view of the landscape, so you can anticipate hazards (like sheer cliffs you might run into, or floating space mines drifting into your path) before you see them in the main view window. You may land anywhere you think you can safely.

The spacecraft's flight characteristics differ according to cargo load. Its responsiveness is well programmed, ranging progressively from the dangerous skittishness of a powerful sports car, when cargo pods are empty, to the sloppy sluggishness of an overloaded station wagon when the cargo pods are full and/or rocket engines have been lost. A keyboard command toggles the cargo doors when the craft is on the lunar surface, as shown in the bottom portion of "Action Displays," and you can either load salvaged items or drag icons representing such necessities as fuel, weapons, or spare engines from storage to immediate use. In this way, you can make repairs and refuel during long, hard-fought journeys.

Crash Course

Lunar Rescue has a practice mode for perfecting crash-proof flight and combat. Even after practice runs, most players will suffer numerous crashes; the game would benefit from a Revert procedure to prevent this needless hassle. As it now stands, you must exit the game in which you crashed, open the backup game you have presumably stored, and, for prudence, store another backup game before resuming. Another annoyance is the occasional tendency of the mouse to refuse to move an icon when you are loading cargo, but this glitch is not so bothersome.

Lunar Rescue is commendable as a game with humanitarian goals, its killing being limited to machines. The manual is concise and adequate. Although little is ground-breaking in the game or in its technology-runs-amok theme, Lunar Rescue creates challenges on more than one level and may become addictive for those who crave long-haul, arcade-style action.

—Keith McCandless

See Where to Buy for contact information.

Retriever 1.0


In principle, MultiFinder has made desk accessories almost unnecessary; with 6 megabytes of RAM, you can just load FileMaker or Reflex Plus and always have a database just a few clicks away as you work in other applications. However, since multimegabyte machines are still a minority, a well-designed and compact DA for file handling could be a considerable convenience for people who work mostly with word processors or page-layout programs. Retriever does a great job of providing this convenience, within its not-particularly-restrictive limits. If you need occasional fast access to a variety of simple (nonrelational) files, Retriever could easily become one of your favorite Mac utilities.

Tabling the Motion

Retriever works with simple table-style files. It imports data from HyperCard stacks and from any text file that has tab or comma delimiters (a standard export mode for most databases and spreadsheets). Once data has been imported into Retriever files, you can call it up with a few clicks, sort it, search it, and cut and paste data selections to other applications. Retriever files also export to HyperCard and to tab- or comma-delimited text. A special section of the manual steps through production of mail merge files for Microsoft Word.

Once you have established data files, using Retriever is extremely easy—compared to fancier file managers—since only the most basic functions are supported. A small icon menu gives you six possible choices: Mark/Unmark, Sort, Find, Copy, Add Record, and Help. Believe it or not, all relevant help information for standard use fits comfortably on a single screen. This includes instructions for hiding and displaying columns, editing, and date/time stamping. The Retriever menu itself is mostly used for rearranging columns and managing import and export.

This simplicity may at first make you think that Retriever doesn't offer much for its price. For example, the spreadsheet
Getting Hyper

For flashy effects, data from Retriever files can be popped over to HyperCard (note the import/export buttons at upper-right corner of the card), where graphics and calculated fields are possible.

built into SideKick can mimic most Retriever functions and perform calculations as well. Furthermore, the database in Microsoft Works has more features and can be called up as an always-open window. But Retriever has some built-in conveniences that are quite valuable. You can mark records according to a search criterion for printing or export. You can store long (254-character) text fields and edit them in a dialog-box expanded view. You can hide a selected column of fields with a double-click and then print only the visible fields in a table.

Performance on standard file-manager benchmarks is also respectable. Retriever imports records from text files at 10 to 20 records per second, depending on record length. In a 1000-record file (maximum file size is 32K) searches for individual records took a few seconds, and sorts on numeric and text fields ranged from 30 to 50 seconds. Since the typical Retriever file will probably be a few hundred records, most manipulations will take only a few seconds.

Into the Stacks

Retriever lacks two items Mac users have come to expect from databases: graphics fields and calculated fields (fields whose value is computed from data in other numeric fields). To at least partially remedy this shortcoming, Retriever offers an interface to HyperCard.

The essence of the interface scheme is to provide field compatibility between records in Retriever files and cards in HyperCard stacks (see "Getting Hyper"). Exodus provides a utility for installing import and export buttons on stacks to make the initial images of Retriever files in HyperCard, and Retriever includes three model stacks with matching Retriever files so you can see how it's done. The HyperCard stacks contain examples that show you how to use HyperCard to make bar charts from data in Retriever files, but if you're seriously interested in charting or extensive calculation, Retriever isn't the program for you. There's also the drawback that you can't simply toggle back and forth between HyperCard and Retriever—since Retriever is a DA, HyperCard can be active only when Retriever is closed. For those who have address lists and other important data in stacks, however, Retriever access to this information from other applications will be particularly convenient.

For the Record

Retriever is not quite Microsoft File as a DA, but it's close. With a mere 54K this utility offers 90 percent of the functionality of a standard file manager, lacking only calculated fields. It's simple enough that you can't forget how to use it, even with once-a-week use. And Retriever has been optimized for use with both standard word processors and HyperCard. If you work with lists or tables but don't want to spend much time mastering a new application (training time for Retriever is about ten minutes), take this little program seriously.—Charles Seiter

See Where to Buy for contact information.

Where in the World Is Carmen Sandiego? 1.0

Geography/mystery game. Pros: Teaches geography, use of reference material, and deductive reasoning in an entertaining manner. Appealing sound effects and graphics; comes with copy of World Almanac. Cons: Repetitious animation gets tedious; predictable number of steps at each level of play; key-disk copy protection. Company: Broderbund Software. List price: $39.95. Requires: 512K.

Where in the World requires you, as a detective, to decipher clues that reveal in which of 30 cities a globe-trotting thief is hiding. At the same time you gather clues that will help you identify which of ten master criminals you must arrest. As you solve more cases, you move up in rank and the game becomes more difficult.

The Sounds of Crime

Right from the start, Where in the World grabs your attention with imaginative sounds and graphics. You hear breaking glass, an alarm, and racing footsteps (continues)
Swivel 3D goes where no program has gone before.

Introducing Swivel 3D. The program with the speed and power to create masterpieces in color 3D.

Swivel 3D is the fastest color, three-dimensional drawing/modeling program for the Macintosh®. It is also the first program to feature Linking. Linking allows you to quickly build models with parts that swivel. Your models can have switches, knobs, hinges, wheels or even more complex joints for building arms and legs that move naturally.

The best tool for unlocking your imagination.

Swivel 3D is an essential graphics tool for preparing business and slide presentations, graphics, illustrations, product designs and animation. Using the scrapbook, you can easily move images to programs such as Adobe Illustrator™, ImageStudio™, PowerPoint™, Cricket Presents, MacDraw™, SuperPaint™, PixelPaint™ and many others. Images can be saved in two formats: PICT, or Draw type images; and bit-map, or Paint type images.

The beginning of 3D animation right at your fingertips.

Swivel 3D also provides an incremental animation command (Tweening) which can save an animation sequence of Paint files. Animation can be easily created using HyperCard stacks or with animation packages like VideoWorks.

Start creating today.

Because Swivel 3D uses standard Macintosh commands and contains a library of pre-drawn images, you can begin creating in 3D right away.

For more information see your local computer dealer or call Paracomp at 415-543-3848 and see just how far you can go with 3D. Suggested retail price is $395.00.

Swivel 3D
Set your imagination free with the power of 3D
as a trio of Keystone cops chase a trench-coated fugitive across the screen. But apart from the opening and closing animation and an occasional evil henchman, most of the game's graphics consist of static images of famous sights in each city.

You start a session by entering your name via the keyboard, but you actually play the game using only the mouse. For instance, click on the magnifying-glass icon at the bottom of the screen to begin the search for leads (see "Main Screen"). From there you might click on the hotel where a bellboy tells you that the suspect was reading a Malagasy dictionary and that he had a tattoo. Another icon leads to a short list of destinations where the thief could have gone. Using the latest edition of the World Almanac and Book of Facts (Pharos Books) that comes with the program, you can list all the places in Moroni, the capital of Comoros in the Indian Ocean. Call up a map of the world, click on Moroni, and you're on your way.

**Fingering the Suspect**

You want to remember that the suspect has a tattoo. By feeding such clues into the Interpol computer you can narrow the list of suspects until only one remains and you are issued a warrant. If you catch up with the fugitive before you have obtained a warrant, the thief escapes and you lose. This element of the program, which is designed to exercise deductive reasoning skills, often seems a little too simple even for young players. Sometimes, however, the necessary clues are scarce or subtle, adding an element of tension to the game.

As you search for clues or travel to another city, a clock advances, but during the time you spend looking up information in the almanac, the clock stands still. This is a nice feature that encourages youngsters to use the almanac instead of hopping blindly from city to city. As you move up in rank, you have to travel to more cities before you catch up with the suspect, and the clues get pretty challenging—even for a well-traveled adult. What, for instance, is a taiapan, and where do you look in the Word Almanac to find out? Although familiar clues pop up time and again, and the number of cities you must pass through is predictable, each case poses different problems.

**Family Fun**

Where in the World is not likely to keep an adult game-freak occupied for hours on end the way some kinds of interactive fantasy would. Each round of play is relatively short, and you have ample time to catch the thief. Although you can finally off to parts unknown and temporarily lose the suspect, your route is always fairly straightforward from beginning to end. And the animation that punctuates the game and seems so engaging at first can become tedious.

This is not to say that Where in the World won't entertain, challenge, or even educate adults—especially those who enjoy thumbing through almanacs as a way of quizzing themselves on their knowledge of the world. And some of the cases have a sense of humor that seems directed at a more mature audience. (In Mexico City, the thief absconds with the secret remedy for Montezuma's Revenge.) Where in the World also makes fine family entertainment because children of various ages can play it noncompetitively with their parents.

Where in the World is Carmen Sandiego? is a great alternative to arcade/action games. It not only teaches kids about different countries, it also motivates them to look for the information they need in a reference book and get them to think deductively.

We've had to wait a long time for Where in the World to appear for the Macintosh. In the meantime, Broderbund has come out with two Carmen Sandiego sequels on the IBM PC—Where in the USA, and Where in Europe. The company is looking into the possibility of porting these two programs to the Mac.—Gerry Lukos

See Where to Buy for contact information.

---

**Reviews**

**40MB Tape Backups**

**Tecmar QT-Mac40**

Pros: Well-crafted design; relatively quiet; good software; informative status lights.
Cons: Not enough cables provided; only one SCSI port; no terminator.

Company: Tecmar
List price: $1395.
Requires: 1MB; SCSI interface.

**Tallgrass TG-4000**

Pros: Relatively inexpensive; delayed-backup timer; script capabilities; fast retrieving cycle.
Cons: Bulky; noisy; poor Macintosh interface; poor-quality SCSI ID-number switch; cannot print directory of tape on screen.

Company: Tallgrass Technology
List price: $1195 ($2495 for TG-4040, 40MB drive/tape combo).
Requires: 1MB; SCSI interface.

Don't let the 40 in the term 40-megabyte tape drive fool you. It refers to the approximate storage capacity of one DC-2000 mini tape cartridge for these units (for more information on backup products, see "Why Say No to Backup?" in this issue). The Tecmar formats the cartridge to 38.256MB; the Tallgrass to 42.5MB. If you want to back up more data, the software helps you do it on multiple tapes, thereby giving you essentially unlimited capacity. Conversely, if you are backing up smaller bodies of data, you can perform multiple backups on one tape.

**Beauty and the Beast**

The moment I sat the two backup units on the desk next to my Mac, I thought of Beauty and the Beast. The Tecmar came well packaged and is a sleek, compact unit (continues)
Universal Micro/SEi Internal Hard Disk Drives
Flexible brackets allow these systems to be installed in the Mac SE or the Mac II with an option to keep both SE floppy drives. MicroNet uses only the finest embedded SCSI hard disk drives which are fully tested and formatted before they are shipped. We offer 30, 46 and 80 MB subsystems with fast access and above average data transfer rates. Others promise performance, reliability and the best technical support, but we deliver it. We are Macintosh power users.

Micro/Stack External SCSI Hard Disk Drives
Stackable systems that fit neatly under the Mac Plus or the Mac SE. Saves desktop space and raises the SE to more desirable eye level. We offer 30, 46, 62, 80 and 160 MB capacities. Features include external termination, external ID select, visible disk activity light, two 50 pin SCSI ports and a quiet system fan. Great care was taken in the design of these systems to insure reliability. The Micro/Stack is a perfect match for your Macintosh.

We specialize in affordable, high speed, high capacity, SCSI mass storage subsystems
Our systems provide exceptional reliability and value. We use CDC WREN drives in our Micro/Max systems. These drives are industry known for both quality and performance. Internal and external, 150, 160, 300, 620 MB systems with 16.5 ms access time for the Macintosh II. 60 MB or 150 MB tape backup available. Custom built and tested by MicroNet technicians. One year warranty.

Macintosh is a registered trademark of Apple Computer, Inc.

Circle 275 on reader service card

MicroNet Technology, Inc.
13765-A Alton Parkway • Irvine, California 92718 • (714) 837-6033
AppleLink: D1656 • Compuserve: 76004,1611
Reviews

The Tecmar QT-Mac40 and the Tallgrass TG-4000 work well. Although Tecmar's software is more Mac-like, the Tallgrass software has two features that the QT-Mac40 software lacks.

with an array of status lights on the front. Gadget freaks will like it. The Tallgrass—a bulky, homely unit—was actually rattling around in the box when it arrived. It was so poorly packaged I was surprised that it started right up and gave me no mechanical problems during use, an unintentional testimonial to its robustness. What really fixed "The Beast" nickname on the Tallgrass unit for me, however, was the noise—it is the noisiest Mac peripheral I have ever heard.

As I set things up, the comparison became more balanced. One of the sacrifices Tecmar made to get that nice, sleek profile for its unit was to include only one SCSI port on the back. Thus, the cables provided with the unit are adequate only for use with a single internal hard disk. If you are using an external hard disk or multiple SCSI devices, you need additional cables, including a strange T SCSI adapter cable that costs $79. In fact, a complete optional cable kit (with the T adapter, terminator, and pin connector) lists for $149 (ouch).

The machines ran true to their Beauty and Beast nicknames when I tried out the software. The Tecmar's software is very Mac-like, it offers online context-sensitive help, and it has lots of progress indicators for backup and restore. When you open the Tallgrass software, however, the main menu bar, including the Apple menu, disappears. You get only a window with a dialog box. And no desk accessories are available.

PowerTag

The Tecmar QT-Mac40 software allows elaborate file selection routines for backup. These settings prompt the tape drive to back up files named "Friday Invoices", modified July 22, 1988, or later, and created by MacMoney. Insert and Append combine dissimilar sets.

But the Tallgrass unit has two software features that the Tecmar sorely lacks—a script-writing facility and a delayed timer for backups. With these features, you can set your backup unit to work after everyone has gone home. Then the noise won't be a problem, nor will the unit interfere with work on your network.

Stopwatches, Reliability, and Such

Both Tallgrass and Tecmar support the industry standard Q100 formatting. Tecmar, however, offers a variation. The Q100 is normally formatted as a 2:1 interleaf; the Tecmar unit can also be formatted at 1:1, giving it a speed advantage, but taking away its compatibility advantage.

In absolute raw read/write speed, the Tecmar unit is about 20 percent faster than the Tallgrass. The Tecmar reads and writes about 5MB per minute, ideally filling a 40MB tape in about 16 minutes (it takes a bit longer in practice). The Tallgrass, at 2MB per minute, requires a little more than 20 minutes to fill the same tape.

In actual use, however, speed is affected by such factors as tape retention and recalibration, formatting, erasing, overwriting used tapes, MultiFinder capability, timer-delayed automatic operation, type of backup performed (file-by-file or mirror), and verification procedures. For instance, the Tecmar takes 2 minutes to recalibrate and reformat a tape every time you put one in the machine. Tallgrass does this in 1 minute. When you are doing a multiple tape backup with the Tecmar, and it's time to put the next tape in the machine, if you have only used tapes available, you must abort the current backup, erase an adequate supply of tape, and begin again. With the Tallgrass, you simply select automatic overwrite and continue. Yet, while formatting a tape, the Tallgrass takes over the Mac for 1/2 hour. The Tecmar, however, allows you to use the Mac normally, with no loss of speed, as long as you don't turn off the Mac or reboot.

Both units allow you to back up a mirror image of a disk or to back up on a file-by-file basis. They also allow you to back...
Award winning educational software for the Macintosh!

Our award winning products have brought excellence to computer users of all ages in homes, schools, music studios, and businesses.

American Discovery™ is an interactive program for learning American Geography. Questions, additional information, and answers can also be created or customized. Ages 10 and older $49.95

Crystal Paint™ is an innovative art program which promotes artistic creativity in both amateurs and professionals. All Ages Holiday Special through December 31, 1988 $49.95

KidsTime™ is enjoyed by children of all ages. It encourages creativity, learning, and exploration while developing Macintosh skills. KidsTime contains five interactive programs which develop music exploration and learning, alphabet and counting skills, story writing skills, matching skills, categorization skills, and memory skills. An all time favorite! Ages 3 to 8 $49.95

KidsTime™ Supplement includes the MatchMaker™ program for designing custom KidsTime matching games. Also included are more games, stories, and songs to be used in KidsTime. Available to registered owners of KidsTime. $29.95

Loe™ includes four games which develop strategy, hand and eye coordination, matching, and computer skills. Great fun for the whole family! Ages 4 and older $29.95

NumberMaze™ combines the fun of solving mazes with the challenge of solving math problems. It includes math levels from simple counting to multiple digit multiplication, division, and word problems. Statistics are kept on each child. Animation, graphics, and sound are some of the many features which make NumberMaze fun to play and math exciting to learn. Ages 5 to 12 $49.95

TimeMasters™ is an educational program that teaches children many time concepts including digital, face clock, calendars, seasons, and holidays. Ages 6-10 $39.95

ConcertWare™+MIDI is a highly recommended program for first time MIDI users and an important tool for amateur and professional musicians. It is an integrated package that allows music to be entered, edited, played, and printed without changing programs. It allows real and step time music entry, instant transcription, and a variety of MIDI features. Powerful notation capabilities are included. A non-MIDI version is also available. ConcertWare+MIDI $149.95; ConcertWare+ $69.95

Terpsichore™ is a unique collection of 181 Renaissance and Baroque pieces to be studied and enjoyed with ConcertWare+ or ConcertWare+MIDI. $49.95

Great Wave Software™ Software Excellence for All the Ages™
up files according to custom criteria, such as groups of files or only files changed since the last backup. Tecmar, however, offers more selection criteria (see "Power.Tag" and "Keeping It Together"), and its image backup routine is potentially faster, since it ignores blank areas if instructed to do so. Both units can back up data from, and restore it to, floppy disks.

Unlike the Tallgrass unit's software, Tecmar's is MultiFinder compatible. It's arguable just how useful this is, however. If the Tecmar unit is working in the background, and you are using a CPU-intensive project in the foreground, response times slow down considerably. Similar problems occur on a network. Both manuals recommend doing backups when the networks are idle; otherwise, work nearly grinds to a halt. Both units claim compatibility with AppleShare, TOPS, and MacServe.

Skin-Deep
At the end of the fairy tale, we have a flawed beauty and a beast that isn't so bad after all. Most users will choose the Tallgrass because of the designer case, the software's welcoming Macintosh interface, the unit's potential for speedy backups, and its MultiFinder compatibility. Others, however, will be put off by the Tecmar's lack of cables and its premium price. And some users will want the Tallgrass's delayed-timer feature. The good news is that either of these units works fine if you use it in a consistent backup routine.—Scott Beamer

See Where to Buy for contact information.

Symantec Utilities for Macintosh 1.0

Disk recovery utilities. Pros: Enables fast recovery of crashed disks; partitions and defragments hard disks; provides disk-sector editing tools. Cons: User interface sometimes awkward; not completely compatible with MultiFinder.

Company: Symantec Corporation. List price: $99.95. Requires: 512KE, System 4.0/Finder 5.3 or later.

One day it will happen to you. You'll put a floppy into the Macintosh, and the following message will appear: This disk is unreadable. Do you want to initialize it? It's even scarier when that message refers to a hard disk. If you haven't had the foresight to back up your data, then the only way to resurrect it is to use a disk-recovery utility. Fortunately, Symantec Utilities for Macintosh (SUM) provides a complete set of tools for recovering files from crashed disks. It can even restore a hard disk that has been accidentally initialized.

SUM is made up of several utilities. Guardian is the main recovery application. HFS Recover, Scanner, and Floppy Recover are three programs that help you recover files on disks that have not had Guardian installed. Disk Clinic, the shell that ties the recovery utilities together, asks you a series of questions about your problem; then it selects and launches the program that can best recover your files. Symantec Tools is an editor (like MacMaster Systems' Fedit) that allows you to view and modify the structure of disks and files. Since this editor enables you to make potentially dangerous changes to files, the company recommends Symantec Tools for experienced users only. HD TuneUp defragments files for faster performance. And HD Partition lets you divide a hard disk into separate volumes. QuickCopy is a fast duplication utility for floppy disks.

Be Prepared
The basic philosophy behind SUM is that old adage "An ounce of prevention is worth a pound of cure." You provide the prevention by installing several files on your hard disk. First copy the Shield INIT file to the System Folder. This file loads into memory when you start the Mac and serves two functions. First, Shield watches over the hard disk, protecting it from computer viruses that attack the disk directory. Second, Shield gathers the information that Guardian needs to recover a hard disk quickly if it crashes or if you initialize it by mistake.

Using Disk Clinic, you install two crucial invisible Guardian files. Guardian File Save can recover up to 100 deleted files; Guardian Volume Save can recover an entire disk in the event of a problem. The price you pay for the peace of mind these files bring is the loss of 1 percent of your usable disk space. The last step in the preventive process is to back up Guardian Volume Save onto a floppy disk.

Raising the Dead
With the help of my hard disk's manufacturer, I invoked a disk crash by corrupting the disk's Volume Information Block with Symantec Tools, then pressing the Mac's reset switch. When the Mac rebooted, I got This disk is unreadable: Do you want to initialize? I inserted the floppy with the backup Guardian Volume Save file and started Disk Clinic. Choosing Recover Crashed Disk brought up a series of questions about the problem disk, which I answered. Disk Clinic then launched Guardian and asked me to locate the Guardian Volume Save file backup on the floppy via the standard Get File dialog box. Guardian read the file backup, displayed the date the backup was created, then (continues)
Dreams is so natural and free-flowing, it feels like this.

For years, conventional computer-aided design programs have given you powerful tools for drawing and drafting. But if you're like most design professionals, you still work by hand. Because the typical CAD program feels just like a computer.

Now, there's a whole new way to design--Dreams. It combines serious CAD features with an elegant human interface. Which lets you think more about creating and less about computing.

We designed it with you in mind. On Apple® Macintosh® systems. It's a mid-range, multi-purpose CAD program that gives you MacDraft®-like drawing tools, color, layers, libraries, bezier and spline curves, advanced editing tools, PostScript® and much more. All with the most contemporary interface you've ever seen. Now you can be more productive without spending months learning how.

We can only tell you so much here. But the more you know, the better it gets. To find out more call 415-680-6818 Ext. 400 for the dealer nearest you. Where you can discover what's way beyond computers.
asked if I wanted to proceed. I clicked OK, and 5 seconds later Guardian reported the restoration was complete. Returning to the desktop, I rebooted, and the crashed hard disk mounted, with all files intact. Total elapsed time: about 1 1/2 minutes. Wanting to see how quickly the program could recover an initialized disk, I wiped the disk using the Finder’s Erase Disk command, then repeated the recovery process, with the same result. If you’ve installed Guardian, but don’t have a current floppy backup of the Guardian Volume Save record, SUM scans the entire hard disk, looking for the file. It took about 15 minutes to scan my 20 megabyte hard disk. After SUM found the file, recovery again took just 5 seconds.

You can recover files from bad disks that haven’t had the Guardian data files installed, but the process takes much longer. SUM uses HFS Recover, Floppy Recover, and Scanner first to look on the disk for files, then to recover the files on a separate pass. You can choose to recover all or just a few files. On my hard disk, the scanning pass took slightly less than 30 minutes, with the subsequent recovery of files to another hard disk taking just under 8 minutes. A larger-capacity hard disk would take additional time to scan. If you don’t have a second hard disk handy to receive the resurrected files, HFS Recover puts the recovered files on floppies, splitting larger files across several disks, if necessary. You can later join the split files after you repair the hard disk.

As luck would have it, a friend sent me a crashed floppy disk that wouldn’t mount; the Mac kept reporting. This is not a Macintosh disk. Even though Guardian wasn’t installed on the disk, I was able to recover all files from the disk in about 5 minutes, using Floppy Recover.

Adding to the SUM
HD TuneUp is a disk optimizer. Files on hard disks can become fragmented, meaning that parts of one file spread across noncontiguous sectors. It takes the Mac longer to read fragmented files. HD TuneUp collects the parts of the file and writes them into an unbroken area of the hard disk, thus improving speed. You’ll probably see a significant speed increase only if your disk is severely fragmented, however.

The HD Partition desk accessory works with an INIT file you put in the System Folder. The INIT splits the hard disk into several volumes, each of which acts as though it were a separate disk. You can automatically mount a partition and assign an encrypted password. Partitions are stored as invisible files on the hard disk, and can be any size.

SUM is a revision of Micro Analyst’s MacZap Utilities, and the package suffers from some of its predecessor’s interface problems. The program is sometimes awkward to use and can give error messages not listed in the manual. The SUM manual is a great improvement over MacZap’s manual, giving step-by-step solutions for most disk problems. Symantec does not recommend using SUM version 1.0 under MultiFinder or with a RAM cache.

Most people won’t buy file recovery utilities until they have a defective disk. SUM can still help them, but those who install it before a problem occurs can be up and running again in a fraction of the time it will take the unprepared.—Tom Negrino
See Where to Buy for contact information.

Color Monitors for the Mac II

MegaTrend/2
20-inch RGB color monitor for the Mac II (640 by 480 resolution). 
Pros: Looks nice; doesn’t need configuring; one-year warranty, parts and labor. Cons: Tendency to blur text when most windows are closed; only compatible with IBM PS/2 VGA output. Company: Intecolor. Lit price: $229.5, plus $29 for Mac II cable adapter; antiglare screen ($100) recommended. Requires: Mac II Video Card or compatible video card.

Auto-Sync 1019/SP
19-inch RGB color monitor for the Mac II (640 by 480 resolution). Pros: Switches between Mac II and IBM-compatible displays easily; supports wide range of IBM RGB input; one-year warranty, parts and labor. Cons: Minor visual distortion; colors somewhat dull. Company: MicroVitec. List price: $229.5, plus $34.95 for Mac II cable; antiglare screen ($129) recommended. Requires: Mac II Video Card or compatible video card.

Certain applications and settings require a larger-than-normal display—not additional resolution, mind you, but the normal resolution enlarged significantly. A classroom, a trade show, or a processing control room may need a display that can be seen at a distance. On the Mac II, these large monitors typically plug into the Mac II Video Card (or compatible equivalent), showing the normal 640-by-480 resolution on a 19-inch or 20-inch screen. Two such RGB (red-green-blue) monitors for the Mac II are the MegaTrend/2 from Intecolor, and the AutoSync 1019/SP from MicroVitec. Both of these monitors can be used with IBM PC or PS/2 compatible systems.

The MegaTrend/2
The MegaTrend/2 provides a 20-inch screen, resulting in a 60 percent increase in image and text size. Setup is easy: A single cable, built into the monitor itself, plugs into the Mac II Video Card. Unlike other multisync monitors, this one doesn’t require you to fiddle with settings in the back. However, it has a small adapter (sold separately for $29) that fits between the regular cable and the Mac II. The regular

(continues)
Image Club Graphics Digit-Art vector based clip art and HotType PostScript Laser Fonts can be used with any popular Macintosh applications such as PageMaker, Ready.Set.Go, XPress, Cricket Draw, Freehand, and Illustrator. You can maximize printing detail with a PostScript laser printer including a Linotronic for typesetting sharpness. Image Club Digit-Art is easy to customize or add color for separations when used with Adobe Illustrator or MacFreehand. Unlike 300 dpi scanned, jaggy edged bit-map clip art (edited only with programs like MacPaint), Digit-Art is PostScript. You will experience scaling and cropping flexibility without any loss of image quality. Your Image Club art is perfectly rendered, perfectly vectorized graphics, equivalent to the very best in line art when reproduced on a PostScript laser printer. Digit-Art clip art and HotType fonts by Image Club are available in diskette packages or on the ArtRoom CD ROM. Subscriptions in both formats are also available. For further information or for a dealer demonstration kit call 403-250-1969.

MacUser Rating 5 nice!
The display is clear, steady, and mostly free of visual distortions. Also, the monitor has a feature designed to automatically adjust the screen's brightness for you, based on what's currently being displayed. Unfortunately, one side effect of this feature is that if you have only one or two small windows open, the monitor overcompensates by increasing the brightness, and text appears blurred. You can avoid this problem by keeping the contrast turned down (or by keeping your windows open). The phosphor used in the monitor is “fast,” that is, has limited persistence, so there is little blurring during animation. The phosphor color is light gray with a slight greenish tinge (as opposed to dark gray for the regular Apple monitor). The convergence test (which you can invoke from the monitor's panel in the Control Panel DA) gave straight white lines, indicating that the three electron guns used by the monitor are tightly aligned. The monitor I reviewed had the optional antiglare coating ($100); I recommend it, unless you are getting one of the touch screen options (they have their own antiglare filters).

**Auto-Sync 1019/SP**

The Auto-Sync 1019/SP monitor with its 19-inch display gives you a 50 percent increase in image and text size. Two cables are necessary: one for connecting with a PC compatible, the other (which you have to purchase) for hooking up to the Mac II. Installing Auto-Sync's optional tilt/swivel stand is a matter of fastening two screws.

Auto-Sync isn't much of a beauty. It's a bit bigger than the MegaTrend/2 and doesn't look nearly as nice. On the other hand, it has several controls in front, including brightness, contrast, degaussing, video source select, vertical size and position, and horizontal size and position. The power switch is in the back, as are separate ports for TTL and analog input and a switch for selecting TTL input type.

The video select switch lets you have both a PC-compatible and a Mac II running and hooked up to the monitor at the same time; you can switch back and forth between the two displays. This worked fine for me, first with a Zenith Z-181 laptop, then with a Compaq 286 portable and my Mac II. The only problem was that the display's horizontal position shifted between the Mac II and the PC, but I found a compromise setting using the horizontal position knob on the front.

The display was clear and steady with only a tiny amount of indentation on the upper left edge of the picture, and there was no blurring of text or images. I found one significant problem, though: the monitor Microvitec sent me for review had no antiglare coating on the screen, so the display clearly reflected any well-lit objects in the background. However, you can have an antiglare screen installed (in the factory) for an additional $129. Also, colors looked a little washed out compared to the MegaTrend/2, the AppleColor RGB monitor, and the Sony 19-inch. The convergence test I performed showed a hint of color separation, but nothing significant.

**Test before Buying**

Both these monitors are smaller and easier to handle than the ElectroHome and Conrac monitors; in fact, both can fit on top of a Mac II, though you probably should avoid leaving one there for long periods. Both warmed up quickly. Neither monitor had any noticeable flicker; and there was no apparent interference from either the Mac II (both were tested sitting on top of it) or from an adjacent Sony 19-inch RGB (plugged into a second video card). Of the two, I preferred the MegaTrend/2, because of display quality, physical appearance, and lower cost; however, I considered the auto-adjusting brightness a bug, not a feature. Auto-Sync 1019/SP, on the other hand, didn't look as nice, and its display quality was a shade behind that of the MegaTrend/2, but the specialized features (such as selecting between different video inputs) may be useful in certain settings.

As always, if you’re buying yourself a monitor, you should test it out first, or at least be sure you have a money-back guarantee.

—Bruce Webster

See Where to Buy for contact information.
ADD REAL-TIME DESKTOP PRESENTATION IMPACT.
The new Mac Data Display adds action — and interaction — to desktop presentations. It'll turn you and your Macintosh into instant big-screen communicators. And teach any transmissive overhead projector an animated new act.

LIVEN UP DATA-SHARING & TRAINING TOO.
Mac Data Display also adds a lively new dimension when you're sharing data or training your staff. Because you can give them a roomsized view of even the smallest piece of information.

BRILLIANT IMAGES.
Data Display matches your computer screen pixel for pixel— including all the gray shades. So everything your Mac can show, you can project for everyone to see. In virtually any room lighting.

COMPATIBLE ACTION.
Plug it into any Mac from the original to the "SE". Use any text or graphics software. You'll quickly easily create a hot real-time show. While Data Display's internal fan plus infrared heat filter keep you cool with even the brightest overhead projector.

EASY IMPACT.
It's a snap to install. Top-mounted controls are friendly-as-a-Mac to use. And its compact, portable size fits most briefcases with room to spare. So it's the ideal communications tool whether you use it down the hall — or take your show on the road.

AWARD-WINNING TRADITIONS.
Mac Data Display has the same advanced, reliable chip-on-glass technology as our "PC Magazine Editor's Choice" PC-compatible unit. The same high performance. The same industry-leading one-year warranty.

GIVE IT AN AUDITION.
Next time it's showtime, cast a role for Mac Data Display—the power to show your best. For an audition at your nearest dealer, Call 800/582-2580 (in CA 800/582-0852). Ask for Ext. 302.

MAC DATA DISPLAY
Model A342
Suggested Retail Price $1499

Macintosh™ is a registered trademark of Apple Computer, Inc. ©Copyright 1988 Computer Accessories Corp.
Although it's easier to steal a few megabytes of data than, say, a file drawer full of paper, there are fewer secured microcomputers than there are locked file cabinets. If you want to protect electronically stored data, you have three basic choices: hardware security, password protection, and encryption.

**Hardware Security**

For many situations, controlling access to hardware is the easiest and most direct method of protection. Simply bolting the door to your office with an ordinary lock can be effective, or you may opt for a superlock such as the Ridge Reader MINT fingerprint-pattern reader from Fingerprint Matrix ($1300 to $3300). If you need to leave your office open, you might consider insuring your system with a company that specializes in microcomputer insurance such as Safeware (from The Insurance Agency). Insurance costs $69 dollars a year for up to $5000 of coverage, which includes everything from theft to power spikes to damage from dropping the computer.

Whether or not you have insurance, there are a number of products available to help keep your computer and its data where they belong. The Muzzle ($69.95 Ergotron) for the Mac SE is the most complete access-control system reviewed here; it is the only one that prevents people both from using the Mac and from walking off with it. The Muzzle surrounds the Mac like a tight metal belt and looks a bit like a dog muzzle. It covers the floppy drive slot in the front of the machine and the power cord hole in the back. You can attach the unit to a cable that anchors the Mac to anything in your office that doesn't move easily. To install The Muzzle, remove the Mac's power cord and slip The Muzzle around the computer, using the supplied padlock to attach it to the security clip on the back of the SE.

One version of The Muzzle has a hole through which you can reinstall the power cord after you've placed The Muzzle on the computer. In theory this allows users to view and alter files on the hard disk but not to upload or download to a floppy disk. But because this doesn't prevent someone from attaching an external floppy drive to the Mac, this version of The Muzzle has limited uses.

Another security product, Padolock ($69.95, Doss Industries), has one plate that installs on the bottom of the Mac and another that goes on top of your desk. You attach the plates with—believe it or not—stickum, an acrylic adhesive that, according to the manufacturer, holds with over 10,000 pounds of resistance to force. The plates lock together, securing the Mac to the desktop. Unlike The Muzzle, which works only with the SE, the Padolock works with any Mac, although you need a separate Padolock for each component, such as an external hard drive or a monitor.

MacKablit ($39.95, Secure-It) and MacLock Security Kit ($49.95, Mac Products) both come with a piece of hardware that you attach to the security slot in the back of any Mac (except the Mac II). The kits also include a cable that runs from the Mac to some convenient area of a table (such as around the leg) or to some other similarly solid piece of equipment. Once you've attached the piece of hardware to the security slot, you can remove it only by opening the Mac's back; so installation is semipermanent.

The Muzzle does an excellent job of preventing access to the Mac, and the fact that it can do double duty by tying down the machine is an added bonus. But don't buy this product just to prevent the Mac from being stolen—attaching and removing The Muzzle (which must be done every time you use or lock up the Mac) is cumbersome, involving lifting the Mac and inserting or removing the power cord. For securing the Mac to the desk, I would choose the Padolock System. It doesn't use a cable (which tends to make the Mac look a bit like a bike tied to a bike rack), and it's the most secure since it has an internal lock that can be removed only by drilling or picking. All the other systems use padlocks and cables, which someone can clip off with the right tools. But if you feel squeamish about putting adhesive on your Mac or desk, MacKablit and Mac Lock are about the same, except that the former has a slightly thicker cable.

(continues)
Or the telephone book. Or your favorite magazine. Or any other document that exceeds the limits of ordinary optical character recognition packages. If not, you need TextPert™, the first Expert Text Reader™ for the Macintosh Plus, SE, and II.

TextPert turns your Macintosh and any Macintosh compatible scanner into a powerful Expert Text Reader capable of reading even the most difficult documents and entering the text automatically into editable word processing and database formats.

With extraordinary features such as: manual and automatic learning mode, unlimited reading areas, formula templates, automatic retabulation of tables, special character definition for databases, multipage mode, direct drivers for scanners, and multi-font reading.

TextPert™
Expert Text Reader

TextPert reads quickly and accurately, with maximum flexibility, and at an affordable price. Call us at 1-800-592-2209 for more information, or 212-759-6201 in New York State. In Canada, call 1-800-668-8986.

CTA
In Canada, c/o Uppercase Technology Inc.
PO Box 3280
Markham Industrial Park
Markham, Ontario L3R 3LO

In Canada, c/o Trans-National Trade Development Corporation
866 Second Avenue
New York, NY 10017
(212) 759-6201
Fax (212) 644-9867

Circle 400 on reader service card
Password Protection

Password protection is a type of access control that prevents intruders from accessing stored data—normally on a hard disk. Password protection does not, of course, prevent a hard disk from being stolen, but it does prevent a stolen hard disk from being read. This protection is normally so secure that if you forget the password, your only option may be to erase the protection, along with all your data, using a strong magnet. Password protection does not guard data that is telecommunicated or sent through a network. If you need to secure transmitted data, you'll have to use an encryption program. On the other hand, it takes a lot less time to secure a hard disk with a password than to encrypt individual files. And with password protection, intruders cannot read your files, they can't even see your directory, and they can't plant a virus on your hard disk.

The NightWatch ($149.95, Kent Marsh) is a comprehensive and secure hard disk password system. When you lock a hard disk with the NightWatch, the disk's icon does not appear on the Finder. To access the hard disk, you have to start the Mac with a special User Disk (which contains a System file) and type in an authorized name and password. The Mac then automatically ejects the User Disk and restarts. This system provides a high degree of protection since it takes two security breaches—the password and the User Disk—for an intruder to gain access to the hard disk.

The key to the program is the Administrator Disk, which comes with a "signature" that only your program can read (for security reasons, Kent Marsh does not keep a record of signatures). The Administrator Disk allows you to override the program (in case you forget your password or your User Disk becomes dysfunctional), create User Disks, authorize or delete users, and assign or change passwords.

As long as the Administrator Disk is not stolen, The NightWatch provides as much security as most people need. If all your data is contained on hard disks, and it is not sent through telecommunication media, this is the fastest and most convenient way to protect it.

Data Encryption

Data encryption has the advantage of being portable and selective—you can protect data on floppy disks and data sent over phone lines, and you can protect some files on a disk, leaving others unprotected. The only disadvantages are that it takes longer to encrypt individual files than to lock a hard disk, and encryption usually expands the size of the files.

I first encountered encryption in the form of the coded message displayed at the end of every Captain Midnight episode. To decrypt the message you needed a decoder badge that substituted letters: X for D, Z for R, and so on. Though (with all due respect to the Captain) simple substitution codes can easily be broken by cryptographers, virtually all encryption systems use some—more complex—form of letter substitution or scrambling algorithm.

Sentinel ($295, SuperMac Technology) is the most comprehensive encryption program reviewed here. It gives you a choice of three encryption methods, DES, BlockCrypt, and SuperCrypt. DES (Data Encryption Standard), created for the U.S. National Bureau of Standards, at one time was considered unbreakable. DES has since been broken, but experts say it takes a couple of weeks with a dedicated mainframe to break a code created with DES. If you need more security than that, I'm sure you know a lot more about cryptography than I do. BlockCrypt is based on DES, but BlockCrypt puts the text through only about one-quarter of the mixing. SuperCrypt is the least secure, but it is satisfactory for most users. The more secure the encryption method, the longer it takes to encrypt a file. For instance, Sentinel encrypts data at about 2K a second in DES and in about one-sixth that time in SuperCrypt.

Not only is Sentinel comprehensive, it is also extremely convenient to use. You can select more than one file at a time for encrypting or decrypting, and you can launch applications from Sentinel. For straight encryption, Sentinel is the best package I've seen.

However, P/C Privacy ($95, MCTel) and Packer ($29, Bobbing Software) have unique features that make them better for specific applications. One of P/C Privacy's strongest features is that it allows you to purge the original file, removing all traces of it. (A trashed file is deleted from the directory, but it isn't erased until it's overwritten later.) The program also has two features that make it especially useful for data transmission. First, you can save encrypted files as data only, so you can transmit them to noncompatible hardware or software. Second, the program provides a feature that helps you determine if the received file is the same as the sent one.

Packer compresses files so they take up less space on a disk while at the same time optionally encrypting them. On a Microsoft Word file, for example, Packer reduced disk space by almost 50 percent. Packer is primarily a compression program and secondarily an encryption program, since you can "pack" without encrypting but not vice versa.

Choosing among the three encryption programs is a matter of deciding which features you want. But based just on the strength of the encryption method, Sentinel is your best bet. P/C Privacy rates second because it allows you to encrypt a file as many times as you want (you have to decrypt files as many times as you encrypt them, however). And Packer comes in last since it allows you to encrypt a file only once.

See Where to Buy for contact information.
The Abaton scanning duet, our Scan 300/S scanner and C-Scan Plus™ software, orchestrates your scan so every image is a command performance. Scan in true grayscale and your favorite desktop publishing software can edit and resize the scanned image without distortion. Now you can really take advantage of high resolution output devices.

Abaton’s medley of software packages power the Scan 300/S. C-Scan Plus scans in multiple resolutions and gives you a full repertoire of painting and editing tools to dress up your halftone and line art scans.

Our unique PanelScan™ software lets you “quick-scan” directly from your Macintosh™ Control Panel without leaving your desktop publishing package. Abaton's OCR software teaches the Scan 300/S to “read” text in more than 120 typestyles and font sizes from 6 to 14 points, even on the same page! No one else makes scanning this convenient. We also offer IBM options.

With an Abaton Scan 300/S and your Macintosh, you'll be creating desktop publishing classics.

Ask your local authorized Apple® Dealer or call 1-800-444-5321 for the dealer nearest you.
Who Needs Another Paint Program?

Anyone Who Wants:

FreshPaint™ • Custom Tools • Texture Tool • High Performance • TIFF File Compatibility • Save In MacPaint, PICT, TIFF And Cricket Paint Formats • Graded Tints • Pop-Up Palettes • Perspective • Multi-Window • Full-Page Editing • Landscape Document View • Auto Scrolling • Split-Screen Zooming • 12.5% to 1600% Zooming • 64 User-Definable Patterns • 64 Gray Scale Dithers In Flexible Pop-Up Menus And Palette • Flexible Ruler Units • Reshaping Ellipse • Polygon • Regular Polygon • Rotated Polygon • Spyro Polygon • Parallel Polygon • Hyper Polygon • Smooth Polygon • Pen Tool • Line Tool • Parallel Line • Rectangle • Freehand Tool • Arc Tool • Paint Radial Mode • Invert Paint • Pattern Fill • Darken And Lighten Selection Command • Auto Text Wrap • Selectable Text Style Attributes • Text Alignment • Margin And Tab
We've been asked why Cricket Software would introduce a black and white paint program when the whole world is making so much noise about color. Frankly, we feel it's obvious: There are more than 1.5 million* mono­chrome Macintosh® users — Apple® hasn't abandoned them and neither have we. Plus, we felt there was still a lot of room for improvement over the current best selling paint program.

So, we revved up our monochrome Macintoshes in the best Cricket Software tradition and developed the new standard: Cricket Paint.

**Feature-rich power**
Cricket Paint is loaded with features. Powerful features with more capabilities than you thought possible.

Our FreshPaint™ feature treats your newly painted artwork as an object, completely flexible until you deselect it to create "dry paint" bitmap images. Create, edit and output documents at resolutions from 72 dpi to 300 dpi.

Create your own textures and tools. Then save them for future use.

In addition to the standard Cricket Paint format, you can import or save your files in TIFF, MacPaint™, and PICT formats.

Another member of the First Family of Graphics
Cricket Paint is the latest in the Cricket family of graphics productivity software. Cricket Graph, Cricket Draw, Cricket Pict-O-Graph, Cricket Presents, Cricket Expression Device Drivers. Cricket Software. The leader in graphics productivity software.

*Based on market studies.

Great Valley Corporate Center
40 Valley Stream Parkway, Malvern, PA 19355
(215) 251-9890

Apple, Macintosh, Macintosh Plus, Macintosh SE, and Macintosh II are registered trademarks of Apple Computer Inc. MacPaint is a trademark of CLARIS Corp.

© Copyright 1988 Cricket Software, Inc.

Circle 538 on reader service card
Make your Mac larger than life.

Attach your Macintosh to our 6448C+2 Ultimate Presentation System™ (UPS) and place it on any standard overhead projector. Suddenly you’ve got an interactive Mac display that scales up to even the largest audiences.

Or download your display information into the UPS’s megabyte of memory and take it virtually anywhere. (Lifetime batteries included.)

- High resolution monochrome projection (640x480 pixels)
- Heat tolerant to 65° C (149° F) — no fan
- One megabyte of memory
- Page scroll/windowing/special effects generator
- Compatible with the entire Apple Macintosh family

Fully compatible with: Macintosh™ 128K, Macintosh 512K, Macintosh Plus, Macintosh 512Ke, Macintosh SE (video adapter required), and the Macintosh II (with video card).

So put your Mac in the big time today.

For more information on the UPS or the name of your closest dealer, phone today — 800-327-7231 Ext. 401

IN FOCUS SYSTEMS INC.™
7649 Southwest Mohawk St. • Tualatin, Oregon 97062 • 503-692-4968

Dealer Inquiries Invited.
See us at Comdex, West Hall, Booth #662.
New Products
Information on the Mac's latest software, hardware, and accessories

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.

SOFTWARE

Acknowledge Software tool kit that opens up remote computer services by providing tools to communicate with mainframes, minicomputers, and personal computer networks. Offers ability to create Connections or applications that can tie the Mac into any telecommunications environment. 512K min. memory. $495. SuperMac Software, 415/964-9694.

Architext Text retrieval, management, and presentation program. Bitmaped graphics are entered and stored in subdocuments, called nodes, which may be linked. Comes with a free read-only Viewer application that allows for control of access and path to nodes and maps. 1MB min. memory. $349.95. Brainpower, 818/884-6911.

Chuck Yeager's Advanced Flight Trainer

Mac II flight-simulation program, equipped with Flight Recorder that takes student through stages of becoming a first-rate pilot. Supports 16-color, full-screen graphics, and three levels of on-screen instruction from General Yeager. 512K min. memory. $49.95. Electronic Arts, 415/571-7171.

Data Scan Image processing software with the ability to recover numeric data from printed graphics, and to quantify bar charts, area charts, and various scientific plots such as log/log, log/linear, and linear plots. Analyzes bitmaps in MacPaint, uncompressed PICT, Thunderscan, or TIF format. May be used in conjunction with a scanner. 512K min. memory. $199.95. Brainpower, 818/884-6911.

Finale Integrated notational program that allows for playback and printout. Provides seven methods of inputting music, including HyperScribe and Transcription Mode. Supports complex meter signatures, standard and nonstandard key signature, and nested tuplets. Analyzes chords and creates chord suffixes. 1MB min. memory. $1000. Coda Music Software, 800/843-1337.

FlashCrypt Data security applications that offer file and folder encryption using Data Encryption Standard method. Allows you to save files and folders for encryption or decryption as a group. 512KE min. memory. $295.95. Magnus Corporation, 206/467-5738.

Generic CADD Level 1 CADD tool that enables you to edit multiple drawings in separate windows simultaneously. You can cut and paste objects between different windows within the program, and between CADD Level 1 and other programs using standard PICT format. 1MB min. memory. $99.95. Generic Software, 206/885-5307.

Gofer Text search program that provides search, find, copy, and paste functions with no need for indexing or file conversion. Performs searches as a background function using keyword clue. Allows you to (continues)
We have a very novel way to hide up to 100MB of mass storage.
Put it behind your Mac Plus or SE. With a Jasmine BackPac™.

Unlike any other external mass storage device, BackPac hardly takes up any room at all. In fact, when equipped, your Mac will still fit in its carrying case. So it can travel with you wherever you go.

Or simply stay where you are. And let the world come to you with Talk Bac™—BackPac’s optional internal 2400 baud modem.

BackPac’s even remarkably easy to install. There’s no tricky wiring or exotic tools required. Which means you can be up and running with the preformatted BackPac within minutes.

And once installed, you’ll barely know we’re there. We run quiet and cool, too. And the same switch that turns on your BackPac turns on the Mac.

Available in 20MB, 45MB, 70MB, or 100MB capacities. BackPac comes with Symantec Utilities for Macintosh to prevent data loss and keep your hard disk running at peak performance. And Redux™ from Microseeds—the best backup software written for the Macintosh. And then there’s DriveWare™, which offers true SCSI partitioning. A feature which enables you to allocate distinct storage partitions while you manage everything from the control panel. Plus more than 9MB of public domain software and shareware.

So put your storage problems behind you. Call us toll free with your Visa, MasterCard, or American Express to charge a BackPac with full, two-year warranty.

If it’s not everything we say it is, return it in 30 days and we’ll refund your money.

But we think you’ll come to the same conclusion thousands of other Mac users have.
That the best storage solution is right here in front of you.

Jasmine
1-800-347-3228
Put your storage problems behind you.
New Products

HyperPaq HyperCard interface for data acquisition on the Mac. Works in conjunction with MacPaq data acquisition hardware. Provides complete scripting access to the stack. Can be modified for individual experiments. 512K min. memory. $95. Biopac Systems, 805/967-6615.


MacAuto Provides analysis of spectral data for scientific publications; includes curve-fitting of Gaussian and Lorentzian peaks, and ability to create high-resolution figures. 512K min. memory. $299. Spectral Software, 415/321-1345.

MacMED Uses more than 250 integrated features, plus a differential diagnosis tool, to ascertain possible diagnoses. Runs on the Mac Plus, SE, or II with hard drive. Written in Pascal, C, and assembly language. 1MB min. memory. Introductory price is $2500; trial system $250. JAM Technologies, 415/442-0795.

MacNet Networking application that provides access to Connect’s PC network services. Features include icon-based electronic mail, link to Standard and Poor’s market quotes, custom bulletin boards and forums, online access to Macintosh product information. 512KE min. memory. Basic (continues)
Why settle for industry standards when you can have more.

Setting new standards.

From the beginning, Microtech has been developing sensibly priced quality peripherals for the Macintosh that go beyond the industry standard. The excitement we generated by introducing the first 800K floppy at the Boston MacWorld Expo in 1985 was significant. This revolutionary product set new standards for hardware and software developers combined.

Unprecedented five year warranty.

Microtech next became a leader in service, backing our products one full year while other manufacturers only offered the industry standard 90 day warranty. Today our commitment to servicing your needs is unprecedented with our five year warranty.* Microtech firmly believes that "if we build them better, we can back them better". Each of the components used in our products sustain rigorous testing, enabling us to deliver products with performance levels shared by few; products we can release with confidence; products you can rely on with confidence!

Performance, power, and speed.

Microtech engineers use industry standards merely as a starting point. They have brought together a unique combination of innovative software and technologically advanced hardware to achieve maximum speed and overall performance in all our hard disk drives. Often described as "user-friendly masterpieces", our Nova external and Micro Mac internal hard disk drive series come in a full range of storage capacities.

If you’re looking for expansion capability, the Micro Mac internal Mac II version allows you to buy one hard disk drive now and later add another. Your double mount bracket and all necessary cables come with your first Micro Mac. All Nova and Micro Mac hard disk drives are backed by the Microtech five year warranty!

Backup designed for Macintosh.

In today's market of 50 megabytes and beyond, backup is becoming essential. The Nova T60, our latest product advancement, is a 60 megabyte tape backup system designed strictly for the Macintosh. With the Nova T60 you are not restricted to the standard backup routines. Backup capabilities are virtually unlimited with the reliable, easy-to-use Nova T60. All you need is an imagination ... and a Macintosh.

No memory shortage at Microtech.

With today's memory intensive applications, the demand for RAM is skyrocketing, creating an industry shortage in supply. Not to worry. Our easy to install Micro Snap SIMMs are readily available at competitive prices.

Commitment to the future.

Our commitment to you and the growing Macintosh environment extends well into the future. We will continue setting new standards in our expanding product lines, bringing you an even broader range of system solutions. Leading the way, with a dedication to quality on all fronts - engineering, service, and stability - Microtech is your complete and only choice for Macintosh compatible add-on peripherals.

For more information, pricing, or your local Microtech dealer call

(800) 325-1895
New Products

20 ID pack $999, single evaluation unit $49.95; plus connect charges. National Instruments, 408-973-0110.

**Mac II Solitaire Royale** Game combining Mac II’s sound capabilities, 256-color range, eight versions of solitaire, and a menu of children’s games to create family-style entertainment. 1MB min. memory. $34.95. Sphere, 415/522-3584.

**McClint** C programming support tool that supports unlimited number of source files. Performs incremental syntax checking, user-selected error/warning message reporting, batch and interactive operation; provides support for C compilers. 1MB min. memory. $99.95. MMC AD Systems, 408/263-0781.

**MiniFans** Database for managing contacts, customers, and sales leads. Requires 4th Dimension (complete or runtime versions, System 4.1 or higher). 1MB min. memory. $34.95. Sphere, 415/522-3584.

**My Executive Office** Home office productivity tool that includes desktop design tool to create business and office forms; database tool to help manage forms, reports, and worksheets; word processor; and an electronic worksheet for spreadsheets. 128K min. memory. $195. DataPak Software, 818/905-6419.

**Nvelope** Envelope and label printing program with built-in address list and zip coding. Handles variety of envelope and label sizes. Composes and prints index and Rolodex cards. 128K min. memory. $69. Paul Mace Software, 503/488-2322.

**OmniPage** Program allows scanners to recognize pages containing mixture of images, sizes, and type fonts. Allows you to merge scanned items with spreadsheets and databases, and save them in MacWrite format. Automatically differentiates between images and text. 4MB min. memory. $795. Caere Corporation, 408/395-7000.

**101 Scripts and Buttons for HyperCard** Extends capability of HyperCard by adding such features as an animation recorder, HyperTalk tune recorder, new browsing tools, embedded games, and a button to add new items to Apple DA menu. 1MB min. memory. $59.95. Macropac International, 408/996-8143.

(continues)
Our architectural firm provides a top-quality product, on time, and within our clients' budgets. We're also a company that firmly believes our responsibility does not end with the sale. Standing behind our finished product and servicing our clients' needs is what Livermore, Edwards and Associates is all about...and what we feel Microtech is all about.

We bought a Nova external hard disk drive from Microtech based upon a recommendation from a fellow architect. A number of employees use it for numerous applications: from accounting, to word processing, to graphics; and the one thing we know is...we can count on it!

Microtech has a superb product at a great price, and a top rate service department to back it up. Whenever we have contacted Microtech, we have encountered enthusiastic, technically knowledgeable support personnel. Being a company that doesn't desert you once the sale is made, we appreciate when we run across a company with the same philosophy.

In this day and age it's so rare to find a company that provides exceptional service; we not only recommend Microtech but we are now in the process of deciding which Microtech drives we want to purchase next!
One thing you'll come to appreciate about CMO Icon Review is our almost obsessive attention to detail. Volume sales are our lifeblood, so we have to be good. We've developed a system of service and support that is without equal in the industry. That means we're fast, we're accurate, and we accommodate your needs. CMO Icon Review is the result of years of experience. We're committed to providing Mac users, like you, with the best and latest products at very attractive prices. And we back everything we sell with the factory warranties, expert consultation and technical amenities we know will keep you coming back. Call today for fast and friendly service.

800/228-8910
Good anywhere in U.S.
717-327-9575

Icon Review by CMO: Your clear choice in the Macintosh marketplace
A PARTIAL LISTING OF OUR MORE THAN 4,000 PRODUCTS—MANY GREAT BARGAINS

SOFTWARE

MS EXCEL $249

Notes For Works $39
Notes For Word 39
Personal Finance 29
Record Holder Plus 45
Resume Writer 28
Spellswell 2.0 45
Spelling Champion 32
Willmaker 3.0 36

MISCELLANEOUS

A+ MOUSE $65

MONITORS

HP pTop Full Page $1499
High Top Full Page 1099
Laserview Display 19" SE 1849
Laserview Display II 1899
Mac Larger 12" 369
Pageview CALL

HARD DRIVES

MacBottom HD21 $829
MacBottom HD21M 939
MacBottom HD32 969
MacStack 20 569
MacStack 43 839
MacStack 60 899
MacStack 80 1399
Pro 30 SEI 599
Pro 43 SE I 699
Pro 60 II I 779
Pro 80 II I 1299

UPGRADES

2MG Surface Sims Plus SEII $999
Dipsims 2MG II 899
MacSnap 2SE 469
MacSnap 52E 319
MacSnap 52SE 329
MacSnap 524S 399
MacSnap 548 569
MacSnap 548S 619
MacSnap Plus 2 469

DRIVES WITH TAPE BACKUP

EMAC 20/60 $1999
EMAC 40/60 1899
EMAC 91/60 2499

MODEMS

2400 Mac Pac w/Soft $189
EMAC MD 2400 219
Net Modem V2400 489
Net Bridge 349
Net Serial 349

DIGITIZERS/SCANNERS

Flatbed Scanner $1299
MacScan Flatbed 1799
MacVision 300 DPI 489
 Turbo Scan 1399

BOARDS

Mac 86 MS-DOS to SE $459
Mac 286 MS-DOS to II 1099

PRINTERS

HP Laser Jet $1799
ScripTen Laser Printer 399
Seikosha SP1000 249
Grapper LQ 99
Printer Stand 17
Pro Grapper 89
Serial Grapper + 69

FLOPPY DRIVES

Central Point 800K $189
Mirror Magnum 800K 209

ACCESSORIES

American Power 110SE $369
AnthroCart 225
Carrying Cases 199
Curtis Ruby Surge 55
Protector
Disk Cabinets (Roll Top/holds 45) 34
Fanny Mac 64
Mac 101 Keyboard 169
Mac Tilt 74
Profibint Trackball 119
Thunderscan 4.0 199

NETWORKING

Phone Net Plus $45
Apple Talk Adaptor 8
Apple Talk Clips 19
Modular Cable Kit 99

DISKS

Maxell 3½" DS/DD $19
Maxell 3½" SS/DD 13
Sony 3½" SS/DD 12

PRACTICAL MODEM 2400 $189

Hard Top Fast Back $54

5TH GENERATION CALL TOLL-FREE: 1-800-228-8910

In the U.S.A. and in Canada

We welcome orders from Educational, Governmental and Corporate Organizations

CMO Icon Review. 101 Reighard Ave., Dept.: N2, Williamsport, PA 17701

Over 400,000 SATISFIED CUSTOMERS • ALL MAJOR CREDIT CARDS ACCEPTED

In the U.S.A. and in Canada

Call toll-free: 1-800-228-8910

Outside the U.S.A. call 717-327-9575, Fax 717-327-1217

We welcome orders from Educational, Governmental and Corporate Organizations

CMO Icon Review. 101 Reighard Ave., Dept.: N2, Williamsport, PA 17701

Over 400,000 SATISFIED CUSTOMERS • ALL MAJOR CREDIT CARDS ACCEPTED

POLICY: Add 3% ($3.00 minimum, 2.00 for C.O.D.) shipping and handling. Larger shipments may require additional charges. Personal and company checks require 3 weeks to clear. For faster delivery, use your credit card or send a cashier's check or bank money order. Credit cards are not charged until we ship. Pennsylvania and Maryland residents add appropriate sales tax. All prices are U.S.A. prices and are subject to change. All items are subject to availability. Defective software will be replaced with the same item only. Hardware will be replaced or repaired at our discretion within the terms and limits of the manufacturer's warranty. We cannot guarantee compatibility. All sales are final and returned shipments are subject to a restocking fee. We are not responsible for typographic or photographic errors.

Macintosh is a trademark of Apple Computer, Inc.

Circle 193 on reader service card
Para Mason's Bar Review Series
Supplementary learning tool uses HyperCard stacks to familiarize students with question format of the multistate bar exam. Six modules contain at least 200 multiple-choice questions per subject with explanatory answers. 1MB min. memory. $59.95 per module; complete set $295. En Fleur Corporation, 919/833-7551.

Readstar II Plus OCR package reads typed and typeset characters at constant or proportional pitch, including unconventional characters. Recognizes up to 9000 characters per minute, depending on processor and scanner. Operates in three modes. Compatible with most desktop scanners and a variety of word processing and desktop publishing programs. 2MB min. memory. $4500. Inovative, 703/522-3053.


Super 3D Three-dimensional modeling and animation software. Allows objects drawn in 2-D for modeling and animation to be transformed into 3-D. Changes to a model can be recorded frame by frame or imported from a text file and played back at user-controlled frame rate. 512KE min. memory. $295. Silicon Beach Software, 619/695-6956.

Teacher's Rollbook Records grades, student attendance, behavior, special occasions, student birthdays. Also calculates averages, and keeps track of checkout and return of library items. Requires two 800K disk drives or hard disk. 512K min. memory. $149. Current Class Productions, 213/326-4246.

The NightWatch Prevents unauthorized access to, or erasure of, hard disks. Tracks attempts to unlock disk, supplies report of user names and passwords tried. Protects file containing authorized passwords with the American National Standard for Data Encryption. 512K min. memory. $149.95. Kent Marsh, 800/325-3587.

(continues)
7 Reasons Why Tecmar Tape Backup is Vital if You Own a Mac Hard Disk.

1. Why do you think they call it a hard disk?
   Hard disks are great for storing data, but they're, well—hard to handle. Hard to protect. Hard to transport data and software. You get the picture.

Tecmar's QT-Mac40™ makes owning a hard disk easy. This 40MB tape drive protects your data from human and mechanical failure; lets you remove, yet save, files from your hard disk; lets you send large amounts of data across country overnight; and even organizes all files under an easy-to-use, menu-driven format. That's a hard disk management system.

   Apple selected the 40MB QIC100 tape format using DC2000-size cartridges for its own tape system, so to be compatible you must have a tape backup system capable of reading and writing in this format.

   The QT-Mac40 can. In fact, the QT-Mac40 is so compatible with Apple's own tape system that you can use a QT-Mac40 to write to a tape, put the tape in an Apple system and restore the data to a hard disk, and vice-versa.

3. Faster than a speeding Apple.
   Compatible, but better! The QT-Mac40 is more than twice the speed of Apple's tape backup. So, you can back up an entire 40MB hard disk in just 16 minutes— it takes 40 minutes with Apple.

4. Portability for sharing.
   QT-Mac40's compact, freestanding design makes it easy to move from Mac to Mac or to a chain of SCSI peripherals for sharing. It's so small that it even fits in most briefcases.

5. Superior software.
   Using the Mac's familiar, easy-to-use icon-oriented software interface, the QT-Mac40 requires no special training.

   And, the QT-Mac40 has many software features that simply aren't available with any other unit, such as our exclusive PowerTag™ software that lets you selectively tag only the files that have changed for backup. And a background backup mode that lets you back up while using the Mac.

6. Experience makes the difference.
   As the leading tape backup supplier for all personal computers, with over 100,000 units in the field, no one—not even Apple—can match our experience and engineering know-how. Maybe that's why we're able to give you a two-year warranty. And, if you have a problem in the first six months of ownership, we guarantee a replacement within 48 hours.

7. Experts agree.
   Ric Ford—MacWEEK: "Our experience with the QT-Mac40 was quite positive. The hardware is solid, attractive and compact. It proved fastest among the DC2000 units..."

John Rizzo—MacIntoshToday: "I recommend the Tecmar QT-Mac40 for its speed, portability, quality of construction and software interface.

Shop and compare. Read the reviews. Then buy Tecmar's QT-Mac40. There's lots of reasons. Call us today for information at (800) 624-8560.
New Products

**Timecode Machine Desk Accessory** Software for controlling the Timecode Machine, SMPTE-to-MIDI converter. Offers capacity to stripe a tape with any format of SMPTE, test an existing track of SMPTE time code, display current setting of the DIP switches on Timecode Machine or display the version number of the ROM software. Includes online help. 512KE min. Memory: $300. Opcode Systems, 415/321-9034.


**Virus First Aid** Virus-free collection of public domain and shareware news, information, and programs concerning viruses. Eight utilities for detecting and eliminating a virus included along with documentation. 128K min. Memory: $6 plus $1.50 s/h. Shenandoah Mac User Group, 703/433-8402.

**Apple Laser Scanner**

**HARDWARE**

**ADB Mac 'n Touch Screen** Touch screen for Mac SE and II; compatible with Apple Desktop Bus, HyperCard, and Mac software. Comes with driver software, controller card, and 9-inch glass sensor for Mac SE. $695. Microtouch Systems, 617/935-0080.

**Apple Laser Scanner** Capable of flatbed scanning a range of document sizes; records images from bound documents; reduces distortion in scanned images. 300 dpi for desktop publishing, 200 dpi for Group 3 facsimile, and 75 dpi for quickscan feature. Allows high-speed data transfer between scanner and Mac. Ability to daisy-chain up to six additional SCSI devices. $1799. Apple Computer, 408/996-1010.

**Business LaserPrinter** 300 dpi printer runs Adobe PostScript (version 49) with 2MB of RAM, AppleTalk compatibility, and a SCSI port for hard disk font-storage. Adds four Helvetica Condensed fonts to standard PostScript set of 35. Expandable RAM up to 4MB. $4199; upgrade $2299. General Computer, 617/890-0880.

**CAD/CAM Monitors** GDM-1601 and GDM-1602 16-inch (at 0.26 dot pitch) and GDM-1953 19-inch (at 0.31 dot pitch) Trinitron monitors. Include vertically flat screens and square-cornered image display areas. 16-inch $3095; 19-inch $4195. Sony Corporation of America, 212/418-9427.

**Colorfreeze-24** 24-bit Video Digitizer board for Mac II. Provides full-color capture of standard NTSC composite video signal triggered by software or external

(continues)

---

**OUR FIREWORKS PREVENT BURNS!**

If you leave a constant image on your screen for too long a time, it can “burn” into the screen, causing permanent damage.

That’s why you need PYRO! The Entertaining Screen Saver. PYRO! prevents screen burn-in by darkening the screen. Then, so you know it’s working, it puts on a fun little fireworks show that moves around the screen until you either use your mouse, press a key or insert a diskette.

All you have to do is put PYRO! in your system folder and it installs automatically when you turn on your Mac. The display then activates at a time interval you’ve selected (you can also choose a roving clock instead of the fireworks), and the display will even be in color if your system supports it.

Extend the life of your Mac. Ask for PYRO! wherever Macintosh products are sold.

![PYRO! THE ENTERTAINING SCREEN SAVER](image)

Circle 250 on reader service card
Now you can create prints and overhead transparencies that rival 35mm slides in brilliance, color, and sharpness. Easily, with a chooser-selectable, QuickDraw™-based driver. And quickly, at the rate of one page per minute. All with the Tektronix 4693D Color Image Printer for the Mac II.

For publishing or presenting, in business, engineering, science, or even graphic arts—the 300 dot-per-inch, 16.7 million-color 4693D delivers the performance you need. And it's compatible with an impressive range of applications, such as Microsoft® PowerPoint™, Cricket Presents, Aldus PageMaker® and Freehand® SuperMac® PixelPaint, and others.

For more on what Tek 4693D showmanship can do for you, or the location of a Tektronix dealer near you, call 1-800-225-5434. In Oregon, call 1-235-7202.
GRAPHIST

Paint II

A new and advanced paint, editing and special effects program.

For the serious artist, with capabilities and speed beyond any other Macintosh paint software

CUSTOMIZING COLOR PALETTES Create and save your own set of colors — one at a time with color picker, or a range of colors using RGB and/or HLS tables. Blend any range of colors from 2 to 256. Change palettes to change the color scheme of any illustration.
New, Exclusive “Magic-like” Special Effects
- 2 Layers with Paint and Edit features on both.
- Incrust selected images from Stencil layer onto top layer.
- New Pixel Brush allows you to create customized paint brushes.
- New “water drop” tool allows selective blending of colors.
- New “thermometer” displays colors on the palette.
- New spheration of any image including text.
- Two to ten times faster than any other advanced Macintosh paint or draw program.

INCURSTING
Take any two images, on two layers . . . incrust an image from one onto the other — in any position — or onto any other illustration — in any position — or back onto the full original.

SPHERIZATION
Take any image, or text . . . define the area . . . and create a 3-D sphere of the entire image, or text.

CUSTOM COLOR MANAGEMENT
Customize color palettes by changing RGB and/or HLS wave forms — or use the standard Macintosh color picker.

Graphist Paint II is a new hi-end paint program with all of the standard painting tools, file formats and 16 Macintosh standard modes . . . PLUS you can:
- Import all of the standard formats, PixelPaint and video inputs (driver built-in) including PAINT, PICT I and II, TIFF and RIFF.
- Export many different formats for direct integration with other software to provide a more complete and better art solution.
- Digitize existing images from a video camera or a television (NTSC or PAL) with on-screen viewing, for subsequent editing.
- Select from 16.7 Million colors, supporting 1 palette of 256 colors at a time, on each of 2 screens.
- Pixel by pixel editing.
New Products

**GDM-1953 Monitor**

**Feel Factory** Interface device that incorporates a Mac-to-MIDI converter and SMPTE reader/generator to give a human feel to synthesizers and drum machines. Accesses complex and variable algorithms, memorizes time modulations and allows you to manipulate MIDI timing information in real time using feel factor algorithms. $695. Filmsonix, 213/653-0240.


**MacADIOS II Jr.** Data acquisition board for Mac II. Includes TurboDriver I/O software for oscilloscope and scrolling strip-chart recorder emulations. Features interrupt-driven background tasks, spooling to hard disk, and scan-line recorder emulations. $890. GW Instruments, 617/625-4096.

**MacDSP** Floating-point accelerator card for Mac II; includes menu-driven signal processing analysis package. High-speed floating-point capability for acquiring data at up to 125 kHz. Comes with wide range of signal processing functions and flexible viewing modes. Can be configured to work with analog or digital inputs and outputs. 8-MFLOPS with 64K driver software $2249; 12-MFLOPS version $1745; 25-MFLOPS version.

**Commlink 2400**


**MacADIOS II Jr.** Data acquisition board for Mac II. Includes TurboDriver I/O software for oscilloscope and scrolling strip-chart recorder emulations. Features interrupt-driven background tasks, spooling to hard disk, and scan-line recorder emulations. $890. GW Instruments, 617/625-4096.

**MacDSP** Floating-point accelerator card for Mac II; includes menu-driven signal processing analysis package. High-speed floating-point capability for acquiring data at up to 125 kHz. Comes with wide range of signal processing functions and flexible viewing modes. Can be configured to work with analog or digital inputs and outputs. 8-MFLOPS with 64K driver software $2249; 12-MFLOPS version $1745; 25-MFLOPS version.

**Commlink 2400**


**MacADIOS II Jr.** Data acquisition board for Mac II. Includes TurboDriver I/O software for oscilloscope and scrolling strip-chart recorder emulations. Features interrupt-driven background tasks, spooling to hard disk, and scan-line recorder emulations. $890. GW Instruments, 617/625-4096.
Is your HyperCard playing with a full deck?

It can happen to the best of us. You file something and it gets lost in the stacks. Or what comes back from the stacks is different from what went in. Or you find yourself locked in a corner—can't go forward, can't go back.

Well, there is a way out. CompuServe. We have the largest Mac® user forums of any online service anywhere. Tens of thousands of people who share their problems (and, more importantly, their solutions) with each other every day. HyperCard™ users. HyperCard experts. HyperCard authors.

Visit a CompuServe Mac Forum, and, chances are, you and your HyperCard will be Hyper Active again in no time.

To join CompuServe, see your computer dealer. To order direct or for more information, call 800 848-8199. In Ohio and Canada, call 614 457-0802. If you're already a member, type GO MACINTOSH at any prompt.

HyperCard is a trademark of Apple Computer, Inc.

Circle 57 on reader service card
DATA ACQUISITION AND CONTROL FOR MAC II™ & MAC SE™

STRAWBERRY TREE COMPUTERS ANNOUNCES

STRAWBERRY TREE COMPUTERS, INC.
160 SOUTH WOLFE ROAD ☐ SUNNYVALE, CA 94086
(408) 736-3083

FEATURING ANALOG CONNECTION WorkBench™

"The easiest to use data acquisition software on any host!"

Feel Factory

New Products

$324; 125-kHz programmable 16-bit A/D and D/A card $486; DSP software $496. Spectral Innovations, 408/734-1314.

MacMOD Memory module for the Mac Plus, SE, and II. Single Inline Memory Module consists of eight 100-nanosecond, low-power CMOS 1MB DRAM chips mounted on a PCB. Attaches directly onto the Mac's system board. $425; 2MB expansion kit $850. STB Systems, 214/254-8750.


Micro Max Series SCSI hard disk drives (150, 291, and 620MB) and tape backup series (60MB and 150MB) featuring universal power supply that operates with 90- to 260-volt input and 47Hz to 63Hz. External SCSI ID select, external termination, disk activity LED, power-on LED, two 50-pin ports, and double-shielded interface cable. SBX-150 $2995; SBX-300 $4095; SBX-620 $5495. MicroNet Technology, 714/837-6033.

Micro SE I Series Internal 3½-inch hard disks, compatible with Mac SE and II. Offset mounting bracket allows floppy and hard disks to be installed in SE. 30-4MB $895; 46.7MB $995; 80.5MB $1500. MicroNet Technology, 714/837-6033.


Orchard Internal Disk Drives Internal hard disks featuring low power usage for Mac SE. Each includes easy-to-use installation software. 30MB $625; 47MB $810; 100MB $2300. Franklin Telecommunications Corporation, 805/573-8688.

PanChroma CHC-345 300 dpi color-image printer compatible with all Apple PICT files. Outputs to paper or Mylar. $8000. Computer Friends, 503/626-2291.

PrintLink Communications controller that lets QMS printers attach to IEEE 802.3 Ethernet TCP/IP networks through thick or thin cabling. Acts as an independent node without imposing on network CPU for management. Console interface allows performance of various tasks. $3250. QMS, 205/633-4300.

Tempest LaserWriter i1NT Printer that produces high-resolution, full-page text and graphics. Can be linked to as many as 31 Mac IIs, Mac SEs, or T5170s through an AppleTalk network. $8900. Atlantic Research Corporation, 703/642-4000.

(continues)
Having problems with desktop publishing?

Well, let's see. It could be your software. Then again, it might be your hardware. Or maybe your printer just doesn't recognize those new fonts you're using. Who knows? CompuServe knows. Because we have the largest Mac® user forum of any online service anywhere. Tens of thousands of people who share their problems (and, more importantly, their solutions) with each other every day. People who have been working with—and working the bugs out of—these complex systems for years.

Visit a CompuServe Mac Forum, and, chances are, you'll soon be right back where you belong: in print.

Circle 370 on reader service card

To join CompuServe, see your computer dealer. To order direct or for more information, call 800 848-8199. In Ohio and Canada, call 614 457-0802. If you're already a member, type GO MACINTOSH at any prompt.

CompuServe®

An America Online company
New Products

ACCESSORIES

How to Use PageMaker (Macintosh Version)  
Self-study audio cassette course covers basic to advanced techniques for PageMaker version 3.0. Includes data disk and fully indexed Quick Reference Guide. $95. FlipTrack Learning Systems, 312/790-1117.

Inland MacDrawer  
Compact keyboard storage system features sliding keyboard drawer, built-in wrist support, and cabinet with keyboard cable port. Elevates Mac approximately 3 1/4 inches. $89.95. Inland Data-Pak, 313/583-7150.

Mac-Kit  
Specialized hardware security kit contains clips, a cable, and lock. Adhesive accessory pads to secure additional equipment also available. $29.95 to $59.95 depending on configuration. Qualtec, 415/490-8471.

Monitor Mover  
Adjustable platform that controls height, distance, position, and angle of monitor. Capable of 360 degree rotation with 17-inch arm extension. Clamps onto desktop. $149.95. Inland Data-Pak, 313/583-7150.

ProGarde 3  
Surge protector for telecommunications equipment; includes safe surge protection LED and ground default indicator status lights. Modem connectors accept standard modular phone cables. Four-outlets $79.95; four-outlets with modem protection $99.95; six-outlets $89.95. Inland Data-Pak, 313/583-7150.

Pro-Tech Transparency Films  
Transparency films for thermal transfer, dot matrix, inkjet printers, as well as desktop pen plotters. Offers high image-resolution for overhead projections. Optically clear, 4-mil films accept wax-based inks and have been treated for heat stability. For thermal transfer $41.25, for dot matrix $46.25, for inkjet $49.95, for pen plotter $41.25. James River Corporation 413/589-7592, 800/521-5035.

Sentrymac SE Workstation  
Mobile locking storage cabinet for entire Mac Plus or SE system. Comes with adjustable keyboard shelf that doubles as a removable lap-board. Oak veneer $499; laminated $399; school and corporate discounts available. Southern Technical Associates, 901/853-0317.

Write Companion  
This 330-page guide to Microsoft Write contains illustrations, practical applications, index, and side-margin headings. Text arranged by topic. Explores Write's capabilities; includes tips, techniques, and keyboard shortcuts. $19.95. The Cobb Group, 502/425-7756.

To have your product considered for inclusion in New Products, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, Macworld, 501 Second St., San Francisco, CA 94107. We reserve the right to edit press releases.
Your Macintosh® remote terminal isn't speaking to your DEC® workstation. When it comes to transferring files to your Mac®, your Toshiba® laptop is sitting down on the job. And when you try to get your Mac to remote control an IBM®, the I/O bottlenecks drive you to drink.

Well, if you can't talk to them, you should talk to us.

CompuServe. We have the largest Mac user forum of any online service. Tens of thousands of people who share their problems (and, more importantly, their solutions) with each other every day. People who have been working with—and working the bugs out of—these systems for years.

So if what you have here is a failure to communicate, visit a CompuServe Mac Forum. And start speaking to each other again.

To join CompuServe, see your computer dealer. To order direct or for more information, call 800 848-8199. In Ohio and Canada, call 614 457-0802. If you're already a member, type GO MACINTOSH at any ! prompt.

Circle 371 on reader service card
Datacopy Grayscale Scanners: Now you can put gallery quality photographs in all your publications.

The best imaging in a desktop scanner comes from Datacopy. Now you can merge finely detailed photographs and other artwork directly into your desktop publications.

VERSATILE SOFTWARE
Datacopy software brings all the capabilities of a professional graphics house to your desktop. With MacImage you can take any scanned image and modify it with an extensive selection of electronic darkroom functions. Then you can merge images with text using your current desktop publishing package. What's more, Datacopy MacOCR lets you automatically scan the most popular types of hard copy information into your computer in seconds... and it will format the text for your favorite word processing and desktop publishing programs. Quickly and easily.

HIGH RESOLUTION
Datacopy's complete range of scanners delivers the ultimate in high-resolution imaging. With advanced grayscaling capabilities and 300 or 400 dot-per-inch quality graphics, Datacopy Scanners clearly outperform all other products in their price class.

VERSATILE SOFTWARE
Datacopy software brings all the capabilities of a professional graphics house to your desktop. With MacImage you can take any scanned image and modify it with an extensive selection of electronic darkroom functions. Then you can merge images with text using your current desktop publishing package. What's more, Datacopy MacOCR lets you automatically scan the most popular types of hard copy information into your computer in seconds... and it will format the text for your favorite word processing and desktop publishing programs. Quickly and easily.

QUICK INFORMATION
Call us today. We'll furnish you with information on our complete line of scanners and software. And where to find the nearest Datacopy reseller. (800) 821-2898

DATACOPY
A Xerox Company
Circle 376 on reader service card
The method described in June's Quick Tips for choosing Microsoft Word 3.0x menu commands from the keyboard doesn't work on a keyboard without a numeric keypad. William J. Reynolds of Sioux Falls, South Dakota, reports that you can activate the menu bar by pressing 3-Tab no matter what keyboard you have (from the keypad you can also activate the menu bar by pressing the period key [.] or 3-period, if Num. Lock is on). To pull down a menu, type the first letter of a menu name or a number from 0 to 8. Then to choose a command, type the first letter of the command and press Return. If the menu has more than one command starting with the same letter, type the letter repeatedly until the appropriate command is highlighted, then press Return.

Linked HyperCard Scrolling

With a special script, you can scroll two or more HyperCard fields simultaneously with one scroll bar. That scroll bar belongs to one of the fields—call it the independent field—and the script sets the Scroll property of the other, dependent fields to the Scroll property of the independent field.

The fields scroll together, but because they are actually separate, each can use a different font and style (though the text must be the same height in all the fields). Scrolling is not synchronous, because the script scrolls the dependent fields only after you finish scrolling the independent field with the scroll bar. As a side effect, you can type no more than one character at the bottom of any of these linked fields, and you cannot select text in them by dragging above or below the field edges.

Arrange the fields so that each one covers the scroll bar of another, with the independent field on top so its scroll bar is uncovered (see "SimulScroll"). To make two adjacent fields look like one, cover the boundary line between them with an opaque field whose width is 1 pixel and whose height is 2 pixels less than the height of the fields.

"MultiScroll" lists two handlers: idle and multiScroll. They go into the card script, the background script, the stack script, or even the Home stack's stack script, depending on how wide you want the script's range to be.
Imagine what you could do with an advanced drawing program that was actually easy to use. A program that could give you the freedom to create more with your Macintosh® than any other drawing program; even work as sophisticated as the illustrations in this ad.

That's the power of Aldus® FreeHand™ 2.0. And here are some of the things you'll be able to do with it.

1. Achieve unequalled control over your type. Curve text on a path, create stroked and filled type, and mix sizes, styles, fonts and colors in the same type block. 2. Not only can you import PICT, EPS and TIFF images, you can actually work with them. There's no easier way to enhance existing artwork. 3. Choose graduated, radial and patterned fills from our extensive library, or create your own PostScript®-language fill patterns for special effects. 4. Now PANTONE® Colors are available in Aldus FreeHand 2.0. So it's easy to see and specify the colors you want. 5. Use the autotrace function to convert any PICT or...
scanned TIFF image to instant line art. It'll both save time and expand your options. 6. Our blend feature allows you to transform one shape into another and produce airbrush effects with colors. 7. A built-in color separation capability for spot and process color makes it easy to output separated film—saving hours of production time. 8. Make short work of technical drawings with the most comprehensive set of advanced PostScript-language tools available; plus a set of familiar Macintosh drawing tools.

To experience creative freedom first-hand, visit an authorized Aldus dealer, or call 1-800-33-ALDUS to order a free self-running demo disk. In Washington state, call (206) 628-2375.†
ArchicAD™ - If you have been waiting for a professional Architector’s only CAD tool that allows you to completely automate your office with features such as:

- Complete construction documents,
- Bill of materials with pricing,
- 3D shaded color perspectives & 3D sections,
- plus, a macro-language, plotter drivers, object libraries, full color...

ArchicAD begins where other CAD programs end...

SIMULATION

SIMUL™—For the first time, you can draw, visualize, and calculate the dynamic interaction occurring in virtually any phenomena.

- Breakthrough Simulation Software
- Create simulations using values, formulas or moving objects
- Full graphic palette (you can also import designs from any other software)
- Export or import numerical data
- Almost infinite formulas

As you’ve discovered, BASIC’s LPRINT and LCOPY statements don’t work with LaserWriters. But BASIC version 3.0 can print to a LaserWriter if you open the printer as an output device using a statement such as OPEN “LPT1: PROMPT” FOR OUTPUT AS #1 (see “BASIC LaserWriter”). Then you must use the same device number in PRINT and in other output statements that you want to go to the printer. (Device “LPT1:” is the printer currently selected in the Chooser. You can also use the device “LPT1: PROMPT” to select that printer and display the standard Page Setup and Print dialog boxes.)

If you want to be able to print graphics and any text font, size, or style, include a statement such as WINDOW OUTPUT #1 after the OPEN statement. Next use a WIDTH # statement to set the line width at the printer. After the preliminaries, use PRINT # and PRINT # USING statements (continues)
WETPAINT

Now & Volumes!

Each WETPAINT volume contains an extensive collection of useful pictures, icons, borders, maps and patterns—in a wide variety of styles, designed for both home and business use.

WETPAINT files can be read and read by painting programs (like FullPaint, MacPaint, SuperPaint, etc.) and applications like PageMaker. WETPAINT is also available in PictureBase format at an additional $10 per volume.

Even if you don't own a painting program, you can still copy pictures directly from WETPAINT files using our ArtRoundup, a desktop accessory—included free with every WETPAINT volume! And ArtRoundup's new Slideshow tool is a great way to scan hundreds of images in minutes.

Each volume is three 800K disks.
$79.95 suggested retail.

©1988 Dubl-Click Software, Inc. • 1201 Gresham Street • Northridge, CA 91325 • (818) 349-2758

Circle 155 on reader service card
Six Months Ago
You Wrote A Paragraph About Alaska.
Find It. In 30 Seconds.

If you work with words, you need Sonar. Because only Sonar and Sonar Professional give you the power to search and compare hundreds of documents in seconds. Not just titles, but actual content. And not just key words, but complex relationships across multiple documents, multiple folders, even documents created with different applications. Sonar shows the full text, gives exact paragraphs, page numbers, document titles and location.

Sonar brings mainframe capabilities to your Mac. Search up to 15,000 pages of text in under a minute! Sonar Professional can search at speeds exceeding 250,000 pages a minute!

TO ORDER OR FOR DEALER INFORMATION CALL:
804-739-3200 (EST)

Once you've bought Sonar you can upgrade to Sonar Professional at any time. Try Sonar's full featured demo for 30 days for just $30 and you'll see why you need Sonar, the power tool for word processing:

Sonar ... $295
Sonar 30 Day Demo Disk ... $30
Sonar Professional ... $795

$600 shipping and handling charge added to all orders.

Also from Virginia Systems: Round Up! a low cost utility that searches file contents across multiple documents and moves them to the desktop for easy access. Round Up! is just $49.95 or free with Sonar.

All trademarks acknowledged. Search times quoted for Mac!

Virginia Systems
5509 West Bay Court
Midlothian, VA 23112

(continues)
MANAGING YOUR MONEY...
NO OTHER PROGRAM DOES MORE FOR YOUR MONEY.

Managing Your Money® is the most comprehensive, easy to use money management program available on the Macintosh™! Fully integrated and updated for the new tax laws, MYM Mac is everything you’ll ever need to master your personal or small business finances:

- CHECK WRITING AND BUDGETING
- TAX PLANNING
- INSURANCE PLANNING
- FINANCIAL PLANNING
- PORTFOLIO MANAGER
- NET WORTH
And there’s more:

- POWERFUL SMALL BUSINESS FEATURES
- EXTENSIVE GRAPHICS & REPORTING
- EXPORTS TO EXCEL® AND MACINTAX®
- NOT COPY PROTECTED

Let Andrew Tobias become your financial advisor and find out why year after year, Managing Your Money is rated the outstanding program in its class.

"If you’ve got a computer, you should have Managing Your Money."
— Stock Market Magazine, 1988

Circle 37 on reader service card meca®
Software that makes your personal computer worth having.
© 1988 • MECA • 355 Riverside Avenue • Westport, CT 06880
For Macintosh Plus, SE, II, 512KE. Two disk drives (one being at least 800K).
WHATEVER WE HAVE

When Dr. Leakey discovered stone tools at the Olduvai Gorge in Central Africa, it was proof that early man was intent on improving his productivity. Today, more than one million years later, only the tools have changed.

Why type it, when any scanner can read it.
A good tool should always do the work for you. And, when it comes to taking the printed word, converting it into usable text that you can edit in your word processor, store in your database or place in your desktop publishing application, nothing does it better than our fully trainable READ-IT™ O.C.R. (Optical Character Recognition) software.

You can use READ-IT! O.C.R. with any scanner, including Thunderscan, to input text from books, magazines, newspapers, letters, price lists, phone books, etc. READ-IT! O.C.R. even works with Fax Modems and in the background under MultiFinder and, unlike other O.C.R.s, READ-IT! O.C.R. requires only a standard Mac Plus with one megabyte of RAM. The NEW VERSION 2.0 now includes speech, drivers for popular scanners and EasyLearn™ – the superfast way to teach READ-IT! O.C.R. new fonts.

So why type it when, as MacUser put it in their 4-mice review: “READ-IT! O.C.R. can save you time, money and frustration, and can dramatically increase your productivity.”

Efficient networks share fonts. Thanks to FONTSHARE™ font server software, all Macs on a network can now share downloadable Laser fonts residing in any network file server. Imagine the disk space, not to mention the money, you’ll save by not needing a dedicated hard disk for each workstation or printer. As MACazine says...

“FONTSHARE is wonderfully practical... we rate it this month’s BEST BUY!”

Cut and paste across a network.
Now, with CLIPSHARE™ anything that can be copied and pasted, (including simple messages), can be instantly transferred to any user on a network. CLIPSHARE seamlessly integrates with new MULTICLIP™ forming an incredibly powerful and versatile network clipboard system. The “Workgroup” environment has never been more efficient.
YOUR TRADE
THE TOOLS

The end of the
Macintosh clipboard as
we know it. Introducing
MULTICLIP™, the superfast scrap-
book/clipboard replacement that
allows you to have multiple clip-
boards. Everything you cut or
copy, (text, graphics, etc.) can now
be stored in its
own
“ClipFrame.” MULTICLIP
allows you to edit the contents
of these ClipFrames, whether
text or graphics, with the
built-in editing tools, and is
so useful in any application
(MULTICLIP is also a con-
stantly active backup of all
your clipboard activity) you’ll
wonder how you ever managed
without it.

“HyperCard-like” buttons for
any application. With a simple
click on one of ICON-IT!”s cus-
tom-designed icons, you can select menu
items, DAs, fonts, FKeys and macros! Why pull
down menus or try to remember awkward key-
board commands, when all you have to do is
ICON-IT! MacUser magazine gave
ICON-IT a
4½
mice rating,
saying...
“ICON-IT is
a must!”

ART-FO\nHigh-quality Laser fonts that
don’t cost a serif and a descender.
Give your document or publication a strik-
ing new look with ART-FO\nTS™ an exciting
collection of downloadable Laser fonts
(including symbols) designed for headlines
and logos.
ART-FO\nTS’ three-volume set consists
of six different typefaces per volume.

Free Demo. For a free demo disk including the
OLDUVAI product line HyperCard stack, just send us
your business card or a blank disk.

For more information or the name of your nearest
OLDUVAI dealer, call TOLL-FREE 1-800-822-0772.
Because, whether you’re an archaeologist or an en-
gineer, a scientist or a designer, at OLDUVAI we have the
tools to improve your productivity.

OLDUVAI Corporation
7520 Red Road, Suite A, South Miami, FL 33143
(305) 665-4665 -- Fax (305) 665-0671

All OLDUVAI products are not copy-protected. READ-IT O.C.R. requires 1 MB RAM and any scanner. Thunderscan version requires 512K and Thunderscan 4.0
FONTSHARE requires 512K and any network file server. ICON-IT requires 512K. All product names mentioned are trademarks of their respective holders.

Circle 284 on reader service card
"I made $800,000 in 12 days with the Index Program."

I.B., Los Angeles, CA

Profitable Buy/Sell signals with about 80% accuracy.

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

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

Amazingly Precise.

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

It's also fast. If you decide to download from Dow Jones with a modem, IBM (and compatible), Apple II and Macintosh personal computers. The software is easy to use, amazingly precise, and very, very clear in its signals.

It's also fast. If you decide to download from Dow Jones with a modem, IBM (and compatible), Apple II and Macintosh personal computers. The software is easy to use, amazingly precise, and very, very clear in its signals.

What's more, you can play "What If?" make quick profits from quick decisions with about 80% accuracy. With stock options, commodities, indexes, or funds.

Results: Winning Trades.

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

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

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

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

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

For More Information.

Call (213) 312-0154 today for our free twelve page brochure, or place an order with a 30-day guarantee. Each program costs $499—any three $999, or invest in all four for just $1299. Demos available for $49 each.

How To/Quick Tips

A What about a drawing application such as MacDraw II or SuperPaint? I created a sample long-division problem and a sample stacked-fraction problem in about 10 minutes in each application. Then I used the samples as templates and created a page of 26 problems in 20 minutes (see "Homework Assignment"). For this type of work, drawing applications have a real advantage over painting programs like MacPaint because the numbers you put in a template are easy to change in a duplicate of the template. You can create a long-division sign using the oval, rectangle, and line tools (see "Long Division"). To resize the entire division sign, select all of its parts, group them, and drag one of the corners of the composite object. When typing the divisor to the left of the long-division sign, use right-aligned text. Use left-aligned text for the dividend under the division sign.

To create the fraction template, use left-aligned text for the whole numbers. Use center-aligned text for the numerator and denominator of the fractions and put them in a smaller font size than the whole

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

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

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

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

Call us today for more information and the E-Machines dealer near you.
LEONARDO WOULD LOVE IT!

The Master would settle for nothing less. Da Vinci's genius for clarity, symmetry, and detail would have demanded the best. Which is why he would appreciate Nutmeg Systems' newest large screen offering: the Nutmeg 19. Perfection in Macintosh™ display technology achieved. Crisp. Precise. Proportionate. And priced to make the Mona Lisa smile. See it at your local Apple® dealer or call toll free 1-800-777-8439 for details.

Portrait of the Great American Investor

It's his job to know good advertising—and he also knows a good investment. Terry Wilson puts his money in U.S. Savings Bonds. Bonds now pay competitive rates, like money market accounts. Find out more, call 1-800-US-BONDS.

Multicolumn Laser Labels

Tip: I have discovered a way to print multicolumn mailing labels on a LaserWriter using the Print Merge command in Microsoft Word 3.0x. The Word manual's directions for printing three-column labels work only with continuous forms, which you can't use with a LaserWriter.

The main print-merge document, which specifies the format of the printed labels, contains a separate template for the first label in each column. In each template you put the name of each field where you want the field value to appear when printed (see "Print-Merge Laser Labels"). You can use <<if>> instructions to skip empty fields. More <<if>> instructions at the end of the first template compensate for skipped fields by inserting blank lines. (Only the first template needs to compen-
FastNet™
The Power of Intelligent Ether-Networking.

Do you need Ethernet™ communications to:
- Link AppleTalk™ networks together
- Connect Macintoshs™ with UNIX™, VAX™, or PC systems
- Support EtherTalk, TCP/IP, DECnet™, and other protocols
- Realize top speed and performance

Then make your choice FastNet products. Choose the desk-top FastNet SCSI controller for the Macintosh 512, Plus or SE. For your Macintosh II, FastNet II couples intelligence with NuBus performance. Or choose FastNet III, the value-priced, high-performance NuBus Ethernet adapter for the Mac II.

Make the intelligent connection: call Dove Computer Corporation for additional FastNet information. 1-800-622-7627.

DOVE COMPUTER CORPORATION
1200 North 23rd St.
Wilmington, North Carolina 28405
(919) 763-7918

Circle 173 on reader service card
Print-Merge Laser Labels
This Microsoft Word document specifies where information goes when you print three-column labels (24 labels per sheet) on a LaserWriter using the Print Merge menu command. The columns appear side by side when printed but not when viewed on screen. The entire document is formatted for side-by-side columns and no break between sections. The Larger Print Area option is on; the paper height is 11.4 inches, and the bottom margin is 0.1 inches.

Re-ink Your Printer Ribbon for Less Than 5 Cents
Special Offer: FREE MOUSEPAD with any order $60.00

MacInker™, the automatic ribbon re-inker. The Imagewriter MacInker (mod 2341M) re-inks Imagewriter I/II black & single color cartridges. The Universal MacInker also re-inks hundreds of different cartridge types (including the Imagewriter LQ) with suitable adaptors. Extra dark, dot matrix, lubricated ink yields a truly better than new print quality and helps extend print-head life. Average number of re-inkings/cartridge is 60-100. With the Multicolor Adaptor (mod M422, $40.00) your MacInker can re-ink the multicolor Imagewriter II cartridges. We have a full range of optional accessories, inks & cartridges: indelible ink, heat transfer etc. Colors: red, green, blue, yellow, purple, brown, orange, silver, gold. Ask for free catalog.

Imagewriter I/II MacInker (mod 2341M).................. 42.00
Multicolor Adaptor (mod M422) ......................... 40.00
Epson MacInker (mod 271EP) ............................ 42.00
Universal MacInker.............................................. 68.50
Heat Transfer Adaptor............................... 35.00
Imagewriter cartridges ...3.15/ea... 4-color ... 10.00/ea
Extra ink bottle ................. 3.00/ea .... pint ............. 16.50

DATA SWITCHES & MODEMS
2 years warranty. Modems 100% Hayes compatible. Free software.

4 port 8 pin ...................... 50.00
4 port 9 pin ...................... 50.00
SCSI Switch 2 port .......... 46.00
SCSI Switch 4 port .......... 59.00
Cables .................................. 15.00
1200 baud ..................... 89.00
2400 baud ..................... 245.00
World Minimodem ............. 169.00

Order Toll Free 800-547-3303
in Oregon (503)626-2291- fax(503)643-5379
Computer Friends, Inc.
14250 NW Science Park Dr. Portland OR 97229

Circle 68 on reader service card
"This baby is loaded with extras..."

When Kristi Coale of MacUser magazine looked at our Master Piece® Mac II, she had expected it to have extra outlets, individual and master switches, surge suppression, and noise filtering. But she was impressed to find modem surge suppression and a swivel base, too. All for $159.95.

And we were delighted with her comment, since that's exactly what we aim for when we design accessories for the Mac—to build in the most benefits at the best price possible.

That's how we came to feature a fan in our System Saver Mac. How we slipped an extra shelf under our SuperBase. And popped a paper catcher in behind our Printer Stand.

In fact, we've figured out so many ways to enhance and protect your Macintosh, we can't fit them all on one page.

So, give us a call, and we'll send you a free 20-page brochure. And we guarantee—this baby's loaded!

Call (800) 535-4242

251 Park Avenue South NY, NY 10010
(212) 475-5200, Fax (212) 475-5996
Circle 30 on reader service card
Then choose Page Setup again, but without pressing Shift, and set the paper height to 11.4 inches and the bottom margin to 0.1 inches. These settings enable you to print a row of labels at the very bottom of the page.

When you use the Print Merge command, you must click the New Document option to create a new document of merged labels. You then use the Print command to print the new document on label stock.

You can adjust the gap between rows of labels by changing the After specification of the paragraph format of the first label’s last line.

Paul M. Suchko
Pittsburgh, Pennsylvania

For more information on merge printing, look under “Form Letters” in the Word manual.

Hidden Numbers

Tip: Would you like to hide numeric values on a Microsoft Excel worksheet without affecting the cell values or formu-
At MacPEAK, The Fine Art Of Design Always Results In One Thing:
MacPEAK Unveils A New Collection Of High Performance Peripherals For The Macintosh® Family.

The artists at MacPEAK have been at it again. Designing the most innovative products for Macintosh computers on the market today. Our palette features a wide variety of high performance upgrades, colored with an eye for attractive pricing. Simply stated, no one offers you a better product—at any price—than MacPEAK.

The Orion™ SE Accelerator. A full-featured multi-speed accelerator card for the Macintosh SE, the Orion SE replaces the SE's standard 8 MHz 68000 microprocessor with a 68020 processor, running at either 20 or 25 MHz.

The Orion SE also supports two co-processors: a 68020 with a 25 MHz 68030, supported by 256k of zero-wait-state static RAM. The result is an incredibly bright, crisp large-screen display that's every bit as good as the original. Fast? You bet. With its 16 MHz 68000 microprocessor and zero-wait-state static RAM, refresh and redraw times are up to 3 times faster than an ordinary large screen monitor. Pegasus works wonders for PageMaker® and other layout programs!

Pegasus™ Plus and SE. MacPEAK introduces Pegasus, a cutting-edge graphics system for the Macintosh Plus and SE. It's a powerful combination of Orion One accelerator technology and the finest ECL graphics drivers available. The result is an incredibly bright, crisp large-screen display that's every bit as good as the original. Fast? You bet. With its 16 MHz 68000 microprocessor and zero-wait-state static RAM, refresh and redraw times are up to 3 times faster than an ordinary large screen monitor. Pegasus works wonders for PageMaker® and other layout programs!

Galaxy II. Galaxy II is MacPEAK's 19" Monochrome Video Controller for the Macintosh II, using the most advanced high-speed ECL technology. With its bright, stable 1024 × 890 image, the quality of the Galaxy II equals the original Macintosh screen. One look and you'll see the difference!

Galaxy II + the Orion One. Galaxy II + the Orion One Accelerator technology is a powerful combination of Orion One accelerator technology and the finest ECL graphics drivers available. The result is an incredibly bright, crisp large-screen display that's every bit as good as the original. Fast? You bet. With its 16 MHz 68000 microprocessor and zero-wait-state static RAM, refresh and redraw times are up to 3 times faster than an ordinary large screen monitor. Pegasus works wonders for PageMaker® and other layout programs!

ST-60™ and ST-150™. With our ST family of streaming tape backup systems, you can store up to 150 MB of data at the speeds you're accustomed to from MacPEAK Quality TEAC mechanisms, double data integrity checking, and speeds of 3—5 MB/minute make the ST family the fastest and most reliable backups available today. The ST family is fully network compatible and supports file-by-file, mirror image, incremental, timely backups, and even multiple backup sessions per cartridge.

To find out more about these works of art from MacPEAK Systems, call 800/225-7509 for the dealer nearest you.
TWO OUT OF THREE OF YOU ARE ABOUT TO TRASH YOUR ACCOUNTING PROGRAMS.

It's painful for a business to throw out its accounting software and start all over again. But that's just what most businesses do, according to a recent survey by Business Software magazine.

Business Sense® will change all that. It's a fully-integrated, full featured program that overcomes the accounting problems most businesses are fed up with.

For one thing, businesses often find the program they started with can't grow to meet the demands of their success.

Business Sense gives you sophisticated cash flow analysis. You can use forward or backward to get a clear picture of your commitments.

Business Sense can manage up to 2000 employees, 2000 vendors and 2000 customers. And it handles checks up to a trillion dollars! It's accessible enough for a CEO, but powerful enough for a CFO.

According to the survey, accounting software can be difficult to use—even for non-accounting personnel. Instead of dealing with "integrated modules," you have one program disk with all the functions built in: General Ledger, Accounts Payable, Accounts Receivable, Payroll, Invoicing and Budgeting. They all work alike. Moving from one to another is as easy as pulling down a menu.

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

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

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

It's a bargain at under $500. And it's from Monogram, publishers of Dollars and Sense, the world's best-selling personal financial management program.

So there's no need to suffer any longer.

Every reason businesses throw out their accounting software is a reason Business Sense users won't.

General Ledger • Manages multiple companies, up to 2000 accounts, five bank accounts, 99 departments or profit centers; unlimited transactions. • Handles checks to $1 trillion. • Automates recurring entries. • Distributes data automatically on posting. • Transactions can be reversed. • Provides multiple open months. • Imports Dollars and Sense® files.

Accounts Receivable • Provides detailed history and analysis for up to 2000 customers, with credit limit warning and automatic credit memos. • Calculates and applies finance charges and discounts. • Handles partial payments. • Tracks commissions. • Produces aging reports.

Accounts Payable • Manages up to 2000 vendors. • Tracks invoice date, due date and discount date. • Details aging for cash flow analysis. • Allows partial payments. • Tracks 1099 forms. • Provides vendor analysis.

Payroll • Manages up to 2000 employees, 10 withholding and wage categories plus tips and fringes. • Prints W-2 forms, checks and 941 forms and handles federal and state taxes.

Invoicing is fully integrated into AR and GL.

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

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

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

Getting Started with Scanners

From dithers to gray scales to OCR, an introduction to turning pictures into pixels

by Jim Heid

Owning a scanner probably sounds enticing. Think of the possibilities—if your database manager supports graphics, you can put scanned images of products in your inventory database. A real-estate database could include an image of each property along with its description, allowing prospective buyers to search for—and see—houses meeting their needs.

Scanned images team up well with HyperCard, too. You might scan a map, then adorn it with buttons and scripts that describe a street or landmark when you click on it. Or you could scan a diagram of an engine, then create scripts describing each part’s purpose.

But before you head for the store, consider the drawbacks. Most scanners are expensive, as well as being gluttons for storage and memory. This month I’ll explore the world of electronic imaging to help you decide if a scanner belongs on your shopping list (for a list of vendors, see “Scanning the Field”).

A Scanner’s Roles

By optically reading photographs or other artwork to create electronic images that you can alter, a scanner typically provides graphics files for use in desktop publications. But since most Mac programs can accept graphics from the Clipboard or directly from MacPaint documents, you can use scanned images just about anywhere.

Jim Heid is a Macworld contributing editor who focuses each month on a different aspect of Mac fundamentals.

Scanners can also be used with optical character recognition (OCR) software—which turns a scanner into an electronic typist that can scan pages of text and turn out text files you can edit with a word processor. (Without OCR software, scanning text is like photographing it—you can’t edit or reformat the end product.)

When it comes to scanning images, originals come in two flavors: continuous-tone images (such as photographs), which contain white and black areas along with many shades of gray; and line art (such as diagrams or pen-and-ink drawings), which is strictly black and white.

Scanner Species

Most scanners work like photocopiers—illuminating the original while a sensor called a charge-coupled device (CCD), measures the light it reflects and generates a voltage. The scanner’s software translates the voltage values into data that represent the image (see “Anatomy of a Scan”).

There are two main types of scanners. With a flatbed scanner, the original image remains stationary and the CCD mechanism moves across it during the scan. With (continues)
Macintosh owners have a reputation for being fanatical about their Macs. And rightfully so, when you consider the elegance of the Macintosh user interface.

So when Novell set out to network the Macintosh with PCs, it was with one clear caveat: preserve the Mac environment. Create network software that would feel right to the pickiest of all Macintosh users. And none are pickier than the ones at Apple.

**Full AppleTalk compatibility.** Working directly with Apple, Novell’s programmers created a version of NetWare® that is compatible with the AppleTalk File Protocol (AFP). It’s an achievement hailed by Apple President and CEO John Sculley as “a very significant event for the industry.” And it means that Mac users can now get all the power and flexibility of the number one local area network in the world, without sacrificing any Macintosh functionality.

AFP compatibility also means that NetWare for Macintosh will be fully compatible with future Macintosh hardware and operating system versions. So you can take advantage of new Macintosh product releases as soon as they become available.

**Freedom to choose.** NetWare for Macintosh lets you connect Macs with a
work made to satisfy Macintosh user.

myriad of PC, minicomputer and mainframe environments, including OS/2. So you can choose the workstation environment that best suits your needs while communicating easily between dissimilar operating systems and sharing files and peripherals.

You get all the performance, security, fault tolerance and functionality of NetWare without changing the way you work with your Macintosh. And you get the power to transparently connect to over two million NetWare users worldwide.

To satisfy your need for a powerful Macintosh network, plug into NetWare—the network that passed the ultimate Mac test drive. See your Gold Novell Authorized Reseller, or call 1-800-LANKIND.

For more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter the access code NVMC17.

For network solutions, you should be seeing red.
Scanning the Field

Abaton Technology Corp.
7901 Stoneridge Dr.
Pleasanton, CA 94566
415/683-2226

Apple Computer, Inc.
20525 Mariani Ave.
Cupertino, CA 95014
408/996-1010

AST Research
2121 Alton Ave.
Irvine, CA 92714
714/553-0340

Barneyscan Corp.
1198 Tenth St.
Berkeley, CA 94710
415/524-6648

Comtrex Ltd.
P.O. Box 1450
El Toro, CA 92630
714/855-6600

Datcopy
2515 Terra Bella Ave.
Mountain View, CA 94043
415/965-7900

DEST Corp.
1201 Cadillac Ct.
Milpitas, CA 95035
408/946-7100

Hewlett-Packard
700 71st Ave.
Greeley, CO 80634
303/350-4444

Howtek Inc.
21 Park Ave.
Hudson, NH 03051
603/882-5200

Koala Technologies
269 Mt. Hermon Rd.
Scotts Valley, CA 95066
408/438-0946

LoDown
10 Victor Square, #600
Scotts Valley, CA 95066
408/438-7400

Microtek Labs, Inc.
16901 S. Western Ave.
Gardena, CA 90247
213/321-2121

New Image Technology, Inc.
10300 Greenbelt Rd.
Seabrook, MD 20706
301/464-3100

Pixelogic, Inc.
800 W. Cummings Park
Woburn, MA 01801
617/438-5520

Spectrum Digital Systems, Inc.
2702 International Lane, #112
Madison, WI 53704
608/244-4300, 800/541-6661

SuperMac Technology
295 N. Bernardo Ave.
Mountain View, CA 94043
415/962-2476

The Laser Connection, Inc.
7852 Schullinger Park West
Mobile, AL 36608
205/633-7223

Thunderware, Inc.
21 Orinda Way
Orinda, CA 94563
415/254-6581

Truvel Corp.
8943 Fullbright Ave.
Chatsworth, CA 91311
818/407-1031

a sheet-fed or edge-feed scanner, you feed the original into a slot, and a set of rubber rollers draws it past a stationary CCD mechanism.

Each approach has advantages and drawbacks. Flatbed scanners can scan pages from books and other originals too thick to fit between a sheet-fed scanner’s rollers. Flatbed units also eliminate the risk of a delicate or irregularly shaped original’s jamming inside the unit. And they provide guides that make it easy to position the original. With a sheet-fed scanner, it’s easy to insert something crookedly, causing crooked or skewed scans. Skewing is especially apparent with line art because it causes straight lines to assume a jagged-edged, stair-stepped look. With photos, skewing simply makes your photographer look sloppy.

But sheet-fed scanners usually cost less, since they don’t need a system of precisely aligned guides and rails to move the scanning mechanism. And their transport mechanisms lend themselves nicely to accepting automatic document feeders, paper-handling add-ons that shuttle originals into and out of the scanner for you—a real time-saver for OCR work. Automatic document feeders are available for some flatbed scanners, but they’re more common and often less costly in the sheet-fed world.

Both types of scanners usually attach to either the Mac’s SCSI port or its modem port. SCSI-equipped scanners are preferable: besides not monopolizing your modem port, they transfer data faster—a big plus, since scanned images can comprise many megabytes of data.

Sharing the field with sheet-fed and flatbed scanners are such unconventional units as the legendary ThunderScan. The ThunderScan’s scanning hardware replaces (continues)
Teach your Mac to perform unnatural acts.

If you're losing your passion for running the same old programs on your Mac, add a little excitement to the relationship. Start writing your own, with the new Microsoft QuickBASIC for the Macintosh.

BASIC is already the easiest language to learn on the Mac. And now, with new Microsoft QuickBASIC, it's even easier.

We've built the compiler and the interpreter into one program. Which means you can compile and execute whatever your heart desires with a simple double click of the mouse.

We've even added a complimentary personal finance program so you can practice. See any Microsoft dealer for a trial run.

You're going to have a lot of fun programming your own Mac, even when you're getting down to serious business. With new Microsoft QuickBASIC, you'll learn how to customize business applications and programs so they meet your specific needs and work with existing applications.

And don't be surprised at some of the ingenious things you can create right off the bat. That's perfectly natural.
Anatomy of a Scan

The scanner illuminates the original, and the CCD measures the amount of reflected light, generating higher voltage levels for lighter shades than for darker ones.

---

Looking Sharp: Resolution

Like video screens and laser printers, all scanners represent images by using very small dots. The more dots per inch a scanner, screen, or printer can work with, the higher its resolution, and generally, the sharper its images.

Scanners typically provide a resolution of 300 dots per inch (dpi), a value matching the resolution of most laser printer output. A few scanners, such as Microtek’s MSF-400G and Datacopy’s 8401, provide 400-dpi resolution, although for reasons I'll explain shortly, 300 dpi is usually more than adequate. The ThunderScan's resolution with an actual-size scan (no enlargement or reduction) is only 72 dpi, but using some clever scanning tricks, you can boost an image's resolution to nearly 300 dpi.

Differences in resolution can be more apparent in scanned line art than in scanned photos. As resolution drops, sharply defined shapes in line art take on the jagged look (known as aliasing); to see for yourself, compare a circle on the Mac's screen to one printed by a laser printer.

Looking Shady: Gray Scales

Continuous-tone images impose their own demands. Because a bit can represent only white or black values, depicting shades of gray requires special techniques.
QuarkXPress*, the complete electronic design and production environment, provides all of the resources you need to get the job done. Full featured word processing, powerful graphics editing and global search & replace functions are just a few of its exceptional features. And while QuarkXPress is already recognized for its superb typographic and layout capabilities, these convenient tools make Version 2.0 a pleasure to use. MacUser magazine thought so when it awarded QuarkXPress its highest rating for desktop publishing software.

But for all of its capabilities, QuarkXPress is remarkably easy to learn and to use... which means that you'll be able to take advantage of its power quickly. And now, Version 2.0 has an expanded palette of new features, such as image manipulation, style sheets and advanced color features.

To find out how QuarkXPress 2.0 can make your computer your best creative resource, visit your authorized Quark dealer or call 1-800-356-9363.

You'll see that expressing your best ideas has never been easier than with QuarkXPress.

Quark and QuarkXPress are registered trademarks of Quark, Inc.

Circle 295 on reader service card
MiniCad 4.0
80% faster, a galaxy of new features!
MiniCad High Precision CAD System Now With Optional Plotter Driver...

New with 4.0 Version:
Angular, diagonal, and chain dimensioning
Creation of arc or circle by choosing 3 points
Auto join
Double-line polygons
Trim circle capability
To add to the hundreds of fabulous features in 3.0 versions
All still for only $495.00. Call today
Visa/Mastercard welcome. Demo $19.00
In USA call: 301/461-9488. Canada: 604-384-2131
Australia: 7-369-1204 or write Graphsoft 8370 Court Ave. Suite 202 Ellicott City, MD 21043

Score One For Our Team.
Cleaning up the environment is easy when we work together. So, Team Up and take the Woodsy Pledge: We Give a Hoot, so We Won't Pollute!

How To/Getting Started

The first scanners used a scheme called dithering, in which the scanning software combined black and white dots into patterns that simulated shades of gray. The Mac’s desktop pattern is a good example of a dithered shade of gray.

The drawback of dithering is that the scanner software must assign each gray shade a specific number of dots. In the image-rendering world, when you assign a specific number of dots to anything, you lose the ability to take advantage of a screen or printer whose resolution is higher than the resolution you’ve already chosen. That’s why it’s preferable to retain some resolution independence, rather than lock the image into a specific number of dots per inch before printing.

When you scan a photo with a gray scale scanner, the scanner’s software saves the incoming gray-scale information and the image is converted into dots only when you print it. (Gray-scale scanners also assign more bits to each dot; for example, a four-bit scanner can represent 16 different shades of gray; a six-bit, 64 gray levels; and an eight-bit, 256. The more shades of gray a scanner can detect, the better the image will look, especially if it’s printed on a Linotronic.) This dot conversion process is known as halftoning. It’s what allows a printing press—which can’t print shades of gray—to represent a continuous-tone image. The image is photographed through a screen that converts it into a series of tiny black dots that a press can print. The halftone represents different gray shades by varying the size of the halftone dots: larger dots for darker shades, smaller dots for lighter ones.

A laser printer handles halftoning differently: since it can’t vary the size of its dots, it must combine several dots into a larger cell whose size it can vary (by turning some dots on and others off). You’re able to print halftone images, but at a price: because the printer must combine dots to create the halftone cells, its effective resolution drops. That’s why a 300-dpi scanner is more than adequate: even if you scan an image at 300 dpi, you’ll still get hard copy with fewer dots per inch. For example, if 5 dots are assigned to each cell, a 300-dpi printer can print only 60 dots per inch—about as many as are in a newspaper photograph. That’s sobering: when you bought your $2500 scanner, you probably had in mind an end product that would look better than a newspaper photo.

(continues)
MultiDisk™ ... hard disk partitioning

Introducing MultiDisk. Now you can partition any hard disk into multiple hard disks. Each MultiDisk partition is just like the original hard disk only better!

- Increase disk performance by grouping files into separate partitions.
- Password protection provides security to each partition.
- Network users of AppleShare™ and TOPS® can remotely mount partitions separately.
- Partitions are conveniently accessible through a desk accessory.
- Individually set partitions to automatically appear on the desktop at startup or only when requested.
- Add or delete partitions at any time without having to reinitialize your hard disk.
- Make your data safer! Files in one partition will not be affected by directory damage to another partition.
- Exclusive! Resize a partition without having to recreate it.

Available exclusively from ALSof, Inc. for the introductory price of only $39.95!

DiskExpress™ 1.5 ... now the fastest

Why isn’t your Macintosh running at top speed and what can you do about it? Read what the experts have said:

"Just like humans, the older your disks get, the more they slow down. Computer gurus have dubbed this electronic hardening of the arteries 'disk fragmentation.' Fortunately, there's a program that can restore your disks to their youthful vigor |After running DiskExpress| the resulting speed improvement was impressive." Léo Lapece, MacUser Magazine.

"I run DiskExpress...to restore my hard disk to optimum performance |It| is a well designed product which should be packaged with every hard disk sold." C.J. Weigand, MACazine.

DiskExpress is the only true optimizing software for the Macintosh. It fully optimizes a disk including files, free space and directory while requiring no free space to operate.

DiskExpress does wonders for the speed of network file servers and maintains all AppleShare access privileges.

The NEW "Quick Optimize" option is also 100% compatible with AppleShare and all hard disk back up programs while making DiskExpress the absolute fastest disk optimizer available. And the NEW "Show Free Space" command graphically displays any disk's free space fragmentation.

ALSoft, Inc. / P.O. Box 927, Spring, Texas 77383-0927, (713) 353-4090

ALSoft, MultiDisk and DiskExpress are trademarks of ALSof, Inc. All other trademarks acknowledged.

Circle 202 on reader service card
How To/Getting Started

Scanning at higher resolution increases an image’s sharpness and reduces aliasing. A two-to-one ratio is optimum, if you have the disk space. For example, you would scan at 300 dpi for output at 150 lpi (lines per inch). However, if you’re creating a gray-scale image of a continuous-tone original that doesn’t contain a lot of detail and you don’t plan to enlarge the image in a publishing program, you can often scan at lower resolution—as low as 75 dpi for laser-printed output, or 150 dpi for Linotronic—with little difference in image quality. You’ll not only shorten print times, but you’ll also save a lot of disk space—a 75-dpi gray-scale scan is roughly $\frac{1}{6}$ the size of a 300-dpi scan. (Line art, which doesn’t require halftoning, should always be scanned at maximum resolution.)

There’s More than One Way to Scan a Cat

There’s More than One Way to Scan a Cat: the more dots per inch a printer provides, the better the quality of its halftones. At left, output from a 300-dpi PostScript printer, using a 53-lines-per-inch halftone screen. At right, the identical image printed on a 1270-dpi Linotronic typesetter, using a 125-lpi halftone screen.

200 dpi per inch—more than that of a high-quality magazine halftone (see "There’s More than One Way to Scan a Cat").

Of course, when you leave the halftoning job to the printer, the printer must be able to create halftones. PostScript-based printers contain halftoning routines, but QuickDraw-based printers, such as General Computer’s Personal LaserPrinter...

(continues)
Road Racer Lunar Rescue MacGoH Speed limit 200.
Strap yourself in for the ride of your life.

Road Racer's detailed graphics and digitized sounds simulate driving conditions in 5 environments ranging from high-speed desert flats to twisting mountain roads. So convincing you’ll actually find yourself trying to look over the hills and around the turns.

The trees, rocks, telephone poles, and other graphics fly past your 1965 Corvette at breakneck speeds. Hear its thundering 350-horsepower engine and screaming tires as you come around wicked curves.

Steer and accelerate with the mouse, and use your keyboard for brakes and shifting.

Each level is tougher than the last with unpredictable road hazards and many courses to travel. You score points for fast, skillful driving. Road Racer is high performance you won’t forget.

Watch out! ... SMASH! ...
A heat-seeking missile has just slammed into your ship.

The year is 2059. Raiders have stolen five controlling crystals that maintain the defense and supply network for the moon's 26 cities. With key commodities cut off, the cities are doomed.

Your mission is to recover the fiendishly hidden crystals while transporting vitally needed goods between cities. Traverse dangerous terrain and combat relentless attacks with your arsenal of lasers, cannons, bombs and shields.

Prepare yourself for an odyssey of furious action and strategic high stakes trading.

Lunar Rescue is an addictive adventure that challenges your imagination and sets your adrenaline on fire.

A premium edition of the best selling Macintosh game in the world.

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

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

MacGolf Classic gives you a player's eye view and an aerial overview of each hole with close up options. You have complete control of your position, ball placement, ball speed and direction, and selection of all 14 clubs. Spectacular digitized graphics and sounds add to the excitement.

MacGolf Classic is so close to the real thing it will improve your golf game. Every challenge should be this spectacular.
QMS introduces thousands of improvements to PostScript printing.

The new QMS ColorScript™ 100.
The world's first color PostScript printer.

PostScript printing is no longer simply a black-and-white issue. Thanks to the QMS ColorScript 100.

Now QMS has opened your projects to a range of new graphic possibilities using Adobe PostScript®, the industry-standard language of the desktop publishing revolution.

Now, your proposals, presentation graphics and publications can go from gray to glorious. Graphic design color schemes can change with just a single keystroke, not a hundred marker strokes. Even commercial printing proofs and in-house color separations can be produced and color-matched. All this will help save the two things every business needs. Time and money.

QMS worked closely with Adobe Systems, software developers and users to design the
ColorScript 100. All agree it's a breakthrough. That's no surprising since QMS offers more PostScript products than anyone else.

The ColorScript 100 uses a revolutionary thermal transfer process that produces true 300x300-dpi resolution. That means you can generate thousands of brilliant colors with pinpoint registration that can match the color swatches scattered on this page.

The printer is built around an intelligent controller, running a 68020 processor, equivalent to the one in the Macintosh II. That makes it a powerful computer in its own right. A 16 MHz processing speed makes it responsive. Especially to things like deadlines. You can print an 8½"x11" page in just a single minute. An 11"x17" page in under two.

The system's large 8 megabyte memory can handle complex applications. And a 20 megabyte hard disk offers generous space for downloadable typefaces to complement its 35 resident Adobe typefaces.

Compatibility is also built in. The ColorScript 100 connects with Macintosh®, IBM®, Compaq® and other compatible PCs, along with minicomputers, workstations and mainframes.

That means you can work with Aldus FreeHand®, Micrografx Designer®, Quark XPress®, Adobe Illustrator 88™, AutoDesk AutoCAD® and most programs written under Microsoft® Windows. Plus all the new programs that are being developed to join dozens of other color-compatible applications.

The ColorScript 100 is yet another useful solution from QMS. Solutions that have made us a leader in print technology. That's one fact we don't mind giving you in black and white.

For information on the QMS ColorScript 100, including print samples, a complete list of compatible software and information on financing, call 1-800-631-2692, ext. 202.
How To/Getting Started

### Image Formats

<table>
<thead>
<tr>
<th>Format</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>PICT</td>
<td>Supported by most applications</td>
<td>Image usually can’t be moved to IBM PCs or other computers;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>half-tone patterns (dithers) created by scanner software are</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prone to distortion during resizing</td>
</tr>
<tr>
<td>PICT2</td>
<td>Supported by many Mac II graphics applications</td>
<td>Gray-scale images generally don’t print properly</td>
</tr>
<tr>
<td>MacPaint</td>
<td>Supported by most applications</td>
<td>Resolution is limited to 72 dpi; to save a 300-dpi scanned image,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>you must either crop it significantly or lose resolution</td>
</tr>
<tr>
<td>Tagged-image file format (TIFF)</td>
<td>Saves gray-scale data; can be resized with no distortion of half-tone pattern; gray scale can be remapped for brightness and contrast adjustments or special effects; supported by most scanner software and desktop publishing applications</td>
<td>Files can be large; generally not supported by nonpublishing applications; some scanner software cannot reopen a file saved in TIFF</td>
</tr>
<tr>
<td>Encapsulated PostScript (EPS)</td>
<td>Supported by most desktop publishing applications</td>
<td>Image can’t be edited; files can be extremely large; image can be</td>
</tr>
<tr>
<td></td>
<td></td>
<td>printed only on PostScript printers</td>
</tr>
<tr>
<td>Native</td>
<td>Image can be reopened by scanner software for limited editing</td>
<td>Rarely supported by other applications</td>
</tr>
</tbody>
</table>

**Image Formats**

Most scanner software lets you save images in more than one format. Here are the most widely supported image formats, along with each format’s strengths and weaknesses. Native refers to the scanner software’s own format.

and Apple’s LaserWriter IISC, do not. If you plan to print gray-scale images as halftones with a non-PostScript printer, the program you use for printing must do its own halftoning. Among page-layout programs, only Aldus PageMaker 3.0 does. (Silicon Beach’s image processing program, Digital Darkroom—near release at this writing—will also do halftoning.) For more details on gray-scale scanning, see “A Halftone Handbook” (*Macworld*, October 1988) and “Shades of Gray” (January 1988).

**A Scanner’s Command Post**

Scanning software lets you adjust settings before scanning, edit the resulting image, and save it in a variety of formats (see “Image Formats”). To allow you to compensate for imperfect originals, scanning programs provide buttons or sliders that let you adjust brightness before scanning; some programs can alter contrast as well. These controls don’t change the lighting within the scanner; they assign different brightness and contrast values to the incoming gray-scale data.

Scanning software lets you specify the area to be scanned as well as an enlargement or reduction percentage to create scans larger or smaller than the original. You can also specify whether the original is line art or a continuous-tone image. If it’s the latter, you can designate whether the software should halftone the incoming image (through dithering) or simply save the gray-scale data. If your scanner, its software, and your printer support gray scale and halftoning, always scan continuous-tone originals using your scanner software’s gray-scale setting and save the result as a TIFF file. Then you can alter the image without distorting its halftone dot pattern. If instead you let the scanning software create the halftone, the resolution of the halftone’s dot pattern will not be alterable once the image has been scanned.

All scanning software also provides MacPaint-like editing features such as erasers, pencils, and line-drawing tools. But most programs’ editing features are adequate only for simple retouching tasks. For serious editing, consider an image processing program such as Letraset’s Image Studio or Silicon Beach’s Digital Darkroom. These programs’ sophisticated drawing and retouching tools let you blend, soften, sharpen, and otherwise alter images. Because a Mac II can display shades of gray, it’s the best Mac for electronic retouching.

Another extremely useful image processing feature is the ability to change a photo’s brightness or contrast after you’ve scanned it. Because gray-scale images retain the gray-scale data the scanner sends to the Mac, image processing programs can change the brightness and contrast by simply interpreting the data differently. This ability to re-map the gray-scale data lets you compensate for brightness or contrast flaws in the original and allows for special effects (see “Fun with Gray Maps”). Incidentally, PageMaker 3.0 also lets you remap gray-scale data.

(continues)
"I COULD SEE RIGHT AWAY THE BROCHURE MEANT BUSINESS."

The typography was quality, all the way. The face was CG TYPE™ Antique Olive. Crisp, economical, infinitely readable. A real business type, like me. Obviously the brochure was the product of a designer who understood the evocative power of typography and played it like a Stradivarius.

"From now on, I'll be seeing more and more business publications that look like they mean what they say. Because now all the designers who use Macintosh™ computers can get type—as well as consultation and technical support—from the professionals. From the people whose name is on the type charts that designers have been consulting for years: Compugraphic."


Compugraphic is a registered trademark and CG TYPE™ is a trademark of Compugraphic Corporation. Macintosh is a registered trademark of Apple Computer, Inc. PostScript™ is a registered trademark of Adobe Systems Inc.
How To / Getting Started

But Is Scanning the Answer?

With all the wonders that scanners perform, why are they one of the last peripherals you should consider buying? First, you don't need one to include photos in a publication. You can use the standard graphic artist's technique: draw a black box—a halftone window—to indicate where the photo will appear. Then have a print shop make a photographic transfer, or PMT, from the photo, and position it on your pasted-up page.

Second, scanners start at about $1000 (the one exception is the marvelous ThunderScan, which will do the job if you have the patience and the ImageWriter). And if you don't already have a hard disk and 2 or more megabytes of memory, add their prices to the tally. For top-notch retouching, throw in a few hundred dollars for an image-processing program.

Finally, remember that the quality of laser-printed gray-scale images is far from National Geographic standards. A Linotronic gives better results, but while small images will usually print in no more than 20 minutes, a full-page, 8½-by-11-inch image could take up to an hour to print on an older machine (one with the original raster-image processor). Therefore, since Linotronic use is often charged by the hour, very large digital halftones could cost you a lot more than conventional ones.

But if you work with images frequently, if you'd like to be able to retouch them electronically, if you can put a scanner's OCR features to work, and if you can satisfy a scanner's appetite for disk space and memory, then you should consider owning one.

If OCR is important to you, examine the method each scanner uses to recognize characters. Matrix matching compares each scanned character with a database of characters in the scanner's memory, but it requires a separate font database for every font you plan to scan. Feature extraction recognizes characters by their general shape, but although it lets you scan a wider variety of fonts, it's slower and tends to use more memory.

Scanners have always promised a lot, but only now are they starting to deliver. Whether one can deliver enough for you is a gray area that no scanner can detect. You're the one who has to assign a 0 or a 1 to that question.

Fun with Gray Maps

*You can open gray-scale TIFF files with an image-processing program and remap the gray scale to adjust brightness and contrast or produce special effects. Here are three images displayed by ImageStudio, along with their corresponding gray maps (which translate data from the scanner into shades of gray). In (A), the gray map is unchanged. In (B), the image has been lightened so that text could be superimposed on it. In (C), a custom gray map gives the image a solarized appearance.*
The Mac II Workstation

- Recapture Desk Space Held Hostage by your Computer!
- Radial Arm Suspends the Monitor above the Desk Top.
- Adjustable Processor Shelf Keeps CPU out of the way, yet still within easy reach.
- Instant "touch-of-a-hand" Monitor Adjustments:
  - 6-inch Vertical
  - 20-inch Horizontal
  - 360° Swivel/20° Tilt
- Position Beside or Behind Existing Desk or Table.
- Available with Mobile Frame and Adjustable Worksurface.
- Multiple Arm Capability.
- Priced from $500.00
- Compatible with:
  - Apple 12"
  - Apple 13"
  - Macintosh SE
  - Mac Plus
  - Monochrome 19" Monitors
  - 19" - 24" Monitors weighing up to 62 lbs.

Call toll free (800) 888-8458 for a free Installation Planning Guide.

ERGOTRON
3450 Yankee Drive
Eagan, MN 55121
(612) 452-8135 • (800) 888-8458
“Buy it right, or, we’ll take it back.”

—Réal Provencher
People you’ll like…prices you’ll love… and a return policy that can’t be beat.
"More and more large companies are calling to set up accounts with us. Many of these people are changing over from traditional mail order companies, because of our return policy, both for trial purchase, and outright sale. And, they've always appreciated that we don't charge their account, until the order's been shipped. It doesn't make sense to do it any other way."

-Sarah

WORD & PAGE LAYOUT

Coach 3.0
Coach Professional
Findswell
Fluent Laser Fonts (ea.)
Fontographer
FullWrite Professional
MergeWrite
More 2.0
PageMaker 3.0
Read It! (OCR)
Read It! (Thunderscan)
ReadySetGo! 4.0
SpellSwell
WordPerfect
Works Plus Spell
Write Now 2

COMMUNICATION HARDWARE
Anchor 2400 Modem
Everex 2400 Modem
Shiva NetModem 2400
TurboNet

DISK DRIVES
Dayna File
CMS Pro 45 SE/r
CMS Pro 60 II
CMS Pro 140 II
CMS SDU 30
CMS SDU 81
CMS SD 60
CMS SD 140
CMS TS 60 Tape Backup
EMAC-20DLX
EMAC-40DLX
EMAC-60T Tape Backup

OTHER PERIPHERALS
Personal Laser Printer Plus
Qume ScriptTEN Laser Printer
Thunderscan 4.0
MacScan Flat Bed Scanner
MacScan Grey Scale FB

MONITORS
Laserview 19” - Mac II
Monitenn Viking I (Hi-Res)
Monitenn Viking 10 (Color)
Monitenn Viking GS
Monitenn Viking 2400

SYSTEMS
Let us configure your system solution!
Mac II System: Pro 60 hard drive, Mac 101 Keyboard, Viking 1 monitor
Mac II Color System: Pro 60 hard drive, Mac 101 Keyboard, Viking 10 monitor

HUNDREDS MORE...
No surcharge on Visa or MasterCard. Purchase orders accepted on approved accounts. Sorry, no COD's or personal checks. Trial purchase based on a 10-day minimum, plus six free days for shipping. All hardware sold with a 30-day money-back guarantee. Prices subject to change without notice.

SONY and KAO disks
at BIG Savings...Call Now!

When you’re sure of the software you want, buy it with our promise...if there’s something you don’t like, we’ll take it back. When you’re not sure, ask about trial purchase. You can look at one, or several competing programs, and save with our Try-Pack specials. Either way, we’ll help you get Software That Fits.
We'll do everything we can to get you the right software at the right price. And, if it turns out to be something you don't want, we'll take it back.

“Our Proof of Performance Pledge is unique in the industry. Buy any program you need. If you decide you don’t like it, send it back, and pay only the regular daily trial. You can buy at discount, mail-order prices, and still be sure you’re not going to get stuck. And, we have a 30-day money-back guarantee on all hardware, too.”

-Real

ACCOUNTING

Atrix Payroll Plus 179.00
Business Sense 279.00
Checkmark MultiLedger 284.00
Checkmark Payroll 3.0 209.00
In Sight 3-Pak 1149.00
In Sight (any single module) 399.00
Managing Your Money 129.00
Quick Silver 35.00
Rags to Riches 3-Pack (GL/AR/AP) 299.00
Simply Accounting 209.00

“We get software back every day, and people tell us, ‘Boy, am I glad I had a chance to try this out first’. These are customers who really thought they wanted a certain program, but later found it wouldn’t fit their particular application. And, they’ll often take a competing program on a trial purchase. Then, when they decide to keep it, they’re sure they’ve got the right one.”

-John

CASES & COVERS

High Trek Case (IW II) 50.95
High Trek Case (512/Plus/SE) 59.95
High Trek Case (SE Extended Keyboard) 69.95
Dust Covers (Most) 19.95

-DATABASES

DBase Mac 305.00
Double-Helix 349.00
Foxbase 216.00
Record Holder Plus 49.95
Reflex Plus 165.00

-GRAPHICS

ClickArt EPS Illustrations 79.00
ClickArt Graphics (ea.) 29.00
Canvas 109.00
Cricket Draw 169.00
Curator 79.00
Desk Paint 2.0 80.00
Illustrator ‘88 309.00
Image Studio 279.00
MacDraft 151.00
Modern Artist 109.00
myDiskLabeler (IW) 32.00
Pixel Paint 269.00
Print Shop 36.00
Video Works II 118.00

“Most people these days have done their homework, and pretty well know which program they want. Now, we’ve made it even easier to buy software. Call us with the program you need. Once you’ve used it awhile, you may find something you weren’t aware of, that you don’t like. No problem... just send it back. We’ll treat it as a trial purchase, and refund the difference between what you paid to buy the software, and what it would cost if you had taken it on trial. (10-day minimum, and we provide six free days for shipping).”

-Mike

BUSINESS

CAT 239.00
Cricket Graph 119.00
Cricket Pictograph 105.00
Cricket Presents 289.00
Fast Forms 98.00
Focal Point 69.00
Mac Calc 59.00
Mathview Pro 145.00
MicroPlanner + 6.0 349.00
WillMaker 36.00

DESK ACCESSORIES & UTILITIES

Disk Express 35.00
Disk F>is 55.00
Disk Tools Plus 32.00
Gofer 45.00
HyperDA 38.00
Power Station 37.00
QuickDEX 33.00
Quickkeys 55.00
Sentinel 159.00
Stepping Out II 54.00
Suitcase 37.00
Super Laser Spool 82.00

COMMUNICATIONS & NETWORKING

MacLink Plus 145.00
MacNet Starter Kit 36.00
Microphone 2 229.00
Red Ryder 59.00
Timbuktu 72.00
TOPS (Mac) 119.00

“Most people these days have done their homework, and pretty well know which program they want. Now, we’ve made it even easier to buy software. Call us with the program you need. Once you’ve used it awhile, you may find something you weren’t aware of, that you don’t like. No problem... just send it back. We’ll treat it as a trial purchase, and refund the difference between what you paid to buy the software, and what it would cost if you had taken it on trial. (10-day minimum, and we provide six free days for shipping).”

-Mike
Boxed in Tens

3½" SS $1.09 ea. 1G36A12

3½" DS $1.59 ea. 1G38A12

MAC • PAC

Bulk Packaged In 50's

3½" SS $1.22 ea. 1H38A13

3½" DS $1.17 ea. 111

Sony Labels 5¢ each

Minimum 50

MAC • MODEM Turbo 24

2400 BPS External Modem

Specify Mac or Mac Plus Cable

DT-240TM

OLINK-MAC

F1-MACMODEMPI

$189 ea.

KAO

Media from the Surface Scientists

100 years of leadership in surface science technology goes into every KAO diskette — from raw materials to final packaging. You can be assured that every KAO diskette exceeds all worldwide industry standards.

Boxed in Tens

3½" SS . . . 1.21 1.15 ea.

1K36A12

3½" DS . . . 1.48 1.37 ea.

1K38A12

Rainbow Pack

5 colors per clear plastic box

Boxed in Tens

3½" DS . . . 1.65 1.54 ea.

1K38A11-RB

Mac • Pac

Bulk Packaged in 50's

100 + 200 +

3½" SS . . . 1.21 1.15 ea.

1K36A12

3½" DS . . . 1.48 1.37 ea.

1K38A12

Rainbow Pack

5 colors per clear plastic box

Boxed in Tens

3½" DS . . . 1.65 1.54 ea.

1K38A11-RB

Mac • Pac

Bulk Packaged in 50's

100 + 200 +

3½" SS . . . 1.21 1.15 ea.

1K36A12

3½" DS . . . 1.48 1.37 ea.

1K38A12

Rainbow Pack

5 colors per clear plastic box

Boxed in Tens

3½" DS . . . 1.65 1.54 ea.

1K38A11-RB

Minimum order $250 “No Surcharge on Visa MasterCard.” COD orders add $395 Surface. Shipping UPS add $395 per 100 for 3½ or 5½, add $395 per 100 for 8½. UPS delivery add 5% “Prices subject to change without Notice”

Circle 562 on reader service card

Circle 305 on reader service card
SOFTWARE

ALDUS
PAGEMAKER 3.0
Create your own brochures, newsletters, and reports with page formatting, layout and design tools.

$335.00*

BUSINESS SOFTWARE

READY SET GO!

By: Lretasets

• Easy to use interface
• Customize your own format
• Run text around graphics

$245.00*

PLOTTERS/SCANNERS

AST
Brotuscan Mac (Flatbed) 1,229.00
AST Scanner (Sheetfed) 1,059.00
CALCOMP All Models CALL
HOUSTON INSTRUMENTS CALL
HEWLETT PACKARD Scanjet 929.00
KOLA Mac Version 2.0 197.50
SUMMAGRAPHICS Mactab T12 x 12 348.45
MICROTEK Scanners CALL

BOARDS

AST RESEARCH Mac 86 355.92
AST RESEARCH Mac 386 961.00
DCA Macima 698.95
DOVE COMPUTERS Mac Snap 524e 159.00
DOVE COMPUTERS Mac Snap 548e 353.00
DOVE COMPUTERS Mac Snap Plus 265.00
ORCHID Colorvue SE 455.00

DISK DRIVES

NEC MULTISYNC II
$544.95* (35.7 GB)

ACCESSORIES

ABATON Pro Point 109.00
AMERIPAC Pac-40 Disk Case 9.40
COMPUTER CVRP Mac+ Case 65.05
CURTIS Diamond Surge Protector 27.27
CURTIS Saft Strip 17.67
DATADERK Mac-101 Keyboard 125.00
ERGOTRON Mac Tilt 56.00
FUJ I 3.5" Diskette (box of 10) 17.17
FUJI 3.5" Rainbow Diskette (box of 10) 18.95
INNOVATIVE CONCEPTS Flip n' File II 13.13
KENSINGTON Mouse Pocket 6.31
KENSINGTON ADB Keyboard Cable 22.50
KENSINGTON Turbo Mouse 74.95
KENSINGTON Masterpiece II 89.95
MAC NETWORK ImageWriter Ribbons (6) 17.00
1MB Simms Modules CALL

PRINTERS/COMPUTERS

NEC LC980 $2,950.00*
LC980 Toner Cartridge (6 Pk) $51.00
Postscript Printer
8 PPM
3 MEG RAM

ImageWriter II $425.00*
Panasonic 10911 $239.00
Orange Micro Grappler LQ $153.00
Apple Local Talk Connector Kit $153.00

MAC SE $1,950.00*
MAC SE with 20MB $2,496.00*
MAC Plus $1,250.00*
MAC II $2,636.00*

BUY NOW AT DISCOUNT WHOLESALE + 8% PRICES!

MITSUBISHI DIAMOND SCAN
Diamond Scan 13" Color Monitor $435.00*

NEC MULTISYNC XL $1,813.95*
PRINCETON Ultrasync $749.75*
SIGMA Laserview SE 15" $1,159.00*
SIGMA Laserview SE 19" $1,469.00*

RECREATIONAL SOFTWARE

ACTIVISION Shanghai 22.00
BROADERBUNDAncient Art of War 24.00
BROADERBUND Jam So 29.04
DAVIDSON Word Attack or Math Blaster 26.25
ELECTRONIC ARTS Chessmaster 2000 30.27
LEARNING COMPANY Math Rabbit 24.21
LEARNING COMPANY Reader Rabbit 31.75
MICROSOFT Flight Simulator 30.25
MINDSCAPE Balance of Power 26.50
MINDSCAPE Shadowgate 26.50
PRACTICAL COMPUTER Mac Golf 31.81

REAL BUYING CLOUT-Call now & join over 200,000 members who are too smart to pay more! MEMBER-
SHIP BENEFITS: * Pay just 8% above advertised wholesale price + 3% cash discount (included in whole-
sale price) + Optional software rental library + FREE Word Processors Guide + FREEUPDATES + Price Pro-
tection + Fully insured-48 hr. delivery + 10 Day return policy + FREE Tech Support + FREE Bulletin Board-
Quantity Discounts - All prices subject to change + All Products subject to availability. Join Today For As
Little As $10

1-800-62 1-SAVE
Corporate & sport Order Hotline 1-312-205-1300
MONDAY-FRIDAY 9:00AM-6:00PM
SATURDAY 10:00AM-4:00PM

TECH SUPPORT 1-312-205-1410
CUSTOMER SERVICE 1-312-205-1510
MW1188
Fax 1-312-205-1522
625 ACADEMY DRIVE NORTHROCK, IL

MODEMS

HAYES Smartmodem 1200 255.00
HAYES Smartmodem 2400 392.89
T.H.P. 2400 Baud External Modem 85.89
T.H.P. 2400 Baud External Modem 139.00
U.S. ROBOTICS Courier HST 9600 595.00

Circle 380 on reader service cord
MacLand can now Lease you equipment for low monthly payments. We lease hard disk drives, monitors, printers, memory, tape backups, and more! Call to see how you can qualify for our leasing program.

To Order Call 1-800-333-3353

Monday thru Friday 7AM to 7PM (Mountain Time) /Saturday 8AM to 6PM. If you don’t see it call us.

BUY or LEASE

Compare our Prices!!!
We are one of the country’s largest CMS hard disk dealers.

NOBODY BEATS MACLAND!!!
-WARNING-
Beware of money-back offers on hardware!
MacLand sells only NEW, NEVER USED merchandise. We will not send you re-packaged, slightly-used hard disks.

Hardware Accessories

Anchor
2400 Baud Modem ........................................ $149
Farrallion
Mac Recorder ................................................ $135
General Computer
Personal Laser Printer ..................................... $1,439
Business Laser Printer ..................................... $3,049
Moniterm
Viking 1 Monitor ........................................... $1,549
Viking 10 Color Monitor ................................... $3,775
Sigma Designs
LaserView II 19" ........................................... $1,749

Rodime
Radius 16 Accelerator ..................................... $849
Radius 25 Accelerator ..................................... $1,399
Radius Full Page Display ................................ $887
Radius Two Page Display ................................ $1,399
Radius Color Monitor ...................................... Call

Prices subject to change without notice. All products are subject to availability.

To Order Call 1-800-333-3353

Monday thru Friday 7AM to 7PM (Mountain Time) /Saturday 8AM to 6PM. If you don’t see it call us.

Circle 264 on reader service card

To qualify for LEASING, the following applies:

- Visa, MasterCard & Amer. Express accepted. No surcharge.
- All U.S. Residents are insured at no extra charge.
- Arizona Residents add 5.6% sales tax.
- Your Credit Card will not be charged until order is shipped.
- We accept COD charges - $2.00 surcharge.
- Call 1-800-333-3353
SOFTWARE

3G GRAPHICS
Impact Graphics & Symbols ........................................... 52

ABA SOFTWARE
Draw it Again Sam ....................................................... 74

ADOBE SYSTEMS
Adobe Illustrator ’88 ..................................................... 325

AFFINITY MICROSYSTEMS
Tempo II ........................................................................ 76

ALDUS
PageMaker ....................................................................... 419

ALSOFT
Desk Express . ............................................................... 26

ASHTON-TATE
FullPaint ................................................................. 69

BETTERWARE
TurboPaint ............................................................ 275

BEDFORD SOFTWARE
Simply Accounting ...................................................... 199

BERKELEY SYSTEMS
Stepping Out II ............................................................ 49

BORLAND INTERNATIONAL
Sidekick ........................................................................ 59

BRAVO TECHNOLOGIES
MacCalc ........................................................................ 72

CE SOFTWARE
QuickKeys ................................................................. 50

COMPUSERVE
Compuserve Navigator .................................................. 40

CRICKET SOFTWARE
Pic·o·Graph ............................................................... 169

DENEBA
Canvas 2.0 ........................................................................

E.K.D.
MacTerm .......................................................................... 83

FIFTH GENERATION
Fastback ........................................................................ 51

FOX SOFTWARE
FoxBase Plus .............................................................. 200

IMAGINE SOFTWARE
Smart Alarms & App Diary ............................................... 32

INNOVATIVE DATA DESIGN
MacDraft ................................................................. 144

INTUIT
Quicken ........................................................................... 35

LACIE
Silver Server .................................................................. 89

LETREASET
Ready, Set, Go 4.0 ...................................................... 275

MACROPAC INTERNATIONAL
101 Macros for Excel .................................................... 36

MECA
Managing Your Money .................................................. 125

MICROLYTICS
WordPerfect ............................................................... 32

MICROSOFT
MS Word 3.0 ................................................................ 249

MINSK SOFTWARE
Wall Street Investor ...................................................... 285

SILICON BEACH SOFTWARE
Super Paint ................................................................. 76

SILICON TOOLBOARDS
Dark Castle ................................................................. 26

SMETHERS BARNES
Prototype ................................................................. 69

SOFTWARE VENTURES
Microphone 1.1 ............................................................ 119

SOLUTIONS INTERNATIONAL
SmartScrap & The Clipper ............................................... 36

SUPERMAC SOFTWARE
SuperSpool 5.0 ............................................................. 54

SUPERMAC SOFTWARE
SuperSpool 5.0 ............................................................. 54

SUPERMAC SOFTWARE
Multi-User SuperSpool .................................................. 199

SUPERMAC SOFTWARE
Network DidIt ............................................................... 199

SURVIVOR SOFTWARE
Mac Money 3.0 ............................................................ 59

To order or for a complete list of all Hardware and 
Software items and our free catalog call
Dr. Mac INC.
1-800-825-MACS
1-800-825-6227
FAX • 1-818-501-3760

Circle 368 on reader service card
GET MORE FROM YOUR MACINTOSH™ INVESTMENT

PERFORMANCE ENHANCERS THAT WON'T BREAK THE BANK.

INTERNAL DRIVES

Internal Drives

For Macintosh SE, II
OME 40i- 45 Megabytes $899.95
For Macintosh II
OME 100i- 100 Megabytes $1199.95
OME 140i- 140 Megabytes $1599.95

External Models Available

- 110/220V Power
- < 30 ms access

FREE STACKWARE & Microsoft Excel Templates by Heizer Software.

MEMORY

CALL NOW & SEE IF YOU QUALIFY FOR SPECIAL DISCOUNTS

MEMORY

CALL NOW & SEE IF YOU QUALIFY FOR SPECIAL DISCOUNTS

YES! We've Got It! Guaranteed!

For Macintosh Plus, SE, II
Ram II+II - Cost Effective $CALL
4 Megabytes RAM, 120ns, CMOS.
Ram II - Cost Effective $CALL
Expands to 2.5 Megabytes RAM. SE & Plus

For Macintosh Plus
RamPlus 2- Cost Effective $CALL
Expands to 2 Megabytes RAM. Plus Only
RamPlus 4- $CALL
Expands to 4 Megabytes RAM. Plus Only

NOTE: RamPlus may not be physically compatible with internal devices.

VIDEO

NOW WITH GENLOCK!

Mac II to NTSC (Television) Converter
Connects your Macintosh II to NTSC video.
Record your Macintosh images to video tape, or use for live presentations. Compatible with Apple & Spectrum Video Cards.

STANDARD $599.
GENLOCK $999.

GOVERNMENT & FORTUNE 1000
Purchase Orders Encouraged
PACE: 415-686-4244

OPEN MAC Enterprises
415/682-0440
2280 Bates Avenue, Suite J, Concord, CA 94520

DON'T HAVE A MAC II?
Try our Hi-resolution composite video adapters for the
Mac SE & Plus.
(Sorry, not TV!)


Circle 45 on reader service card
## 20 Megabyte External Hard Drive $449

### Hard Drives

<table>
<thead>
<tr>
<th>Type</th>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AST</td>
<td>20 mb/20 mb Tape Back-up</td>
<td>$749</td>
</tr>
<tr>
<td>CMS Mac Stack SD Series</td>
<td></td>
<td>$549</td>
</tr>
<tr>
<td>(Mac Plus, SE, II)</td>
<td>20 MB</td>
<td>$629</td>
</tr>
<tr>
<td></td>
<td>30 MB</td>
<td>$625</td>
</tr>
<tr>
<td></td>
<td>60 MB</td>
<td>$1249</td>
</tr>
<tr>
<td>CMS Pro Series Internal Mac SE/II</td>
<td>30 MB</td>
<td>$1499</td>
</tr>
<tr>
<td></td>
<td>45 MB</td>
<td>$689</td>
</tr>
<tr>
<td></td>
<td>65 MB</td>
<td>$899</td>
</tr>
<tr>
<td></td>
<td>80 MB</td>
<td>$1199</td>
</tr>
<tr>
<td></td>
<td>100 MB</td>
<td>$1489</td>
</tr>
<tr>
<td></td>
<td>60 MB</td>
<td>$1145</td>
</tr>
<tr>
<td></td>
<td>150 MB</td>
<td>$1879</td>
</tr>
<tr>
<td></td>
<td>300 MB</td>
<td>$2799</td>
</tr>
</tbody>
</table>

### Tape Back-up

<table>
<thead>
<tr>
<th>Type</th>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMS 60 Megabyte External</td>
<td></td>
<td>$729</td>
</tr>
<tr>
<td>800K External Disk Drive</td>
<td></td>
<td>$175</td>
</tr>
</tbody>
</table>

### Monitor Monitor

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viking 19&quot;</td>
<td></td>
<td>$1598</td>
</tr>
<tr>
<td>Viking 2400 24&quot;</td>
<td></td>
<td>$1698</td>
</tr>
<tr>
<td>Viking G/S 19&quot;</td>
<td></td>
<td>$2498</td>
</tr>
<tr>
<td>Viking 10 19&quot; Color</td>
<td></td>
<td>$3698</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Desk Keyboard</td>
<td>101-key layout, 15 Function keys, separate numeric and cursor pads, positive Tactile feel</td>
<td>$129</td>
</tr>
<tr>
<td>Kensington Microware</td>
<td>New Turbo Mouse</td>
<td>Call</td>
</tr>
<tr>
<td>System Saver</td>
<td></td>
<td>$63</td>
</tr>
<tr>
<td>System Saver SE</td>
<td></td>
<td>$52</td>
</tr>
<tr>
<td>Tilt &amp; Swivel</td>
<td></td>
<td>$22</td>
</tr>
<tr>
<td>Masterpiece Mac II</td>
<td></td>
<td>$105</td>
</tr>
<tr>
<td>System Stand Mac II</td>
<td></td>
<td>$19</td>
</tr>
<tr>
<td>Mouse Pad</td>
<td></td>
<td>$8</td>
</tr>
<tr>
<td>Mouse Systems</td>
<td>A+ Mouse</td>
<td>$65</td>
</tr>
<tr>
<td></td>
<td>ADB Mouse</td>
<td>$79</td>
</tr>
</tbody>
</table>

## Epson Printers

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX-850</td>
<td></td>
<td>$500</td>
</tr>
<tr>
<td>FX-1050</td>
<td></td>
<td>$549</td>
</tr>
<tr>
<td>FX-286e</td>
<td></td>
<td>$599</td>
</tr>
<tr>
<td>LQ-500</td>
<td></td>
<td>$369</td>
</tr>
<tr>
<td>LX-800</td>
<td>9 pin, 180 cps</td>
<td>$199</td>
</tr>
<tr>
<td>Grappler C/Mac</td>
<td></td>
<td>$79</td>
</tr>
</tbody>
</table>

## Epson LQ-500

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 pin, 180 cps</td>
<td></td>
<td>$369</td>
</tr>
<tr>
<td>Grappler LQ</td>
<td></td>
<td>$89</td>
</tr>
</tbody>
</table>

## Hewlett Packard

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DeskJet</td>
<td></td>
<td>$698</td>
</tr>
</tbody>
</table>

## General Computer

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLP Laser</td>
<td></td>
<td>$1598</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLP Plus</td>
<td></td>
<td>$1698</td>
</tr>
<tr>
<td>Business Laser Plus</td>
<td></td>
<td>$3398</td>
</tr>
</tbody>
</table>

## Dove Computer

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacSnap Tool Kit</td>
<td></td>
<td>$15</td>
</tr>
<tr>
<td>MacSnap Plus 2</td>
<td></td>
<td>$299</td>
</tr>
<tr>
<td>MacSnap 2 SE</td>
<td></td>
<td>Call</td>
</tr>
<tr>
<td>California, Mach II/SE Accelerator</td>
<td></td>
<td>$549</td>
</tr>
<tr>
<td>Co-Processor 68881</td>
<td></td>
<td>$249</td>
</tr>
</tbody>
</table>

### Call for SIMM prices

### Modems

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beverly Hills</td>
<td>External 1200 Baud</td>
<td>$99</td>
</tr>
<tr>
<td></td>
<td>External 2400 Baud</td>
<td>$189</td>
</tr>
</tbody>
</table>

### Everex

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2400 with cable</td>
<td></td>
<td>$219</td>
</tr>
<tr>
<td>DCA</td>
<td>Mac Irma-Mac II or SE</td>
<td>$795</td>
</tr>
</tbody>
</table>

### SE Silencer

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultra quiet internal Fan</td>
<td></td>
<td>$399</td>
</tr>
</tbody>
</table>

### Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kingston Microware</td>
<td>New Turbo Mouse</td>
<td>Call</td>
</tr>
<tr>
<td>System Saver</td>
<td></td>
<td>$63</td>
</tr>
<tr>
<td>System Saver SE</td>
<td></td>
<td>$52</td>
</tr>
<tr>
<td>Tilt &amp; Swivel</td>
<td></td>
<td>$22</td>
</tr>
<tr>
<td>Masterpiece Mac II</td>
<td></td>
<td>$105</td>
</tr>
<tr>
<td>System Stand Mac II</td>
<td></td>
<td>$19</td>
</tr>
<tr>
<td>Mouse Pad</td>
<td></td>
<td>$8</td>
</tr>
<tr>
<td>Mouse Systems</td>
<td>A+ Mouse</td>
<td>$65</td>
</tr>
<tr>
<td></td>
<td>ADB Mouse</td>
<td>$79</td>
</tr>
</tbody>
</table>

## Seikosha

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP 1000 AP</td>
<td></td>
<td>$215</td>
</tr>
<tr>
<td>Imagewriter II Compatible</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Epson LX-800

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 pin, 180 cps</td>
<td></td>
<td>$199</td>
</tr>
</tbody>
</table>

## Grappler C/Mac

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$79</td>
</tr>
</tbody>
</table>

## Epson LQ-500

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 pin, 180 cps</td>
<td></td>
<td>$369</td>
</tr>
<tr>
<td>Grappler LQ</td>
<td></td>
<td>$89</td>
</tr>
</tbody>
</table>

## Hewlett Packard

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DeskJet</td>
<td></td>
<td>$698</td>
</tr>
</tbody>
</table>

## General Computer

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLP Laser</td>
<td></td>
<td>$1598</td>
</tr>
</tbody>
</table>

## General Computer

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLP Plus</td>
<td></td>
<td>$1698</td>
</tr>
<tr>
<td>Business Laser Plus</td>
<td></td>
<td>$3398</td>
</tr>
</tbody>
</table>

---

**OUR POLICY**

- Plain and simple. Hardware. your satisfaction guaranteed or your money back.
- Software. defective software will be replaced immediately.
- Manufacturers policies prohibit us from offering refunds on opened software.
- We accept most major credit cards with no surcharge added.
- Your credit card is not charged until we ship.
- Please allow 10 days for personal and company checks to clear.
- C.O.D. orders accepted.
- We gladly accept purchase orders from most major institutions.
- California, Texas and Georgia residents please add the appropriate local sales tax.
- To place orders call Monday thru Friday 7AM to 6PM P.S.T.
- Prices and Availability subject to change.

---

**SHIPPING**

All items in stock will ship in 24 hours. We offer daily service from Federal Express UPS, U.S. Postal Service UPS ground shipments, please add 50¢ per pound. UPS Air shipments, please add $1 per pound. Minimum shipping and handling charge $4.00.

---

**Computer professionals since 1975.**

**1-800-426-8166**

From Beverly Hills Fax Machine

(213) 273-3710 (213) 675-2522

279 South Beverly Drive, Suite 1200, Beverly Hills, California 90212

Circle 5 on reader service card
ScripTEN™

High performance and immediate delivery. Qume has it right now. It's the ScripTEN with genuine Adobe PostScript® — a rugged value-packed laser printer that's 25% faster and comes with 50% more memory than the Apple® LaserWriter® IIt.

Start Desktop Publishing Today
The ScripTEN with Adobe PostScript page description language gives you virtually limitless capability to create sophisticated graphics and layouts. You can integrate typefaces of any size and style with complex images to produce newsletters, manuals, artwork and illustrations with quality that rivals typesetting systems.

Choose from ScripTEN's 11 resident type families with 35 typefaces in an unlimited range of sizes and styles. Or, if that's not enough, a wide selection of downloadable fonts is also available from Qume.

Plus ScripTEN's ten-page-per-minute print speed and three megabytes of RAM memory give you full pages of printed bit-mapped images quicker than ever.

Bulletproof Quality, Competitive Price
Money can't buy a more ruggedly built or more dependable page printer than the Qume ScripTEN. And, at just $4,595, it's priced below the competition. So don't wait a moment longer. For more information, or a demonstration, call your local Qume dealer or distributor. Or contact Qume, 500 Yosemite Drive, Milpitas, CA 95035. Telephone (800) 223-2479.

End users circle 353 on reader service card
Dealers circle 115 on reader service card

PostScript, Apple and LaserWriter are registered trademarks of their respective corporations. ScripTEN is a trademark of Qume Corporation. *Suggested Retail Price  †Qume Corporation, 1988
Insights on Cricket Graph

Chart a course to improved business graphics

by Adrian Mello

The quickest way to turn an audience into zombies is to start counting off a slew of numbers. Face it—hard facts are hard to take. But people like pictures, and you can change numbers into pictures using a chart program. Cricket Graph, the most capable chart program available today for the Mac, produces a wide variety of charts and provides good control over most aspects of a chart's appearance.

To create charts in Cricket Graph, you always follow the same basic procedure: you type data into a spreadsheet-like data window and then choose from one of 12 basic graph types listed in the Graph menu. Once you create a graph, double-clicking on almost any part of it produces a dialog box that enables you to modify the attributes of that graphic element. You can also choose from the Goodies menu to add depth, value labels, and other graph enhancements. Although that synopsis covers most of Cricket Graph's basic operations, beginners often experience a couple of common stumbling blocks.

Choosing Variables

Beginners are often perplexed by the dialog box that follows a choice from the Graph menu. This dialog box lets you choose the variables that will be graphed. Most graphs fall into one of two main categories: x- and y-axis graphs, and category and value graphs. The only exceptions are quality control, polar, and text graphs.

First, a look at x- and y-axis graphs. When you create scatter, line, area, or double-y graphs, you must choose one variable for the x-axis and one or more variables for the y-axis. (For a double-y graph you choose two variables for the vertical axis.) These four types of graphs work like playing the game Battleship. The individual points are plotted by cross-referencing numbers on the vertical and horizontal sides of a rectangle. In scatter graphs these points stand on their own; in line graphs the program draws lines between the points; and in area graphs the areas defined by the lines are filled.

When you create a bar, column, stacked bar, or stacked column graph, you must also choose a variable for the category you want to compare, such as car models, and one or more variables for the values in each category, such as the number of cars sold. This boils down to choosing what items you want to compare and choosing a set of amounts that correspond to each item. Pie charts work essentially the same way, but you choose a category and only one set of values, so the pie wedges add up to a whole.

Multiples and Overlays

It is simple to compare multiple sets of data on one graph but the procedure may not be immediately obvious. There are two ways to compare data sets. For some graphs, such as column and line graphs, Cricket Graph lets you specify two or more data sets in the values (or vertical axis) portion of the variables dialog box. When the dialog box appears, click each set of data you want and then click OK. Multiple bars or lines then appear in the graph.

Another way to compare information is by layering one chart on top of another. You create an overlay after you have already created a graph. Instead of returning to the data window, you just go to the Graph menu again and pick the chart of your choice. When the variables dialog box appears, select a second data set and click the Overlay Plot button. Repeat this process for each data set you want to plot; you can even mix some graph types.
# Hardware

| **Accessories** | | **Laser Printers** | | **Input/Output Devices** | | **Disks Drives** | | **Scanners** | | **Memory Upgrades** | | **Modems** |
|----------------|-----------------|---------------------|---------------------|---------------------|---------------------|---------------------|-----------------|----------------|-----------------|----------------|
| Curtis Manufacturing | | AST Research | | ABaton | | DataDesk | | AST Research | | Bernoulli |
| Micro Cabinet | | TurboLaser P/S | | ProPoint | | 101 Keyboard | | AST 86 Co-Processor (Mac II) | | A220 20 MB Dual |
| Double Micro Cabinet | | $3,065 | | $85 | | 101-A 16 KB Keyboard | | Mac 286 Co-Processor (Mac II) | | CMS |
| Triple Micro Cabinet | | | | | | | | | | |
| Kensington | | **Mouse Systems** | | **Orchid** | | **Sigma Designs** | | **Disk Drives** | | **Summagraphics** |
| A/B Box | | A + Mouse | | Color Vue Se | | LaserView 15" for MAC SE | | | | MacTablet 12 x 12 |
| Control Center | | A + ADB Mouse | | | | LaserView 19" for MAC SE | | | | |
| Mouse Cleaner | | | | | | LaserView 15" for MAC II | | | | |
| Mouse Cleaning Kit w/Pocket | | | | | | LaserView 19" for MAC II | | | | |
| Mouse Pocket | | | | | | **Keyboards** | | | | |
| Mouseway | | | | | | DATADISK | | | | |
| Polarizing Filter | | | | | | 101 Keyboard | | | | 1,107 |
| Printer Muffler 80 | | | | | | 101-A DB Keyboard | | | | 1,237 |
| System Saver Mac (platinum) | | | | | | | | | | 1,606 |
| 3.5" DS/DD | | | | | | | | | | 1,042 |
| 3.5" SS/DD | | | | | | | | | | |
| Orange Micro | | | | | | | | | | |
| Grappler L/Q | | | | | | | | | | 82 |
| SONY | | | | | | | | | | |
| 3.5" DS/DD | | | | | | | | | | 19 |
| 3.5" SS/DD | | | | | | | | | | 15 |
| **Scanners** | | | | | | | | | | |
| AST Research | | | | | | | | | | |
| TurboScan SF | | | | | | | | | | 1,107 |
| TurboScan FLBD | | | | | | | | | | 1,237 |
| Summagraphics | | | | | | | | | | 355 |
| MacTablet 12 x 12 | | | | | | | | | | |
| Dove Computer Corp | | | | | | | | | | |
| MacSnap 524 | | | | | | | | | | 199 |
| MacSnap 524E | | | | | | | | | | 284 |
| MacSnap 524S | | | | | | | | | | 373 |
| MacSnap 548 | | | | | | | | | | 415 |
| MacSnap 548E | | | | | | | | | | 532 |
| MacSnap 548S | | | | | | | | | | 591 |
| MacSnap Plus 2 | | | | | | | | | | 432 |
| MacSnap 2S or 2H | | | | | | | | | | 444 |
| MacSnap 4S or 4H | | | | | | | | | | 913 |
| SCS Interface/Port | | | | | | | | | | 79 |
| MacSnap Toolkit | | | | | | | | | | 15 |
| EVEREX | | | | | | | | | | |
| EMAC 20D | | | | | | | | | | 479 |
| EMAC 40D | | | | | | | | | | 789 |
| EMAC 60T Tape Backup | | | | | | | | | | 885 |
| General Computer Corp | | | | | | | | | | |
| FX-20 Platinum 20 MB | | | | | | | | | | 592 |
| Rodime | | | | | | | | | | |
| Rodime 20 Plus | | | | | | | | | | 591 |
| Rodime 4S Plus | | | | | | | | | | 883 |
| Rodime 60 Plus EXT | | | | | | | | | | 999 |
| Rodime 1000 RX INT | | | | | | | | | | 977 |
| Rodime 1400 RX INT | | | | | | | | | | 1,096 |
| TECMAR | | | | | | | | | | |
| Mac 40 MB Tape Back Up | | | | | | | | | | 909 |
| Hayes | | | | | | | | | | |
| Smartmodem 1200 | | | | | | | | | | $284 |
| Smartmodem 1200M/w Software | | | | | | | | | | 330 |
| Smartmodem 2400 | | | | | | | | | | 430 |
| PROMETHEUS | | | | | | | | | | |
| Pro Modem 1200 | | | | | | | | | | 207 |
| US Robotics | | | | | | | | | | |
| 1200 | | | | | | | | | | 171 |
| 2400 | | | | | | | | | | 295 |

- No Charge for VISA and Mastercard
- We Do Not Charge Your Card Until Your Order Is Shipped
- You Pay the Ground Shipping $6.00 (except Alaska and Hawaii)
- We Pay the Air Difference
- Free Air applies ONLY to orders up to 10 lbs. & Over $50.
- All products carry only manufacturer's warranties. We do not honor guarantees, rebates, trial period privileges or promotional programs offered by manufacturers.
### ACCOUNTING
- Business Sense .................. $259
- In House Accountant ............. 105
- MacMoney ........................ 57
- Peachtree Accounting ............ 140

### BUSINESS SOFTWARE
- Cricket Graph ..................... $102
- MacCalc ........................... 73
- MS Excel .......................... 225
- MS Works .......................... 168
- Statview 512+ ..................... 163

### CAD PRODUCTS
- Cricket Draw ....................... $145
- MacDraft .......................... 133

### COMMUNICATIONS
- inBox Starter Kit .................. $185
- inBox Personal Connection ...... 66
- MacLink Plus ..................... 103
- Smartcom II ....................... 79

### CREATIVE SOFTWARE
- ConcertWare + .................... $33
- ConcertWare + MIDI .............. 71
- Deluxe Music Construction Set .. 56
- Studio Session ................. 42

### DATABASE
- C.A.T. .......................... $210
- DBase III Plus .................... 289
- Double Helix II .................... 315
- FileMaker Plus .................... 139
- Omnis 3 Plus/Express .......... 268
- Overvue .......................... 139
- PictureBase ...................... 46

### DESK ACCESSORIES
- Smart Alarms Multi User ........ $70
- Multi-User w/Appointment Diary .
- Smart Alarms ..................... 24
- SmartScrap & The Clipper ...... 33
- Tempo II .......................... 71

### DESKTOP PUBLISHING
- Image Studio ...................... $262
- Pagemaker ......................... 366
- Ready, Set, Go! .................. 262
- SuperGlue ......................... 42

### EDUCATIONAL
- KidsTime ........................ $23
- Math Blaster! ..................... 23
- Typing Tutor IV .................. 26

### GAMES
- Balance of Power ................ $27
- Beyond Dark Castle .............. 24
- Chessmaster 2000 ............... 27
- Dark Castle ...................... 24
- Déjà Vu .......................... 26
- Early Games ..................... 25
- Falcon .......................... 25
- Ferrari Grand Prix .............. 29
- Fokker Tri Plane ................ 29
- MS Flight Simulator ............ 29
- Patton vs Rommel ............... 23
- Shadowgate ...................... 27

### GRAPHICS
- Canvas .......................... $92
- Certificate Maker ............... 20
- Click Art Business Images ...... 27
- Click Art Effects ............... 27
- Click Art EPS Illustrations ... 69
- Click Art Holidays ............... 26
- Click Art Personal Graphics ... 27
- Click Art Publications .......... 27
- ClipArt Publications ............ 27
- "Draw It Again Sam" ........... 72
- Fontographer .................... 190
- Freehand ......................... 262
- GraphicWorks .................... 79
- Illustrator ....................... 262
- Image Studio ..................... 262
- Pict-O-Graph ..................... 70
- Picture Base ...................... 47
- PixelPaint ......................... 233
- Post Art ........................ 33
- PosterMaker Plus ............... 33
- Print Shop ......................... 32
- Printworks ....................... 40
- SuperPaint ....................... 71
- Videeworks 2 .................. 103
- WetPaint Clip Art 1-2 ........... 28
- WetPaint Clip Art 3-4 .......... 28
- World-Class Fonts! 1-2 ....... 28
- World-Class Fonts! 3-4 ....... 28

### LANGUAGES
- Lightspeed C .................. 93
- Lightspeed Pascal ............ 66
- MS Basic Interpreter .......... 56
- Turbo Pascal ................. 57

### MONEY MANAGEMENT
- Dollars & Sense ............... 79
- Tobias Managing Your Money .. 114

### SPELLING & GRAMMAR
- Coach .......................... $47
- Coach Professional ............ 92
- Coach Professional Multi-User .. 233
- Coach Thesaurus ............... 28
- Doug Clapp's Word Tools ...... 39
- Sellswell ......................... 35
- Thunder! ......................... 29
- Word Finder ..................... 28

### UTILITIES
- Calendar Maker ................ $24
- Copy II Mac ..................... 18
- Disk Express .................... 28
- Diskfit .......................... 47
- Disktop .......................... 24
- Findswell ......................... 24
- Icon-It! .......................... 38
- Mac Serve ......................... 117
- Multi-User Super Laser Spool .. 186
- My Disk Labeler w/Color ...... 27
- PowerStation .................... 28
- QuickKeys ......................... 47
- Sentinel ......................... 139
- Sidekick ......................... 57
- Stepping Out .................... 44
- Suitcase ......................... 28
- Super Laser Spool ............... 71
- SuperSPOOL ....................... 47
- Tempo II .......................... 71

### WORD PROCESSORS
- FullWrite Professional ........ $239
- MS Write .......................... 99
- MS Word ......................... 225
- Word Perfect .................... 163
- Write Now ......................... 93
Macintosh STATISTICAL SYSTEM

- Unlimited size of data files, double precision calculations, mainframe speed
- Complete statistical data-base management with spreadsheet
- Comprehensive selection of Descriptive, Basic, and Nonparametric statistics
- Crosstabulation and Frequency Tables
- General (multifactor) MANOVA (up to 16 dependent variables)
- General ANOVA/ANCOVA (up to 10 within/between factors)
- General Multiple Regression with Forecasting (up to 50 predictors)
- Discriminant Function Analysis
- Graphics and Exploratory data analysis
- Contrast Analysis
- Flexible selection of subsets of cases for each analysis
- Easy import/export of data and output; can access mes created by
- True Macintosh user interface (not a mainframe adaptation)

Available from your dealer or from StatSoft ($245 + $5. sh h)
limited time offer: $119 + $5. sh h

How To/Insights

If you want to hide information that can't be deleted. For example, if you want to hide the names of some of the columns in a column graph, you can't just select an axis label and cut it; if one column has labels they all get labels. One way to eliminate unwanted text or graphics from a chart is to use the text tool to make opaque text blocks. Choose the text tool and click on the graph near the information you want to mask. Type in spaces to cover the text. By using the space bar and the Return key, and by experimenting with the font size and text orientation, you can make a masking rectangle that generally conforms to the area you want to cover up. (Of course, you can also use this technique with text to quickly replace labels without returning to the Data window.)

Quick Columns

Here's another shortcut. Normally, after you select the chart type, a dialog box appears that lets you choose variables for graphing. For example, if you've chosen a line graph, the dialog box asks you to select a column for the x-axis data and a column for the y-axis data. You can preselect the variables in the Data window by holding down the Option key and selecting the column header numbers before selecting the graph type. When you choose the graph type, those columns appear highlighted in the variables-selection dialog box. You then simply press the New Plot button to create the graph.

Positive Thinking

Many people overlook the options under the Data menu. You don't have to be a mathematician to take advantage of these options. For example, by using the functions under the Transform option, you can change a series of negative numbers into absolute values without retyping. This method works even if you have a series of positive and negative numbers mixed in

(continues)
MAC ARCHITRION® 3.5 is an integrated professional CAD package with 3 modules:

- Real volumetric 3D (Space Processor®),
- Very powerful and versatile 2D,
- Quantifier.

GIMEOR INC.

1815 H. Street N.W.
Washington D.C. 20006
(202) 223-4373 or (202) CAD HERE

130 Pleasant Street
Brookline MASS 02146
(617) 566-6315

Circle 129 on reader service card
Sharing IBM Files With a Mac?

Introducing LAP-LINK Mac. A new, easier way to share files between Macintosh and IBM compatible personal computers.

Just connect the LAP-LINK Mac cable to the PC and the Mac. And start LAP-LINK Mac on each computer and you're ready to share files.

All kinds of files. Like word processing and desktop publishing files. Spreadsheet files. Database files. You name it.

A unique split screen design clearly shows the files on each computer. And our high-speed transfer rate of 57,600 baud allows you to transfer a 50K file in just 25 seconds.

LAP-LINK Mac gives you tremendous flexibility. You can select certain files for transfer, quickly "tag" multiple files or transfer entire groups of files at once.

And LAP-LINK Mac is compatible with Macintosh Finder, Multi-Finder and leading networks.

All for a suggested retail price of $139.95, including cable, disks, and full documentation.

So discover the new easy way to share files. Available at your local computer or software store or for more information call Traveling Software at 1-800-343-8080 in Washington 1-206-483-8088.

Circle 304 on reader service card

How To/Insights

Projected versus Actual Data

Project managers and other professionals who are held accountable for their plans often need to show the difference between projected data and actual results. Column and line graphs are the most common way to do this. In this situation, the data window usually has one column that contains text, such as the months of a year. Two other columns show the projected numbers for the whole year and the actual numbers for a portion of the year.

If you try to create a column graph by plotting projected versus actual data, you will get an alert box that says "The categories you chose do not match the categories that were first selected." To avoid this, insert zeros into the data cells that don't have any "actual" figures yet and replot the graph (see "Plotting Projected Data"). The new graph now contains column bars with heights of zero.

This technique does not work with line graphs, of course, because plotting the zeros would make it look as if your "actual" had suddenly bottomed out. Instead of entering zeros into the data cells, leave the cells empty and choose Row Numbers for the x-axis category. When you select Row Numbers for x-axis values, Cricket Graph does not require corresponding y-axis values. After creating the graph, you must mask the x-axis labels, which now show row numbers, with text labels for each month. If you plan to use this type of graph again, use the Save Format command to avoid retyping and positioning the labels each time you update the report.

Two Sorts

Depending on the column format, you can sort data in two ways. If the column format is set for alphanumeric data, the program sorts the values alphabetically by order of characters in each cell. In any of the other formats (decimal, scientific, dollars, or percent), the program sorts numerically by the order of magnitude of numbers in the cell.
SuperPaint, the best-selling graphics program for the Macintosh®, has always set the standard against which other software is compared. And we just raised that standard.

In Version 2.0, SuperPaint gives you more graphics power than the costly "professional" drawing programs, yet it's easier to use. Draw spontaneously with the freehand Bezier tool, for example. You don't have to get it perfect the first time—the Bezier path is completely editable, so you can progressively refine your work. Or use AutoTrace™ to instantly convert any bitmapped image to an object-oriented line drawing.

Then, with a mouse click, you can further refine your graphic with the most flexible and sophisticated painting tools available on the Mac, including a slick new airbrush that works just like the real thing. Plug-in paint tools can be custom-programmed and will show up in the tool palette.

We've added nearly all the other features you wanted, too. You can set any document size for printing multiple pages, work in landscape view, or use SuperBits™ to edit bitmaps of any size and resolution—you can even edit a full page at 300 dpi. Plus you can preview your image in color before printing.

More power, more flexibility, and easier to use. That's SuperPaint 2.0 — setting the standard for Macintosh graphics... again.

Suggested retail price: $199. Upgrade from 1.0 or 1.1: $50.

System requirements:
Macintosh Plus, SE or Macintosh II;
System 6.0 or later
Silicon Beach Software, Inc.
P.O. Box 261430
San Diego, CA 92126 • (619) 695-6956

AutoTrace, SuperBits, and the Silicon Beach Software logo are trademarks of Silicon Beach Software, Inc. Macintosh is a registered trademark of Apple Computer, Inc.
Learning HyperCard Can Be As Easy As Watching TV

This unique and easy-to-follow video guide gives you the framework for using HyperCard™ on your Macintosh™. You'll understand what HyperCard is, how it works, and what it can do. You'll discover the key concepts that unlock its potential. You'll learn quickly and conveniently, and you don't need your Macintosh—just sit back and watch. Whether you're a complete novice or a computer expert, there's no better way to get up and running!

Get expert insights, tips, and techniques from Danny Goodman

Author of the best-selling reference The Complete HyperCard Handbook and Danny Goodman's HyperCard Developer's Guide, Danny Goodman worked with HyperCard creator Bill Atkinson for 18 months prior to the program's release, and has authored two award-winning HyperCard stack products: Business Class and Focal Point. He is in constant worldwide demand to speak at HyperCard user groups and conferences. Now, in the comfort of your own home, you will benefit from Danny's extensive know-how, and find the easiest ways to put HyperCard to work for you.

ORDER NOW!

Visa/MasterCard/American Express orders call 800-333-0901
Ask for operator 20

Quick Results! is a trademark of PCW Communications, Inc., and The Sterling Group.
Apple is a registered trademark, and HyperCard and Macintosh are trademarks, of Apple Computer, Inc.

How To/Insights

Plotting Projected Data
You must trick Cricket Graph into making a projected-versus-actual graph. Blank cells in the data window won't plot properly, so here the amount 0 is entered in the Actual column for June through December.

Changing Text into Numbers
The word recode may call to mind a series of cryptic numbers and equations. But recoding simply means changing a range of information into some other number or word. You'd never guess by looking at it that the Recode dialog box could be used for text, but it can. For example, if you wanted to find all teenagers in a demographic sample, you could recode all people older than 12 and younger than 20 to equal yes. You can also change text into numbers. For example, a market researcher might want to assign numbers to a range of names in order to show results in a graph. All names beginning with the letters A through F could be given a value of 1, names between G and L could be given a value of 2, and so on. You could then create a chart that would reflect graphically the alphabetic breakdown of names. If you want to extract numeric data from text data in a

(continues)
How to impress the powers that be with the power that is.

Chances are your bosses don't have a full appreciation of your Macintosh. It's powerful, nice to look at, and it's great with graphics—they'll grant you that much. But does it have a way with words?

Well now, thanks to WordPerfect for the Macintosh, you can finally put their minds at ease. It's a new, powerful, easy-to-use word processor from the world leader in word processing. A word processor designed specifically for the Mac.

So give your Mac the word processing power to be its best. For more information, write to WordPerfect Corporation, 1555 North Technology Way, Orem, Utah 84057. Or call (801) 225-5000. (In Canada, call 1-800-267-2499.)

WordPerfect
CORPORATION

WordPerfect® for the Macintosh

Circle 126 on reader service card

WordPerfect is a registered trademark of WordPerfect Corporation. All other brand and product names are trademarks or registered trademarks of their respective companies.
mixed column quickly, convert the column
to decimal format; this procedure elimi­
nates all the text data.

Just Average

Cricket Graph lacks a specific function
for finding the average of a column of data.
However, you can work around this by
choosing Transform from the Data menu.
Choose the Running Sum option in the di­
alog box that appears and select the appro­
priate column of data. Then divide the re­
sulting column by selecting Simple Math
from the Data menu, choosing the division
function, and entering the number of rows
in the Constant box. The last value in the
destination column will be the average.
There is another method of producing an
average, which works only in a column
with an odd number of rows. Using the
Smooth function, choose Smooth Data

How To/Insights

Step Data

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.000</td>
</tr>
<tr>
<td>2</td>
<td>1.000</td>
</tr>
<tr>
<td>3</td>
<td>2.000</td>
</tr>
<tr>
<td>4</td>
<td>3.000</td>
</tr>
<tr>
<td>5</td>
<td>4.000</td>
</tr>
</tbody>
</table>

Step-by-Step Charting

To create a step chart you enter pairs of num­
bers. The numbers in rows 1 and 2 of column 1
specify column width for the left-most column in
the graph. The numbers in rows 1 and 2 of col­
mun 2 give the height. Note that to eliminate
space between columns, adjoining columns
must have one x value.

Now you can recover the
numeric data behind the
printe d graphs with

Data Scan

Data Scan is the first image processing software for the
Macintosh that allows you to recover numeric data from
bar charts, line charts, area charts, log/log, log/linear,
linear plots and more. Data Scan analyzes bitmaps in
MacPaint, Uncompressed FOTO (PageMaker 1.2), TIFF,
or Thunderscan format capturing the numbers behind
the graphic presentation.

With the help of a scanner, Data Scan may be used to
extract numeric data from graphics in newspapers,
journals, or any hard copy source when the original
numeric data is not available. Data Scan has a number
of impressive options that allow you to process even
imperfectly scanned data.

Numeric data captured by Data Scan can be quickly
exported into a spreadsheet or statistics package for
further analysis.

"Data Scan... fills a gap in the area of technical analysis.
Anyone who needs to extract numeric data from hard
copy graphics will find it invaluable."

— MacWEEK, August 16, 1988

Data Scan... $199.95; requires a minimum 512K RAM.

BRAINPOWER, INC.
24009 Ventura Boulevard
Calabasas, CA 91302
800-345-0519 • 818-884-6911 (in CA)
FAX 818-884-6931

Circle 382 on reader service card
More Power!
12 Issues for $24.00
□ Send me 1 year/12 monthly issues of MACWORLD for $24. Save 20% off the basic subscription rate.
□ Save Even More! 2 years/24 monthly issues for $37.90.
Please Bill me later.
Name ____________________________
Company _________________________
Address __________________________
City State Zip _____________________
By regular subscription, Macworld is $30 for 12 issues. The annual cover price is $47.40 (12 issues). Offer available to subscribers in the U.S. only. Please allow 6-8 weeks for delivery of your first issue.

MACWORLD
More Information!
12 Issues for $24.00
□ Send me 1 year/12 monthly issues of MACWORLD for $24. Save 20% off the basic subscription rate.
□ Save Even More! 2 years/24 monthly issues for $37.90.
Please Bill me later.
Name ____________________________
Company _________________________
Address __________________________
City State Zip _____________________
By regular subscription, Macworld is $30 for 12 issues. The annual cover price is $47.40 (12 issues). Offer available to subscribers in the U.S. only. Please allow 6-8 weeks for delivery of your first issue.

MACWORLD
More to Give!
12 Issues for $24.00
A one-year subscription (12 issues for just $24) will be sent to the person listed below. Save 20% off the regular subscription rate of $30 and nearly 50% off the annual newsstand price of $47.40.
Please Bill me later.
Send Gift to: Name ____________________________
Address ________________________________________
City/State/Zip ________________________________
Send Gift from: Name __________________________
Address ________________________________________
City/State/Zip ________________________________
Please allow 6-8 weeks for delivery of your first issue. Offer good in the U.S. only.

MACWORLD
Discover The Power
Of Macworld At A
Special Savings Rate.
Save Almost $24.00 Off the cover price.

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 1262 BOULDER, CO
POSTAGE WILL BE PAID BY ADDRESSEE

MACWORLD
Subscription Department
P.O. Box 51666
Boulder, CO 80321-1666

Save Nearly 50% When You Subscribe Today!

MACWORLD
The magazine that helps you get the most from your Mac

Macworld is your key to it all. Productivity. Creativity. Whether you want to upgrade software, hardware... or learn to use what you have to its fullest potential.

That’s what Macworld does—links the Mac’s potential to yours.

We look out for your interests. We tell you what’s new for the Mac. What it does. Who it’s for. Compare similar products—and name names! Discuss pros and cons. Assess value for money for both hardware and software.

We help clarify your options. Is the upgrade worth it? What does this program do that your present software doesn’t? Will it work with your printer? If we help you make just one right decision, your subscription is worth it!

Macworld is more product-driven, more YOU-oriented than ever before. The thing to do now is make the most of your Mac. Macworld is the key.

• Applications
• Power Upgrades
• Buying Guides
• Straight-Shooting Reviews

Mail The Attached Card Today!
from the Data menu and then specify the number of rows in the Smooth Width box of the dialog box. This generates the average in the next column of the Data window.

**Data Exchange**

If you want to export tab-delimited text to another program, hold down the Option key as you select Save Data As from the File menu. An option to save in StatWorks format then appears in the dialog box. StatWorks format is a text-file format that can be opened by word processing or other programs as a text file. This option is especially useful if you are moving data between versions of Cricket Graph. Although different versions can’t always read files saved in the program’s own format, they can all read StatWorks format.

**Spacing Bars or Columns**

Although there are no commands that enable you to control the space between columns on a graph, you can change the spacing somewhat by doctoring the data window. You can increase the space between columns by adding dummy (blank) columns between them. Do this by inserting a row containing zero values between each existing row. Use the text tool to cover the extra column labels, as described in the technique for masking text.

By eliminating space between columns in the graph, you can come up with a step graph. In the Data window, you enter data in pairs to define the height and width of each bar.
LOOK INTO FULLWRITE AND FULL IMPACT AND YOU COULD WIN A MACINTOSH II.
You could win this powerful Macintosh II computer with all the trimmings. Because we're giving away 50 complete Macintosh II systems* to 50 lucky winners. And 50 FullWrite and 50 Full Impact packages to 100 lucky winners.

How do you win? Just stop by your participating Ashton-Tate dealer before December 31, 1988. And while you're there, ask to see a demonstration of Full Impact™ and FullWrite Professional™—Ashton-Tate's innovative new products designed to maximize the power of your Macintosh.

Full Impact is the power spreadsheet designed for the real world of business reports. Going beyond the raw number-crunching ability of Microsoft's Excel, Full Impact allows you to combine spreadsheet analysis, text, and graphics, all on the same page. So you can produce crisp, clear and impactful documents.

FullWrite Professional is the complete Macintosh writing environment that takes you beyond just word processing. You can combine text and graphics, and design your page layout as you go—all in the same easy-to-use environment.

Which means you can generate persuasive, visually-exciting documents without the nuisance and delay of switching between several programs, as you'd have to with a program like Microsoft Word.

So come in to your participating Ashton-Tate dealer today. Find out how to make your Macintosh more powerful. And you could be rewarded with a more powerful Macintosh.

---

*Includes 40 megabyte hard disk, RGB high resolution color monitor, Apple video card and expansion kit, and Apple extended keyboard. Total suggested retail price of the Macintosh II system is $7,245. See your local participating Ashton-Tate dealer for complete, official sweepstakes rules and entry details. No purchase necessary. Void where prohibited. Sweepstakes end 12/31/88 and are subject to complete rules. Open to U.S. and Canadian residents 18 years of age and older.

Trademarks/Owner: Full Impact, FullWrite Professional/Ashton-Tate, Ashton-Tate Corporation; Microsoft Excel, Microsoft Word/ Microsoft Corporation; Macintosh/Apple Computer, Inc. ©1988 Ashton-Tate Corporation. All rights reserved.
How To/Insights

NOW YOU CAN DO CAD/CAM,
Desktop Publishing, and all graphics
applications without the clutter of a mouse.

Now you can do CAD/CAM,
Desktop Publishing, and all graphics
applications without the clutter of a mouse.

Nothing against mice. But there are
some applications where they'll drive
you crazy. The MACH IV PLUS Professional Joystick provides both mouse
and joystick compatibility in one unit
for all Apple II and Macintosh users.
Advanced features include an Absolute
Mode that tracks and acts like a mouse and three
Rate Modes of movement.

Or if you already have a CH Products
Joystick, get the MIRAGE," the
joystick/mouse interface for all Apple
II and Macintosh computers that turns
your CH Joystick (MACH II/" MACH
III/" or FLIGHTSTICK") into a highpowered mouse. So
see your dealer to­
day. Credit card

A division of Joystick Technologies, Inc.
1225 Stone Drive
San Marcos, CA 92069

For more information or a complete product brochure, call (619) 744-8546.

Circle 338 on reader service card

MAXEXPERIENCED

You're looking at the most concentrated pool of experience on any Macintosh magazine staff—the contributing editors of Macworld.

These people don't just cover the Macintosh market. They've helped shape it. Their unparalleled collective expertise and historical perspective of the Macintosh goes back to its inception. So when you read Macworld, you'll see that our editors are not just experienced. They're also unique.

MACWORLD

The Macintosh® Magazine
An IDG Communications Publication

Close Columns

To create distinct areas within a step graph, put the y values that define the height of each column in the graph in a separate data column, and then fill the other cells with zeros.

of the columns in the final graph. You actually define points that will create rectangles, and then you create an area graph.

Each graph column will have two x-value entries (to set the width of the rectangle) and two y-value entries (to set the height of the rectangle). To prevent space from appearing between two columns in the graph, they should share the same x value where they abut. For example, the second x value of the left-most column in the graph and the first x value of its neighbor should be identical. Now, plotting the data as an area graph produces a set of columns with no space between them (see "Stepby-Step Charting").

If you want to define each column (or step) with a separate pattern or color, put the y values that define each graph column's height in a separate column of the data window. The y values must still correspond to the same rows held by the x values in data column 1. Fill all the other cells in the data columns holding the y values with zeros. Now plot an area graph. Create the x axis by choosing data column 1 and create the y axis by selecting each data column that should appear as a separate area in the graph (see "Close Columns"). You can modify each column by
Making Histograms

To create histograms, which vary the column width and height, vary the number of times you repeat the y value. The narrow column 4 in this example covers only 2 rows in the data window; column 3 covers 8 rows.

Clicking on its legend symbol to select a color, or by double-clicking to select a pattern.

By taking this approach one step further, you can produce histograms. A histogram is a column graph whose columns vary not only in height, to show variation in amounts, but also in width, to show variation in the duration of the period represented by each column. To create a histogram, you repeat the same y value in multiple rows in a data column. The width of any column in the final graph is determined by the range of x-axis data for which a y value is repeated (see "Making Histograms"). You can modify the color or pattern of each column by clicking or double-clicking the legend symbol.

If you have a Cricket Graph shortcut, trick, or technique you've learned the hard way, why not share it with other readers? Send your tips to Quick Tips, Macworld, 501 Second St., San Francisco, CA 94107.
Introducing Finale. The first music software that efficiently eliminates labor intensive, hand written scoring and editing from the composing and publishing process. All you need is the inspiration to write music. Finale will do the rest.

NO OTHER SOFTWARE HAS THE BRAINS TO WRITE MUSIC LIKE THIS.

The secret lies in Finale's revolutionary cognitive abilities. It literally understands what you play into it.

You just sit at your MIDI keyboard and improvise your score using expressive dynamics and rubato. Within seconds, your score will appear on the screen in standard music notation.

You can even "explode" or expand a simple piano score into a full orchestration with just a few clicks of the mouse.

Then add MIDI channels and patch assignments to hear your orchestration.

And, once your score is entered, you can use Finale's unprecedented page layout and editing features.

Finale even has its own PostScript font called Petrucci.

All of this for only $1000 makes Finale a true investment for the professional composer. Just call toll-free 1-800-843-1337. Or call collect 612-854-9554 for the dealer nearest you or for more information.

Finale

Quartet

by James J. Kyncko

Finale's publisher-quality scores are a sight for sore eyes.
Printer Tools

Are there any real alternatives to printing with an ImageWriter?

by Charles Seiter

If you work in an ordinary business office, or have at any time wandered into a computer store, you will have noticed by now that most computer printers in the world are not Image Writers. Some of them offer lower cost, higher speed, better print quality, or other advantages. The question seems fairly simple: should you consider using a non-Apple printer with the Mac?

After months of sometimes frustrating experimentation, I’ve determined that the answer depends on the situation. It depends on whether you’re planning to use one printer with one Mac or you’re setting up a more complicated office situation, and whether you’ve already got access to a non-Apple printer or you’re thinking of buying one. With nonlaser printers, the focus of this article, three printing situations come to mind.

First, you already have an ImageWriter but wonder if the typeface is somehow crisper and the printing faster on the other side of the fence. In this case, sit down for a few minutes, have a cup of coffee, and ponder these facts. Every application for the Mac is designed to work on an ImageWriter. The people who write the software probably test it on an ImageWriter first. You can be as sure as is possible in the world of computing that you will have minimal printer problems with a Mac/ImageWriter combination. So unless you actually enjoy a bit of electromechanical adventure, buy yourself a new ribbon and learn a little patience.

Second, your boss says you can use a Macintosh but only if you connect it to a printer that’s already there. So you’ll use a non-Apple printer simply because you have no choice. The interface vendors claim this situation is responsible for 80 percent of their sales. As I will detail below, this may work out splendidly or may be a hassle, depending on the complexity and reliability of the hardware you must use.

Third, you have access to a printer that you can use for special purposes. Typically, this would be a daisy wheel printer for true letter-quality printing or an ink-jet printer for higher-than-dot-matrix resolution (and blissful quiet). Convenient and effective solutions for these cases do exist, you’ll be pleased to hear.

Pinpointing the Problem

Beyond the secluded gates of the Apple orchard lies the jungle, teeming with four hundred or so not-exactly-mutually-compatible printers. Major applications for the IBM PC typically provide two or three disks full of printer drivers, instead of the ImageWriter/LaserWriter combination that’s sufficient for all needs in the Macintosh world. To make things more exciting, printer manufacturers will sometimes make tiny changes in the internal ROM that defines a printer’s default fonts and graphics capabilities. What this means in practice is that it’s difficult for the companies that sell Mac drivers for these printers to guarantee that everything will work perfectly, in all applications, with the particular printer you may have. There may be only minor problems, and they may be fixable through the driver vendors’ usually diligent customer support, but the vendor is simply in no position to offer 100 percent assurance that its printer will be as easy to use as an ImageWriter. That’s why so few mail-order Mac vendors carry non-Apple printers—they require too much technical support.

Charles Seiter is a Macworld contributing editor with four years’ experience interfacing various printers to Macs.

(continues)
One drive stands out. This is it.
If you think all Apple* hard disks are created equal, you don't have a Preference. You should.
Preference is our family of performance products for computer users who care. For Apple users, it's the new 20 or 40 megabyte storage solution that's swift, sleek and simply a pleasure to use.

A Preference for Performance.
These new hard disks come with 32 Kbytes of built-in caching, 1:1 interleave and high performance SCSI drivers. Result: They're incredibly fast. So you “Open” and “Save” files in a flash.

Which is all the more amazing when you consider that we packed this performance into such a diminutive package — compact enough to sit beside, beneath or even on top of your computer, and tough enough to travel with you.

A Preference for Simplicity.
Our new drives come ready to plug and play, preformatted and ready to connect to your Macintosh II*, SE* or any Apple II* with SCSI adapter. And they can even be used to provide font storage for the Laserwriter* II NTX.

All in all, it's never been easier to make the right choice! Call 1-415-960-3353 for complete product details. Then see your Apple dealer. And express your Preference.

Western Digital is a registered trademark and Preference is a trademark of Western Digital Corporation.
*Apple and LaserWriter are registered trademarks of Apple Computer, Inc. Copyright © 1988 Western Digital Corporation.
Two Different Routes

A serial printer expects to see information for printing characters arrive telegraph-style at its input port. That is, for each character to be printed, 8 bits of ASCII code are sent down the cable wires one bit at a time. A parallel printer expects to see the 8 bits appear all at once at its collection-input port lines. In principle, a parallel interface can be faster; in practice, the print-head speed is usually the limiting factor.

For a Mac to be used with a parallel printer, a device with a converter chip must be present somewhere between the Mac printer port and the input port of the printer itself. In the Grappler, the conversion takes place in a small box on the printer cable; in the Hanzon system, it occurs on a small card that fits in the Epson printer; in the MacEnhancer, the converter is part of a box that attaches to the Mac.

To work with the Mac, a serial printer needs only a software translator to translate ImageWriter codes to codes for the other printer. The PrintLink or Printworks for the Mac makes operation fairly trouble-free. However, the average office printer has a parallel interface—the serial interface is usually a $100 option, and most IBM PC applications are written for parallel printers. The exception to this rule is that serial-interface daisy wheel printers are fairly common, as are some types of serial-interface ink-jet printers.

Serial or Parallel?

There are two common printer interfaces, serial and parallel. In principle, serial interfaces should be slower than parallel ones, but in practice the printer itself limits the speed of printing. When you encounter a random printer in an office, sales figures suggest, it’s most likely to have a parallel interface.

The Mac, on the other hand, has a serial printer port. Therefore, to drive a non-Apple serial printer, you need only some software and the right cable. If you are trying to drive a non-Apple parallel printer (the more likely situation), you will have to buy hardware to perform a serial-to-parallel conversion—another stage of complication, potential problems, and expense. So you must first determine whether the printer has a serial or parallel interface and proceed accordingly (see "Two Different Routes").

The standard test printers for this study were two dot matrix printers, an Epson FX-80 with a serial interface and a less-expensive Citizen 1200D with a parallel interface, and a popular daisy wheel printer no longer in production. Other printers were used as noted. Applications included Microsoft Word, Microsoft Excel, MacPaint, MacWrite, and for added challenge, Trapeze.
LOW COST SCANNING

If you're shopping for a Macintosh® scanner, you may know that most are quite expensive. At $249, ThunderScan® is the lowest priced scanner of any on the market. But don't be fooled by its price. ThunderScan has power to bank on.

ThunderScan replaces the ribbon cartridge of any ImageWriter™ printer (except LQ). Just snap in the scanner and roll in an original. ThunderScan scans in 32 gray levels with high resolution. Clearly an impressive return on your investment.

Yet that's only part of a great deal. After scanning you have so much power! Take your images at face value or create a wealth of special effects. Enlarge and reduce, change contrast and brightness, rotate and frame. Create halftones and linescreens.

There's even more to the picture. Use ThunderScan to improve your graphics portfolio. Add images to desktop publishing files. Refine your scans with ImageStudio, Illustrator or FreeHand™.

The fine print: ThunderScan (version 4.0) works with the Mac SE, Plus and 512. If you want to scan with the Mac II, you'll also need our $49 Power Accessory for Macintosh II.

The bottom line: it's only $249.

Thunderware
21 Orinda Way, Orinda, CA 94563
415/254-6581 FAX: 415/254-3047

Circle 176 on reader service card
1. Select MacPlot from the 'Chooser'.
2. Select 'PageSetup....'
3. Select 'Print...'. That's it!

Introducing MacPlot version 3.
Plotting with MacPlot is now just as easy as printing on your ImageWriter or LaserWriter. You plot directly from within your application, using the 'Page Setup...' and 'Print...' commands. Now 95% of all the programs you are using can plot through MacPlot. All plotters from the leading plotter manufacturers are supported. Buy MacPlot today at your local dealer, or call us for more information.

MACPLOT
by Microspot
1-800-272-5533

How To/Mac Tools

Serial for Breakfast
If you do have a serial printer, you will have relatively little difficulty driving it from a Mac. Two popular and relatively inexpensive commercial packages, Printworks for the Mac (from SoftStyle, a division of Phoenix Technologies) and The Print-Link (from GDT Softworks), handle this situation effectively. Unfortunately, because most PC programs expect parallel printers, you'll probably be confronted with a parallel interface, but if you're lucky enough to have a serial printer, your worries are over.

When ordering The Print-Link from GDT Softworks, you specify the type of printer you want. To install it, you simply drag the printer interface icon to your System file and select the driver icon and connection port with the Chooser. On an Epson FX-80 with a serial interface, The Print-Link produced output that was virtually identical to ImageWriter output, both in graphics and text, within variations in ribbon quality.

Printworks for the Mac is equally simple but more generous with drivers—you buy either the dot matrix program or the daisy wheel program and each one provides a choice of drivers. Once again, it was difficult to distinguish the Epson output from standard ImageWriter II printing. Printworks also offers superior documentation for installation, with detailed driver instructions for each supported printer, including clear pictures of DIP switches and notes on required cables. Within five minutes of loading the Printworks disk, I watched the daisy wheel printer merrily churning out pages of Mac output, with correct page breaks and perfect letter spacing. Although daisy wheel printers cannot produce graphics, these drivers offer a low-cost way to get crisp business correspondence from a Mac with widely available office printers.

Parallel for Lunch
Now things get a little more difficult. If you have a parallel printer, you have some choices to make. First, you can buy a serial interface (if one is available) for your parallel printer from the printer manufacturer; then you can use one of the programs above. (However, this may be unacceptable if you're supposed to share the printer in an office where a parallel interface is the norm.) Second, you can buy a small, Mac-specific interface that makes the printer appear as an ImageWriter to your Mac (we'll look at two devices of this type). Finally, you can buy a general-purpose, serial-to-parallel converter box to use with software drivers on the Mac. Although this involves the most money (a minimum of $500) and requires quite complicated cabling and ongoing technical support, it could ultimately prove to be the most cost-effective solution for a large office, since it offers the most flexibility in computer/printer combinations.

For Epsons Only
If the printer you need to drive is an Epson in the FX, BX, LX, or MX series, the simplest option is to buy Hanzon Data's Epson Serial Interface Card, which makes the Epson appear as an ImageWriter to the Mac. DIP switches on the card let you toggle the printer back to standard Epson mode as required. Installation is easy (the ImageWriter cable goes into the card), out-
With MacMainFrame, it's so easy to access an IBM mainframe, a mouse could do it.

If you're like most Macintosh® users, one of the reasons you got hooked on the Macintosh in the first place is that it's so easy to use.

Which is why you'll be happy to know that now you can use any Macintosh, from the 512Ke to the Macintosh II, to access any IBM® mainframe with scarcely more than the click of a mouse.

MacMainFrame™ is a Macintosh-to-IBM mainframe link that puts your Macintosh and your mainframe on speaking terms.

MacMainFrame gives you complete Macintosh-to-mainframe functionality including file transfer.

You can access the host remotely from your satellite or home office. Or from client sites.

And because MacMainFrame builds on the flexibility inherent in your Macintosh, you can even create your own personal operating environment. With convenient features that include everything from keyboard remapping to user-definable screen colors.

In all candor, when it comes to connecting the Macintosh with IBM, no other Macintosh-to-mainframe link is as true to the Macintosh ideal as MacMainFrame.

For the authorized MacMainFrame dealer or distributor nearest you, call 1-800-289-2526, extension 27.

Or write to Avatar Corporation, 99 South Street, Hopkinton, MA 01748.

Macintosh is a registered trademark of Apple Computer Inc. IBM is a registered trademark of International Business Machines Corporation. Avatar is a registered trademark and MacMainFrame is a trademark of Avatar Corporation.
put is ImageWriter look-alike, and you make no investment in software (applications use the ImageWriter driver).

**For Epsons and Others**

Another hardware approach is the Grappler C/Mac/GS from Orange Micro. This device looks like a cable with a small box on the printer-plug end. You plug one end of the cable into the ImageWriter and the other into the printer. What sets the Grappler apart from other serial-to-parallel converters is its small size and its built-in printer interfaces. The little box, which also comes with a 120VAC-to-9VDC converter, contains the serial-to-parallel converter with DIP switches for interfacing to twenty or so common dot matrix printers (including color printers). A version of the device to drive 24-pin printers (called the Grappler IQ) is also available but was not tested here.

In principle serial-to-parallel conversion is the slickest approach, as well as the most Mac-like in its lack of fuss. It appears to the user as a "magic cable" that turns other printers into ImageWriter clones. In practice, the earliest versions had bugs, the intermediate versions had less-serious bugs, and at press time Orange Micro was still upgrading the ROM used in the device. While software vendors can change their programs more conveniently than Orange Micro can change its preprogrammed chip, there's no reason why this device cannot ultimately be completely free of bugs. (Orange Micro offers a year-long warranty to accommodate printer compatibility problems.) If you can't use the Hanzon card because you have a non-Epson dot matrix printer, your best hope for hassle-free printing is to give the Grappler a chance. For several technical reasons (mainly oddities in a printer's escape codes), if this product doesn't work with your printer, you can expect trouble with other approaches as well, and you may need to rethink your objectives.

**Miraculous Conversions**

There are many serial-to-parallel converters on the market—typically boxes the size of a toaster with a variety of cable ports—but you must buy the printer drivers to go with them. Most converters offer memory buffers in different sizes, since they provide convenience and improve speed, even over print spoolers, but don't add much to the cost of the device. You should be aware that running serial-port output from a printer driver into a converter and out through a parallel port to a printer will not invariably produce perfect results. Furthermore, you may find you can reliably print only ASCII (text-only) format (no fancy fonts or graphics). I found this serial-to-parallel conversion scheme to cause more problems than any other I tested. It also results in customer-service problems that vendors can't necessarily resolve (software developers can't be expected to provide 100 percent compatibility with other companies' converter hardware).

One converter worth examining is the $245 MacEnhancer from SoftStyle, a division of Phoenix Technologies. It doesn't offer a buffer but it does provide four parallel ports controlled from the Chooser. If you use Printworks you have the added advantage of dealing with a single firm to resolve any problems that might crop up. Phoenix also includes communications software in the package.

Another reasonably priced converter is the Universal Printer Buffer from Jonathan Freeman Designs, which provides two serial-to-parallel converter sections and a 64K buffer. Because of its minimal documentation, I can recommend this product only for the technically proficient. Still, the Universal produced nearly correct output, in text-only mode, using serial-data output from The Print-Link driving a parallel printer under Epson FX-80 emulation. Nearby correct in this context means that page breaks were seriously awry on multipart documents, and special characters transformed into unpredictable hash. While these quirks could probably be eliminated with some effort, the Universal Printer Buffer would probably be more useful in other contexts, such as communications, data acquisition, ASCII printing, or ordinary printer buffering (rather than buffering plus serial-to-parallel graphics conversion).

A product that's ready to accept the challenges of conversion, and anything else you may face, is the Printer Optimizer from Applied Creative Technology. This device allows simultaneous management of several printers, both serial and parallel, accepting input from several computers. The Printer Optimizer can perform different custom-code translations of nonprintable codes, and it features extensive documentation on the Macintosh interface.

One advantage of this complex product is its roaring speedup of an ImageWriter through Printer Optimizer's special drivers, which are enhanced for use with its...

You're a professional who bills by the hour. You're smart. You work hard. In today's business world, you don't have the edge if you can't get your bills out on time.

Which is why we invented Timeslips III, the best-selling time and billing system of all time. It lets all your colleagues handle thousands of clients, with up to 128 projects per client. And tracks all simultaneously. Using Timeslips III, small and medium-size companies report capturing 20% more billable time.

Timeslips III is DA (desk accessory). Always instantly accessible, a built-in "Stopwatch" times any phone call or activity while you work. Then calculates the total fee and updates your client file. Automatically.

Timeslips III accurately tracks time and expenses. Then creates custom bills (thousands of formats are possible), and gets them out fast. You can even import your logo design as a backdrop to your bills.

Timeslips III is a powerful, growth-oriented, productivity tool. It gives you control over your business with user defined reports, including work-in-progress, employee and activity breakdowns by project, for some or all clients.

For all that it does, you may be surprised it only costs $199.95. You could recover that in one day.

For press reviews, product information, or the name of your nearest Timeslips III dealer, call 1-800-338-5314.

And get closer to success.
From January 20-22, MACWORLD Expo/San Francisco is the Only Game in Town.

Pass "GO" and head directly to MACWORLD Expo/San Francisco, the original Macintosh™ computer show. Spin your way through an extraordinary array of hardware, software, and peripherals first-hand. Visit more than 450 exhibiting companies spread over 300,000 square feet of space. Attend dynamic seminars and workshops run by industry experts. Sharpen your Macintosh skills on the spot. And more.

MACWORLD Expo/San Francisco is a hands-on, do-it-yourself show. In three days, you’ll pick up Macintosh tips, tricks, and techniques that would otherwise take weeks to collect.

Everyone’s a winner.
It doesn’t matter whether you’re a Macintosh fanatic or you’ve never played the game. MACWORLD Expo has something for you — including special programs on desktop publishing, business graphics, computer aided design, communications, networking, education, programming with the Mac, and then some. You can’t lose.

It’s all in one convenient location — San Francisco.

This year’s show is the biggest and most exciting MACWORLD Expo ever. And it will be the only game in town January 20-22.

Start at any of three locations — Civic Auditorium, Brooks Hall or Moscone Center. Then hop on the MACWORLD Expo Express bus to go to the other locations.
IT’S YOUR TURN!

This is your chance to pre-register for MACWORLD Expo/San Francisco, January 20-22, 1989. Please choose your option and fill out this form completely. Use one form per person; photocopy if necessary. (Incomplete forms will be returned.) Then send the completed form(s) along with your payment to: MACWORLD Expo, P.O. Box 67, Westwood, MA 02090. Registration coupons must be received by December 16. For further information, call Mitch Hall Associates at 617-326-9955. Purchase orders will not be accepted. Payment must accompany form. Registration fees are non-refundable. U.S. and Canadian attendees will be mailed their badges on January 4. All other badges will be held at the “pre-registration counter” in the registration area at Moscone Center for pick up beginning Thursday, January 19, 1989. Registration coupons received after December 16 will not be processed and will be returned to you.

□ Option One $65
Conference sessions* and exhibits.
Pre-register by December 16. $75 at the door.

□ Option Two $20
Admission to exhibits only.
Pre-register by December 16.

Please send my badge and further information to:

Please check one:   □ Home Address   □ Company Address

Last Name __________________________  First Name __________________________
Mailing Address _______________________________________________________
City, State, Zip _______________________________________________________
Telephone __________________________

If mailing to company address:
Title __________________________
Company __________________________

☐ Check enclosed (make payable to MACWORLD Exposition) Amount: $ __________
☐ MasterCard ☐ Visa ☐ American Express Amount: $ __________
Account Number __________________________
(Include all numbers)
Expiration Date __________________________
Cardholder Signature __________________________
(Signature necessary to be valid)

If cardholder is other than registrant, please print name below:
Last Name __________________________  First Name __________________________

Cash only at the door. After December 16, you must register at the show.

Please check the appropriate categories:

Your industry or profession
a. □ Manufacturer (noncomputer)  o. □ Engineer
b. □ Manufacturer (computer industry)  p. □ Doctor/lawyer/dentist/CPA
c. □ Distributor/dealer/retailer/service  q. □ Educator
d. □ Finance/insurance/real estate  r. □ Consultant
e. □ Professional (law/medicine)  s. □ Marketing
t. □ Communications/publishing  u. □ Other (specify) ______
u. □ Other (specify) ______

Size of your organization (number of employees national/international)
v. □ Under 50  w. □ 50-99
x. □ 100-499  y. □ 500-999
z. □ 1,000-5,000  aa. □ Over 5,000

Your title
k. □ CEO/president/vice president  Which personal computer(s) do you own/or use?
l. □ Comptroller  bb. □ Macintosh
m. □ DP/MIS manager  cc. □ Macintosh Plus
t. □ Owner/Partner  dd. □ Macintosh SE
e. □ Other (specify) ______

Where will you be staying while at MACWORLD Expo/San Francisco?
m. □ Home
n. □ With friends
oo. □ Hotel (specify) ______
nn. □ Other (specify) ______

*All conference sessions are on a first-come, first-served basis with no guaranteed seating.
There are Two Ways to Play the Game at MACWORLD Expo/San Francisco, January 20-22.

Option One
$65
Pre-register by December 16. Discounted rate includes admission to all conference sessions* and exhibits at Civic Auditorium, Brooks Hall, and Moscone Center. Seating is on a first-come, first-served basis. $75 cash only at the show.

Option Two
$20
Pre-register for exhibits only. Avoid long lines at the door. Pre-register by December 16 and we'll mail your MACWORLD Expo/San Francisco badge to you. Visit over 450 exhibitors.

TO PRE-REGISTER ADDITIONAL PEOPLE, COPY THIS FORM AND FILL OUT COMPLETELY FOR EACH ATTENDEE.

*All conference sessions are on a first-come, first-served basis with no guaranteed seating.
Two ways to play.

OPTION ONE. Register by December 16 and save $10 on admission to this action-packed, three-day event. The discounted $65 fee allows you to visit all exhibits and attend all conference sessions* at Civic Auditorium, Brooks Hall and Moscone Center.

What's more, you can hear from the best and the brightest in the Macintosh world at this year's conference sessions and keynotes. Get the inside story from people like Jean-Louis Gassee, Bill Campbell, Marc Canter, Andy Hertzfeld and other Macintosh experts. Conference sessions and keynotes are on a first-come, first-served basis with no guaranteed seating.

Don't wait. Pre-register for MACWORLD Expo now and save $10. On-site admission will be $75, cash only.

OPTION TWO. Even if you simply want to visit the exhibits, we encourage you to register by December 16 and avoid long lines at the door. One $20 fee and you're on board for MACWORLD Expo/San Francisco.

Attention students:
You can pre-register for $15 for exhibits only, but you must send us a xerox copy of your student I.D.

If you want to pre-register additional people, please copy the attached reply form and fill out one for each person. Payment must accompany registration. Purchase orders not accepted. If the registration form is missing from this ad, please call us at 617-326-9955. All registration fees are non-refundable.

Don't miss out on this opportunity to pre-register. Make your move today.

MACWORLD EXPOSITION

MACWORLD Exposition is produced by World Expo Co. and managed by Mitch Hall Associates. MACWORLD Exposition is a registered trademark of World Expo Co., Inc.
MACWORLD Exposition is the original Macintosh computer show. It's sponsored by MACWORLD, the Macintosh* Magazine, a member of the IDG Communications Inc. family. MACWORLD Exposition is an independent trade show not affiliated with Apple Computer, Inc.
APPLE and the APPLE LOGO are registered trademarks and MAC, MACINTOSH, and MACWORLD are trademarks of Apple Computer, Inc.
*All conference sessions are on a first-come, first-served basis with no guaranteed seating.
buffer. In an office in which many computers must be interfaced to several different printers, this product would pay for itself. My limited test application—driving a parallel interface daisy wheel—produced no glitches, but I certainly didn’t push it to its fullest capacity as a sophisticated networking tool.

The Final Printout

If you have access to an ImageWriter and no one is trying to force you to use something else, then you already enjoy a situation that makes most of the computing world weak with envy. Your System, drivers, hardware, and applications have all been designed conscientiously to work together, and harmony reigns.

If you need or want to use a non-Apple serial printer, you’re well covered by software solutions, although you should note that Mac application designers have been known to employ output tricks that demand 100 percent ImageWriter-compatibility.

If you want to drive a parallel printer from the Mac’s serial port, you’ll currently find two simple hardware fixes available. If one of them works perfectly with the applications you need (you should try to test this before making a decision), your problems are over. If not, they’ve just started. You then need to examine combinations of software with serial-to-parallel converters. For a large office with complex printing requirements and a mix of computers, this may prove to be the most satisfactory solution in the long run, despite a formidable technical effort at the outset.

Although 24-pin printers are gaining in popularity, slightly less expensive laser printers will probably represent the bigger trend in the next five years. For the time being at least, only the small percentage of Mac users who are completely dissatisfied with their ImageWriters or who must share printers in an office peopled with PC users should take on the task of hooking up to a non-Apple printer.

See Where to Buy for contact information.
Save on Macintosh Systems... Custom Built to Meet Your Needs

Macintosh Plus Entry System
- Macintosh Plus Computer with 1 Megabyte of Memory
- 1 Internal 800K Drive
- Keyboard and Mouse
- Cutting Edge 1MB External Drive
- Epson LX-800 Printer 180 CPS
- Grappler C Mac GS Printer Interface
- HyperCard Software
- Diskettes-Box of 10
- Computer Paper-Package of 500
- Mouse Pad

Sugg. list $3017 CDA Price $1899
When ordering specify package #8871

Monthly Specials
Limited Quantities!
- MacMemory Turbo Accelerator $ 839
- Everex 40D 40 Megabyte Hard Drive with 28ms Access Time $799

Printers
(procs include required cable)
- Apple ImageWriter II $ 479
- Apple ImageWriter LQ $ 1099
- Apple ImageWriter INTX $ 5695
- Apple LaserWriter llSC $ 3395
- Apple LaserWriter llNTX $ 79
- Apple ImageWriter $ 79

Drivers
- Apple 3.5 Disk Drive $ 349
- Central Point 3.5 $ 195
- Cutting Edge 800K $ 189

Everex External Hard Drives
- EMAC 20 Deluxe (65ms) $ 599
- EMAC 40 Deluxe (28ms) $ 949
- EMAC 60 Deluxe (25ms) $ 1095
- EMAC 91 Deluxe (18ms) $ 1595
- EMAC 60/60 DTI $ 1749
- EMAC 60/60 DTI $ 1899
- EMAC 20D (65ms) $ 529
- EMAC 60 Impact $ 999
- EMAC 91D (18ms) $ 1599
- EMAC F5102 91 MB/60 Tape $ 2549

Everex Internal Hard Drives
- EMAC 20ID $ 485
- EMAC 60ID $ 999
- EMAC 91D $ 1499

Rodius Drives
- Plus External Bases 20 thru 140 Megabytes Please Call
- RX Internal Bases 20 thru 140 Megabytes Please Call

Apple Hardware
- Macintosh Plus $ 1349
- Macintosh SE-Keyboard $ 2595
- Macintosh SE/20-Keybd $ 3149
- Macintosh II w/Ext. Keybd $ 3999
- Mac II/40 w/Ext. Keybd $ 4999

Monitors
- Apple Mac II Monochrome Monitor $ 8329
- Mac II RGB Monitor $ 799
- Apple Video Card $ 4809
- Apple 8 Bit Video Card $ 9829

Raster Ops
- 19" Color with tilt/switvel $ 2499
- 16" Color Trinitron $ 2299
- 19" Color Trinitron $ 3225
- Color 108 Board $ 1149
- Color 124 Board $ 3429

Macintosh SE Super System
- Macintosh SE Computer with 2 Internal 800K Drives
- 1 Megabyte of Memory
- ImageWriter II Printer
- ImageWriter Cable
- HyperCard Software
- Diskettes-Box of 10
- Computer Paper-Package of 500
- Dust Cover for the Macintosh SE
- Dust Cover for the ImageWriter II
- Mouse Pad

Sugg. list $8399 CDA Price $3149
When ordering specify package #8872

Macintosh SE/20 Super System
- Same as the above system but includes Macintosh SE with built-in 20 megabyte hard disk and 1 Internal 800K floppy.

Sugg. list $8448 CDA Price $3599
When ordering specify package #8873

Macintosh II/40 Graphic System
- Macintosh II Computer with 40 Megabyte Hard Drive
- 1 Megabyte of Memory
- Extended Keyboard and Mouse
- Macintosh II Video Card
- Apple Color High Resolution RGB Monitor
- ImageWriter II with Cable
- HyperCard Software
- Diskettes-Box of 10
- Case of Computer Paper-1100 Sheets
- Dust Cover for the Macintosh II/Monitor
- Dust Cover for the Extended Keyboard
- Mouse Pad

Sugg. list $7849 CDA Price $6649
When ordering specify package #8874
Above system with 20 Megabyte Hard Disk
specify package #8875 CDA Price $6399
Above system with 80 Megabyte Hard Disk
specify package #8876 CDA Price $7899

30-Day Trial Period
At CDA we believe in customer satisfaction. If you're not 100% satisfied or are unsure of your purchase, you can take advantage of our 30-day Trial Period. Simply return within 30 days of receipt. (Software excluded for a quick, courteous refund (freight excluded). There will be a 20% restocking charge on returned printers.

Service and Support
CDA offers a full 90-day warranty. After your 30-day Trial Period, we continue to offer free repair services for an additional 60 days. We pride ourselves on our 24-hour technical support. Our experienced technicians are always available to assist you with all your Macintosh needs. Call toll-free (213) 852-9007.

Free Catalog
CDA's latest catalog features the Apple IIgs, Mac SE, and Mac II, complete systems, hard drives, modems, printers, accessories and a list of over 2,000 software titles. Write for your free copy.

Our Policies
Shipping Charges: UPS and BPS Ground Shipping, with 5% (5.50 minimum), UPS Blue Service and APO/FPO Shipping, add 5% (5.50 minimum). Alaska, Hawaii, Puerto Rico and Canada, add 6% (5.60 minimum). Foreign orders must be prepaid. Payment Visa, MasterCard, American Express, Discover, cash. For additional charges, please call.

Payment Visa, MasterCard, American Express, Discover, cash. For additional charges, please call.

CDA Computer Sales
One CDA Plaza Route 513 Califon, NJ 07830

Honor Mon-Fri 9am-10pm est.
Sat. 5pm-7pm est.
In New Jersey (201) 852-9007

Customer Service (201) 852-9007

CDA computer sales
US/CANADA ORDER TOLL FREE
800-526-5313

Circle 32 on reader service card
Don't leave your brains at the office.

Massive storage doesn't have to be an immovable object. For proof, just consider the Jasmine MegaDrive™

An ingenious Macintosh storage device that provides a hefty 20MB or 40MB of storage on a removable MegaFloppy™ diskette. You can finally take it with you, or even send it, wherever you go. The MegaDrive works exactly like your floppy drive. And with additional MegaFloppies, there's absolutely no limit to how much you can store. Jasmine proprietary software provides formatting, verification and on-the-fly media correction/certification and our 3-color LED alerts you to drive status. MegaDrives come with a full two year limited warranty and lifetime MegaFloppy warranty.

Now take your brains with you wherever you go.

Jasmine

1-800-347-3228
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.


HyperDA version 1.1 supports more HyperTalk commands, variations of background in HyperTalk, and features phone-dial function. Shows all custom fonts and icons in stacks, adds text justification in button names, and provides the ability to edit text within the message box. Browses and retrieves text/graphics information from HyperCard stacks; includes three custom dialing stacks. Symmetry Corp., 761 E. University Dr., Mesa, AZ 85203, 602/844-2199. $10 with return of original disk; $69 new.

Inside Out Multiuser version 1.2 supports multiuser environment, aids in design and implementation of stand-alone applications. Provides ready-made data-management system; includes controlled file- and record-locking, plus inter-application messaging. Shana Corp., 9650 20th Ave., #105, Edmonton, Alberta, Canada T6N 1G1, 403/463-3530. $25; $149 new.


MacDesigner version 2.0 adds global data dictionary, which defines all relationships in your software system; includes features to connect data dictionary with structure chart diagrams. Supports large structure charts. Six types of windows; graphics- and text-editing features. Excel Software, P.O. Box 1414, Marshalltown, IA 50158, 515/752-5359. $297 with original disk ID number; $795 new.

Comment version 2.0 is MultiFinder compatible; faster and more memory efficient than earlier versions. Program is customizable, has built-in "Demo" feature. Can be configured to save changes automatically. Does not need to be open for a Time Note reminder to appear on the screen. Denetra Software, 7855 N.W. 12th St., #202, Miami, FL 33126, 305/694-6965. Free if purchased after January 31, 1988, otherwise $17; $99.95 new.

Fast Forms version 1.2 imports files using comma- or tab-delimited formats and supports maximum page size of 11 by 17 inches. Shana Corp., 9650 20th Ave., #105, Edmonton, Alberta, Canada T6N 1G1, 403/463-3330. $25; $149 new.

KidsTime version 1.2 is MultiFinder and Mac II compatible (including speech). Start-up configuration option on all programs. Optional alphabet bar at bottom of screen in the letter-recognition game AB-Key; additional help options and click-drag option in Match-it for moving puzzle pieces. Also features new rewards in Match-it; enhanced puzzle editor for Dot-to-Dot, on-screen Read All button and availability of longer stories in Story Writer. Great Wave Software, 5353 Scotts Valley Dr., Scotts Valley, CA 95066, 408/439-1990. $15; $49.95 new.

(continues)
Let's Not Mince Words...
Let's face it, the art of Page Recognition has not advanced all that much since the days of the Egyptian Pharaohs. Text and graphics never seem to come out right. M's look like inverted W's. Multicolumn documents looking like Sanskrit. It's virtually impossible to mind your P's and Q's when the level of technology has not advanced beyond electronic alphabet soup.

Scan To New Heights...
OmniPage, the most advanced page recognition software available today, lets you transcend the clutter that abounds to work more efficiently. Easily accessible to most users, OmniPage is based on advancements made in artificial intelligence technology. OmniPage lets Macintosh® and IBM® PC users put their scanners to work immediately. Scan multiple fonts and font sizes, including multiple rows and columns. You can now scan virtually any printed page of text, and without all the rough edges. You can even export your data to the many compatible file structures, such as Microsoft Word 3.0™, MacWrite™, Excel™ and PageMaker 3.0™.

Power To The Desktop Publishers...
The advent of desktop publishing may have enabled you to develop spiffy newsletters, brochures, manuals and directories—great strides have been made with respect to output. But one fact remains. There are still far too many strokes for most folks. For the first time you can avoid excessive key stroking by approaching the scanning or input side of desktop publishing with a new level of confidence. OmniPage lets you save time by quickly processing your data—whatever the font or column format—with a level of accuracy not possible until now. With the special Partial Page feature, you can even select the section of the document that is important to you—financial statements, complex insurance and legal documents—all readily accessible.

Store And Retrieve Data Of All Sorts...
Store your data in a personal data base. Manipulate text and graphic images. And that's any text, including spreadsheets. Build a personal library of relevant professional articles, ideas or general information—all within mouse range. Move
data in and out of your system in less time than it takes to say Ramses II. OmniPage has set a whole new standard in page recognition software. The creative possibilities are in fact endless.

OmniPage may not yet allow you to scan the Rosetta Stone, the Dead Sea Scrolls or that menu at your favorite Chinese restaurant. Not now—anyway. But most conventional business and professional scanning needs are in fact possible—for the very first time at an affordable price.

Learn More About The Ultimate Scan . . .
Take the OmniPage Challenge.
Bring one of your favorite documents (any document) to one of our authorized dealers and see how powerful this exciting technology really is—and if for any reason, you're not satisfied with the results—we'll think of something. Remember, this “challenge” does not apply to esoteric defunct languages, foreign lexicon or paleolithic wall reliefs.

Call: 1-800-535-SCAN
Or Write: Caere Corporation
100 Cooper Court
Los Gatos, CA 95030

*Note: Excessive Key Stroking (EKS) has been known to cause "spastic quivers" and ever so slight kneekjerk in software engineers, data entry clerks and desktop publishing fanatics. Avoid whenever possible by using OmniPage.

Circle 230 on reader service card
**Loans Amortization Software**

**Variable Rates**
- Graduated Payments
- Principal Only
- Interest Only
- 360 or 365 Days
- Negative Amortization
- Balloons
- Customized Reports

**Interest Features**
- And many more features.

For your copy or more information call or write:

**Softflair, Inc.**
8753 Porkview • Milwaukee, WI 53226
(414) 797-4490

**Softpack $49.95**
**Softpack Plus $89.95**
**Version 4.0**
**MC/VISA**
**Add $5 S/H**
**512K or Larger & IBM-Compatible**

**Circle 363 on reader service card**

---

**Updates**

**MacNail** version 2.2 adds small-business accounting to the construction estimating and scheduling features of MacNail. Includes General Ledger, weekly payroll reports, and Quick Query features. Provides macros that track costs for individual projects at various levels of detail; linked to Turtle Creek Software's Quick Estimator.


**MSFL: Pro League Football** version 2.0 supports LaserWriter and Image Writer. Has multiple speed variations and audible play calling; lets you make halftime adjustments to the game plan. Keeps statistics for individual players and teams; compiles seasonal statistics. Micro Sports, Inc., P.O. Box 15799, Chattanooga, TN 37415, 615/870-9735. Free with return of version 1.0 disks if purchased after August 1988, $15 otherwise; $49.95 new.

**On Schedule** version 2.0 allows users to vary selling schedules, permits a specified amount of working capital to be held as reserve, and accommodates budget amounts for various line-item expenses.

RealData, 78 N. Main St., South Norwalk, CT 06854, 203/255-2732. Free if previous version bought after February 1, 1988, $30 otherwise; $195 new.

**PacerLink** version 5.0 allows Mac to concurrently interact with multiple VAX sessions via multiview terminal emulation and user interface. Windows can be moved, stacked, sized, scrolled, panned, and zoomed. Includes the ability to map VT terminal attributes to colors on a Mac II and displays 132-column format on screen.

Uses standard AppleTalk. Pacer Software, 7911 Herschel Ave., #402, Westborough, MA 01581, 508/898-3300. Free to customers with maintenance agreement; otherwise $2000 and up per VAX (includes Mac software).

**PICT Detective** version 2.0 for Mac programmers works with third-party compilers such as LightspeedC and Turbo Pascal. Can open a PICT document or paste a picture from the Clipboard into a new document. Displays the picture in one window with description of picture element in another (description provides permanent record of picture’s contents).

Palomar Software, Inc., 2964 Oceanside Blvd., Suite E, P.O. Box 120, Oceanside, CA 92054, 619/721-7000. $20; $125 new.

**Sound Designer Universal** version 1.3 has all previous samplers and Ensoniq EPS (MIDI and SCSI), Korg DSM-1, Roland S-550 and S-330, and Yamaha TX 16W. Transfers sounds between all the samplers Digidesign supports. Digidesign, 1360 Willow Rd., #101, Menlo Park, CA 94025, 415/327-8811. $45; $395 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.
Systat. The only professional statistics package on the Mac.

If you are serious about statistics, there is only one choice. Mac reviewers have named it:

"Systat, the best statistics program on the market . . ." MacWeek

". . . for scientific and commercial use the Systat-Mac combination is the top choice . . ." Macworld

"SYSTAT currently represents the high end of Macintosh stat software . . ." MacWeek

Version 3.2 now offers more graphics than any Mac or mainframe package, plus a new full-featured data editor.

Available for Macintosh Plus, SE and II. Single copy price: $595. Site licenses, quantity prices available. Call or write for further information.

Systat Inc., 1800 Sherman Avenue
Evanston, IL 60201 312 864.5670

Graphics Overlay plots PostScript support for LaserWriter Export pic files Two dimensional: Error Bars Scatterplots Line and Vector Graphs Vector, Dot, Bubble and Quantile Plots Bar Graphs (single, multiple, stacked, range) Box plots (single and grouped) Stem-and-leaf diagrams Linear, quadratic, step, spline, polynomial, LOWESS, exponential smoothing Confidence Intervals and ellipsoids (any alpha value) Smooth mathematical functions Rectangular or polar coordinates Log and power scales ANOVA interaction plots Histograms (regular, cumulative, fuzzy) Strip and jitter plots Gaussian histogram smoothing Scatterplot matrices Voronoi Tessellations Minimum spanning tree Maps with geographic projections (U.S. state boundary file included) Chernoff faces Star plots Fourier plots Pie charts Contour plots on regularly and irregularly spaced points Control charts and limits Three dimensional: Data plots Smooth function plots Vector plots Linear, quadratic, spline, least squares surface smoothing Three-dimensional type fonts.

Statistics Basic statistics, frequencies, t-tests, post-hoc tests Multiway crosstabs with log-linear modeling, association coefficients, PRE statistics, asymptotic standard errors Nonparametric statistics (sign, Runs, Wilcoxon, Kruskal-Wallis, Friedman two-way ANOVA, Mann-Whitney U, Kolmogorov-Smirnov, Lilliefors, Kendall coefficient of concordance) Pairwise/listwise missing value correlation, SSCP, covariance, Spearman, Gamma, Kendall Tau, Euclidean distances Linear, polynomial, multiple, stepwise, weighted regression with extended diagnostics Multivariate general linear model includes multi-way ANOVA, ANCOVA, MANOVA, repeated measures, canonical correlation Principal components, rotations, components scores Multidimensional scaling Multiple and canonical discriminant analysis, Bayesian classification Cluster analysis (hierarchical, single, average, complete, median, centroid linkage, k-means, cases, variables) Time series (smoothers, seasonal and nonseasonal ARIMA, ACF, PACF, CCF, transformations, Fourier analysis) Nonlinear estimation (nonlinear regression, maximum likelihood estimation, and more).

Data Management Spreadsheet data editor with row/column cut and paste Transformations executed via menus and dialog boxes Import/export test files Missing data, arrays, character variables Character, numeric, and nested sorts Subgroup processing with SELECT and BY Value labels and RECODE statements Unlimited cases.

Mac screens LaserWriter graphics

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

Systat. Intelligent software.
Creating presentations can be easy. Your thoughts and ideas are ready, all that's needed is StandOut! software for organizing, packaging and polishing them to a persuasive pitch. At its heart is the AutoProduction System. APS combines specialized presentation features with automation and global control to quickly turn your thoughts into well designed, effective presentations. Here's how.

**Words come alive**
Words make up over 50% of all presentations and StandOut! shows your words at their best. Professional type control means titles and text look typeset, not just typed. APS' style sheets offer a consistent look as well as fast production. And spell-checking helps you catch typos while search and replace speeds up changes.

**Work faster with automated production**
Graphics add impact so APS' Master Slide feature lets you create a design and then duplicate it with a mouse click. If you don't have time to design, choose from a template library of over 50 layouts. Each one can be used as is or modified to your own needs with a full set of drawing tools.

**StandOut draws charts with your data**
StandOut's APS offers automatic chart creation. Just select from five chart types, enter the data and see the result. If it isn't right, view the other options by clicking the mouse. And creating the charts in StandOut! saves time when compared with leaving the program and importing work from other applications.

**Then try a Macintosh rehearsal**
StandOut! can preview your presentation just as the audience will see it. And if the preview suggests changes, APS makes them easy. You can view thumbnails and sort the entire presentation by slide title or image, globally edit text, and update speakers notes and handouts. For a demonstration on how easily you can create your next presentation see your Authorized Letraset Graphic Design Software dealer or call 800 722-0377 for more information.

Letraset
© 1988, Essette Pindallex
StandOut! is a trademark of Essette Pindallex Corporation in the USA, of Letraset Canada Limited in Canada and of Essette Letraset Limited elsewhere.

Circle 225 on reader service card

Recommended retail $395
Now *Macworld* connects you with the world of Macintosh products instantly. And cost-effectively. *The Macworld Catalog* is your immediate access to hundreds of Macintosh products, manufacturers, and services. Each month, this special direct response section brings you detailed product information arranged by category—so you can quickly compare prices and capabilities. Then pick up the phone and order!

For the best Macintosh buys, scroll through *The Macworld Catalog*.
# The Macworld Catalog

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furniture...</td>
<td>Architecture...</td>
</tr>
<tr>
<td>Mouse Pads.</td>
<td>Astrology.</td>
</tr>
<tr>
<td>Supplies...</td>
<td>Business...</td>
</tr>
<tr>
<td></td>
<td>Business Mgmt.</td>
</tr>
<tr>
<td></td>
<td>Clip Art.</td>
</tr>
<tr>
<td></td>
<td>Communications.</td>
</tr>
<tr>
<td></td>
<td>Desktop Publishing.</td>
</tr>
<tr>
<td></td>
<td>Educational.</td>
</tr>
<tr>
<td></td>
<td>Engineering.</td>
</tr>
<tr>
<td></td>
<td>Entertainment.</td>
</tr>
<tr>
<td></td>
<td>Financial.</td>
</tr>
<tr>
<td></td>
<td>Fonts.</td>
</tr>
<tr>
<td></td>
<td>Fund Raising.</td>
</tr>
<tr>
<td></td>
<td>Genealogy.</td>
</tr>
<tr>
<td></td>
<td>Government.</td>
</tr>
<tr>
<td></td>
<td>Graphics.</td>
</tr>
<tr>
<td></td>
<td>Health.</td>
</tr>
<tr>
<td></td>
<td>Investment.</td>
</tr>
<tr>
<td></td>
<td>Languages.</td>
</tr>
<tr>
<td></td>
<td>Mail Order.</td>
</tr>
<tr>
<td></td>
<td>Medical.</td>
</tr>
<tr>
<td></td>
<td>Music/MIDI.</td>
</tr>
<tr>
<td></td>
<td>Payroll.</td>
</tr>
<tr>
<td></td>
<td>Plotter Drivers.</td>
</tr>
<tr>
<td></td>
<td>Presentation Mgmt.</td>
</tr>
<tr>
<td></td>
<td>Printer Drivers.</td>
</tr>
<tr>
<td></td>
<td>Programming Tools.</td>
</tr>
<tr>
<td></td>
<td>Public Domain.</td>
</tr>
<tr>
<td></td>
<td>Real Estate.</td>
</tr>
<tr>
<td></td>
<td>Recreational.</td>
</tr>
<tr>
<td></td>
<td>Rental.</td>
</tr>
<tr>
<td></td>
<td>Retail.</td>
</tr>
<tr>
<td></td>
<td>Sales/Marketing.</td>
</tr>
<tr>
<td></td>
<td>Scientific.</td>
</tr>
<tr>
<td></td>
<td>Security.</td>
</tr>
<tr>
<td></td>
<td>Statistics.</td>
</tr>
<tr>
<td></td>
<td>Utilities.</td>
</tr>
<tr>
<td></td>
<td>Word Processors.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerators...</td>
</tr>
<tr>
<td>Bar Code...</td>
</tr>
<tr>
<td>Computer Systems...</td>
</tr>
<tr>
<td>Data Acquisition...</td>
</tr>
<tr>
<td>Emulators...</td>
</tr>
<tr>
<td>Expansion Chassis...</td>
</tr>
<tr>
<td>Memory Upgrade...</td>
</tr>
<tr>
<td>Miscellaneous...</td>
</tr>
<tr>
<td>Networking...</td>
</tr>
<tr>
<td>Peripherals...</td>
</tr>
<tr>
<td>Plotters...</td>
</tr>
<tr>
<td>Printers...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Insurance...</td>
</tr>
<tr>
<td>Data Conversion...</td>
</tr>
<tr>
<td>Desktop Publishing...</td>
</tr>
<tr>
<td>Disk Duplication...</td>
</tr>
<tr>
<td>Laser Recharge...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Categories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphics...</td>
<td>314</td>
</tr>
<tr>
<td>Health...</td>
<td>314</td>
</tr>
<tr>
<td>Investment...</td>
<td>315</td>
</tr>
<tr>
<td>Languages...</td>
<td>315</td>
</tr>
<tr>
<td>Mail Order...</td>
<td>315</td>
</tr>
<tr>
<td>Medical...</td>
<td>315</td>
</tr>
<tr>
<td>Music/MIDI...</td>
<td>316</td>
</tr>
<tr>
<td>Payroll...</td>
<td>316</td>
</tr>
<tr>
<td>Plotter Drivers...</td>
<td>316</td>
</tr>
<tr>
<td>Presentation Mgmt.</td>
<td>316</td>
</tr>
<tr>
<td>Printer Drivers...</td>
<td>316</td>
</tr>
<tr>
<td>Programming Tools...</td>
<td>316</td>
</tr>
<tr>
<td>Public Domain...</td>
<td>317</td>
</tr>
<tr>
<td>Real Estate...</td>
<td>317</td>
</tr>
<tr>
<td>Recreational...</td>
<td>318</td>
</tr>
<tr>
<td>Rental...</td>
<td>318</td>
</tr>
<tr>
<td>Retail...</td>
<td>318</td>
</tr>
<tr>
<td>Sales/Marketing...</td>
<td>318</td>
</tr>
<tr>
<td>Scientific...</td>
<td>318</td>
</tr>
<tr>
<td>Security...</td>
<td>318</td>
</tr>
<tr>
<td>Statistics...</td>
<td>319</td>
</tr>
<tr>
<td>Utilities...</td>
<td>319</td>
</tr>
<tr>
<td>Word Processors...</td>
<td>319</td>
</tr>
</tbody>
</table>

### Instant Link: Macintosh Products, Manufacturers, Services

<table>
<thead>
<tr>
<th>The Macworld Catalog</th>
</tr>
</thead>
<tbody>
<tr>
<td>501 Second Street</td>
</tr>
<tr>
<td>San Francisco, CA 94107</td>
</tr>
<tr>
<td>800/888-8622</td>
</tr>
</tbody>
</table>

### Account Managers
- Niki Stranz, Western U.S.
- Carol Feldt, Eastern U.S.

### Advertising Rates & Information

The Macworld Catalog section is a monthly link-up for advertisers and volume purchasers of Macintosh-related products and services. The Catalog offers advertisers a low-cost marketing opportunity and provides readers with a timely, easy-to-use menu for product buying.

Display ads are sold by column inches (2” minimum). Standard red is available as a second color. Text-only listings are available for a minimum of three issues at $322 per issue ($965 total).

For more information, space closings, and material deadlines, please call toll-free 800/888-8622.

---

The Biggest Small Investment You Can Make.

Take advantage of the direct link with your buyers that maximizes exposure at a low cost.

The Macworld Catalog reflects the expanding corporate Macintosh audience whose purchasing activities increasingly include mail order. The cost-effective direct response advertising available monthly in The Macworld Catalog links you instantly with nearly 500,000 qualified buyers. Get into the link. Call 800.888.8622 and place your ad now!

800.888.8622

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
TURBO MOUSE*

Now you can own the Winner of the 1988 Turbo Mouse Race, for less than half the retail price!! Our Turbo Mouse has been named Top Input Device for ’87 & ’88 by the readers of Macworld. The 88 Macworld standings for Hardware-Top Input Device: • TURBO MOUSE* • Abator Mouse Trackball-Point • Apple Expanded Keyboard • Mac-101 Enhanced Keyboard • Mouse Systems A+ Mouse. Also Turbo Mouse ADB at low, low prices! Cambridge Automation, Inc., 3260 Industry Dr., Signal Hill, CA 90806, (213) 597-1626, 800-475-8666, 800-826-9214 (in CA)

MOUSE SADDLE

A leather mouse pad for the rugged and rational. Your mouse will ride cleaner, faster, smoother on a Chesapeake Leather Works cowhide mousepad. Each pad is carefully handcrafted with specially tanned leather stitched to a rubber base. The ultimate pad.

- Brown, Black or ADB (platinum)
- $19.95 - Visa/MC

Chesapeake Leather Works, Inc.
PO Box 567, Acton, CA 91701
1-800/638-2358

How to MacLabel your disks for less

save on 2-3/4" continuous form labels!

Company Logo Specialist

Grey, Green & Red Pads
Size: 9½” x 8” x ¼”
- 12 pads $9.50 w/logo
- 50 pads $8.50 w/logo
- 72 pads $6.90 w/logo
- 12 pads $4.70 w/logo
- 500 pads $4.14 w/logo
ENTIRE pad imprinted.
GUARANTEED to last.
MULTI-COLOR jobs OK.
SAMPLES w/your company logo
$12.50.

Mouse Pads

Custom Printing Available Cloth:
Blue, Gray, Burgundy, Red, Brown, Green, Black
Size: 8 x 7½, 8 x 9½, 8½ x 11
12 Pads 3.25 3.50 3.75
72 3.00 3.25 3.50
144 2.85 3.10 3.35
PLASTIC: Blue, Platinum, Gray
Size: 8½ x 11
12 Pads 6.50 6.00 5.75
72 5.75 5.25
144 5.25

CALL AND ASK US ABOUT OUR EXCITING NEW VIEW PAD Precision Line Inc., 14100 23rd Ave N., Minneapolis, MN 55441 1-800/328-0077, 612-557-1979

Mouse Pads

Mouse PAD

Custom Printing Available Cloth:
Blue, Gray, Burgundy, Red, Brown, Green, Black
Size: 8 x 7½, 8 x 9½, 8½ x 11
12 Pads 3.25 3.50 3.75
72 3.00 3.25 3.50
144 2.85 3.10 3.35
PLASTIC: Blue, Platinum, Gray
Size: 8½ x 11
12 Pads 6.50 6.00 5.75
72 5.75 5.25
144 5.25

CALL AND ASK US ABOUT OUR EXCITING NEW VIEW PAD Precision Line Inc., 14100 23rd Ave N., Minneapolis, MN 55441 1-800/328-0077, 612-557-1979

Mouse Pads

Mouse SADDLE

A leather mouse pad for the rugged and rational. Your mouse will ride cleaner, faster, smoother on a Chesapeake Leather Works cowhide mousepad. Each pad is carefully handcrafted with specially tanned leather stitched to a rubber base. The ultimate pad.

- Brown, Black or ADB (platinum)
- $19.95 - Visa/MC

Chesapeake Leather Works, Inc.
PO Box 567, Acton, CA 91701
1-800/638-2358

Mouse Pads

Mouse SADDLE

A leather mouse pad for the rugged and rational. Your mouse will ride cleaner, faster, smoother on a Chesapeake Leather Works cowhide mousepad. Each pad is carefully handcrafted with specially tanned leather stitched to a rubber base. The ultimate pad.

- Brown, Black or ADB (platinum)
- $19.95 - Visa/MC

Chesapeake Leather Works, Inc.
PO Box 567, Acton, CA 91701
1-800/638-2358

Mouse Pads

Mouse SADDLE

A leather mouse pad for the rugged and rational. Your mouse will ride cleaner, faster, smoother on a Chesapeake Leather Works cowhide mousepad. Each pad is carefully handcrafted with specially tanned leather stitched to a rubber base. The ultimate pad.

- Brown, Black or ADB (platinum)
- $19.95 - Visa/MC

Chesapeake Leather Works, Inc.
PO Box 567, Acton, CA 91701
1-800/638-2358

Mouse Pads

Mouse SADDLE

A leather mouse pad for the rugged and rational. Your mouse will ride cleaner, faster, smoother on a Chesapeake Leather Works cowhide mousepad. Each pad is carefully handcrafted with specially tanned leather stitched to a rubber base. The ultimate pad.

- Brown, Black or ADB (platinum)
- $19.95 - Visa/MC

Chesapeake Leather Works, Inc.
PO Box 567, Acton, CA 91701
1-800/638-2358

Mouse Pads

Mouse SADDLE

A leather mouse pad for the rugged and rational. Your mouse will ride cleaner, faster, smoother on a Chesapeake Leather Works cowhide mousepad. Each pad is carefully handcrafted with specially tanned leather stitched to a rubber base. The ultimate pad.

- Brown, Black or ADB (platinum)
- $19.95 - Visa/MC

Chesapeake Leather Works, Inc.
PO Box 567, Acton, CA 91701
1-800/638-2358
LASEREDGE® Paper/Film
Get high resolution from plain paper laser printers and color plotters. LASEREDGE® high resolution Papers/Films are washable for paste-up. The bright white background, denser image, and finer edge of line will allow enhanced capability for 300 dpi to reproduce on camera. Call or write for samples today. MC/VISA accepted.
CG Graphic Art Supply, Inc., 481 Washington St., NY 10013, 800/342-5858
FAX 1 212/941-9765

MDMac Lock/Mac Cables
Mac Lock, finest security kit for Mac +, Mac SE, Mac II, includes Mac keyboard, mouse, 2nd drive, modem, & printer. Attractive red vinyl-covered steel 1/4" cables. Lock included. No tools req., $49.95. Mac Cables provide any length custom cables for Mac+ (incl. keyboard) or almost any computer need. $20 & up. Mac Products, 20231 San Gabriel Valley Dr., Walnut, CA 91789, 714/595-4038

Manual Diskette Ejector
Get rid of that tacky paperclip! Add class and style to your Mac or Apple 3.5 drive. Uses Manufacturer’s ejector hole. Platinum color Tool and Mount (with adhesive) are high strength, electrically insulated, ABS plastic and chrome steel. QUALITY $4.95. Check, MC, VISA + $1 s/h. DEALERS—Christmas special.
PEL Enterprises, Inc., 1818 Manor Hill, St. Louis, MO 63131, 314/821-1415

SECURITY
PADLOCK™ physically secures your computer from theft without cables or bolts. Two interlocking steel pads use high-bond acrylic adhesive technology to protect your equipment with 10,000 lbs. of strength. Easy to install. Order keyed different or alike. $20.95 + $5.00 shipping.
CONTROL POWER™ gives you control over the use of your computer with a key. No unauthorized access. Control Power attaches to any electronic device with a removable, 3 prong power cord. Order keyed different or alike. $69.95 + $3.00 s/h (415) 861-2223
Doss Industries

MAC DUST COVERS
For all Mac dust cover configurations including printers, etc. disk drives & mouse. To 50% Off On Complete Sets. Mac, keyboard & mouse. Reg $22 ... NOW $25 Mac II, monitor also CPU, keyboard & mouse. Reg $62 ... NOW $33 Buy on complete set, add only $5 for basic printer cover for Laserwriter and $50 and $3 for external disk drive cover.

OTHER ACCESSORIES
Ribbons, diskette holders, disk banks. Mac Carrying Cases (West Ridge Designs) at reduced prices with complete cover set purchase. VISA/MasterCard, P.O. & personal checks ok. Satisfaction Guaranteed.
Computer Cover Company
23352 Peralta, P # 14, Laguna Hills, CA 92653
TOLL-FREE: 800/235-5330
VISA In CA: 800/237-5376

IT'S NEW!
Prints Labels of all Sizes
Mailings labels, Disk labels, VCR labels, Mailing Lists, Envelopes, Name Badges, and More...
• Import and format mailing lists,
• Add codes and global text,
• Batch Disk Labeler built in, ImageWriter and LaserWriter. Mac II & up.
FastLabel® $49.95

ITY’S HOT!
Wall Mountable Disk Storage
• Holds over 240 disks.
• Mounts on wall.
• Saves space and time.
“Now my disks are on the Wall instead of in my way.”
Steven Leipz, Computer Products Design

SAVES $20!
Vertical Disk Storage with labeling software only $79.95. Stop fighting your disks. Quality Disk Labels Available: Laser sheet and pin feed.

Vertical Solutions
(800) 942-4008
P.O. Box 1735, Olympia, WA 98507
Macintosh, Macintosh II and similar, as sold parts and lab works.

3.5" DS/DD DISKETTES
99¢ Qtty. 50
Add $8 shipping per 50

MacOnly!
1-312-433-8796
P.O. Box 256 • Highland Park IL 60035

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Macworld Catalog

**Hardware Accelerators**

**Smack-a-Mac!**
Stressed out by your computer's stupid mistakes? Get even with Smack-a-Mac! Poke it. Punch it. Pick it up and throw it! Tough, durable frames, soft polyfoam filling. Jumbo - A great gift for your Macaholic friend! Send check or money order to:

**Smack-a-Mac!**
1706 Linbrook Drive
San Diego, CA 92111
(Price includes shipping)

**68050?**
What else can you call an accelerator that fits the 512/Plus/SE and can use the 020 QR 030?

**Total Systems Integration**
99 West 10th Ave. #333
Eugene, OR 97401
800-674-2288
503-345-7395

**Bar Code & Magnetic Stripe Readers for Macintosh Plus, SE & II**
Connects on keyboard or ADB
Requires no additional program or port
Does not affect keyboard or mouse
Industrial quality, heavy-duty units
Also available Magnetic encoder
Code 39 Bar Code Printing Program Portable Bar Code Reader

**Data Acquisition**

**MacPacq**
The MacPacq transforms the Macintosh into a digital oscilloscope, chart recorder & waveform generator. A complete data acquisition & control system, 8-channel A/D, 8 digital I/O, programmable gain, 64K RAM. Optically isolated, line or nicad powered. Runs remote and or connected to Mac. Comprehensive software interface provides for powerful & flexible system. $1195 complete.

**Dataacq Systems**, 5960 Mandarin Dr. #81, Goleta, CA 93117,
805/967-6615

**Emulators**

**II in a Mac**
An Apple II/e computer... all in software!

Run Apple II software on your Macintosh.

Convert Apple II files to Macintosh files.

$149.95 Add $5 for P&H

**Computer Systems**

**Expansion Chassis for the Macintosh**
Open up your Macintosh Plus, SE or II with an expansion chassis system from Second Wave, Inc. ExpandSE Plus, ExpandSE, and Expand II allow you to customize your Macintosh with a variety of option boards:

- Accelerators
- Monitors
- MS-DOS Communications
- Data Acquisition
- Industrial Control
- Transputers

SECOND WAVE, INC.
9460 Research Blvd., Bldg. II, #210
Austin, TX 78758
(512) 243-9661

**Hardware Accelerators**

**MacSIMMs**
Add memory to your Mac Plus, SE or Mac II. One megabyte SIMM modules available in 2 MB sets. We offer the lowest price you'll find anywhere—any quantity. Call for quote. MC/VISA. Immediate delivery. Product satisfaction guaranteed. We've been in the RAM business since 1982.

Palo Alto RAM, PO Box 50690, Palo Alto, CA 94303,
415/858-0125

**Expansion Chassis**

**Memory Upgrade**

**Catalog**

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Do you need MORE MEMORY for your Mac Plus, SE, or II?

PSI has the one megabyte SIMMS that are necessary to upgrade your Macintosh’s RAM to the maximum.

Call for current pricing

Call today for fast delivery.
800-MAC-1PAC
408-942-8188 in CA
PSI 1609A S. Main • Milpitas, CA 95035

Price subject to change

Visa/MC

WAITING FOR MEMORY?

We are ALWAYS in stock!

• 1 Meg Surface Mount or Dip SIMM for Mac Plus, SE, or II
• 256K Low profile SIMMS for Mac II
• Shipped within 2 days (2nd day air UPS Blue)
• 1 year factory warranty

ORDERS: (800) 950-CARE INFO: (612) 920-CARE

DON'T LET THIS HAPPEN TO YOU!

MEMORY UPGRADES FOR THE MAC PLUS, SE, II

1 MEG SIMMS/1MB
Upgrade your Mac Plus, SE, or Mac II by 2 to 4MB for $375 per meg with ACCU-SIMMS, newest state-of-the-art CMOS surface-mount DRAMS, with lifetime guarantee. Assembled & tested in the USA. Quantity prices available. Free $25 amber filter with each order. Fits all Macintoshes.

Data Memory Systems, Box 785, Middleton, MA 01949. Orders only 800/634-5463 ext. 320. Customer Service 805/683-2325, FAX 508 975 5232

RAME/ROM Upgrades
128K to 512K 512K to Plus
128K to Plus SCSI Port
128K to 2MB Apple ROM/800K Drive

D SIMS MODULE
100% Mac II COMPATIBLE
$360.00 PER UNIT

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Macworld Catalog

Networking

PhoneNET® System
The PhoneNET System creates an AppleTalk network w/convenience, added distance, & flexibility of telephone wire. PhoneNET supports AppleTalk & can use standard telephone cabling, even existing wiring. Components incl: PhoneNET Plus Connectors, PhoneNET Star-Controller w/StarCommand DA & PhoneNET Manager software. TrafficWatch network analysis package & PhoneNET CheckNET DA. Faronline Computing, 2150 Kittredge St., Berkeley, CA 94704, 415/849-2331

Ethernet for the Mac
Kinetics provides Ethernet hardware & software for all Macintosh® computers. Products include:
- FastPath: AppleTalk Ethernet gateway
- EtherSC: Ethernet controller
- EtherPort SE: Internal Ethernet card for the Mac SE
- EtherPort II: Internal Ethernet card for Mac II, AppleTalk Ethernet controller & DECnet supported.

Kinetiks, Inc., 2500 Camino Diablo, Walnut Creek, CA 94596 415/947-0998

Peripherals

MacRecorder™
MacRecorder records real sound into your Mac. Simple to use: Just hold it in your hand & speak into private microphone, or record directly from your TV or stereo. Pkg. incl. HyperSound™ stackware lets you record & work w/sound from within HyperCard. SoundEdit™ software records sound, then lets you edit & save files in a variety of formats. MacRecorder is compatible with HyperCard, Studio-Session™, VideoWorks™ & Beep INITS.

Parallon Computing, 2150 Kittredge St., Berkeley, CA 94704, 415/849-2331

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Hypercard Stacks

Relationship Astrology

HyperTools™

Add Versatility to stacks with HyperTools™ #1 & #2. Each set includes 16 Tools which can be installed easily into most stacks. Great for novices & experts.

Set #1 includes: Icon Editor, Scan Cards, Alignment & Array Creation Tools, Script & Font Tools, plus 10 other tools!

Set #2 includes: Choice Lists for Fields, Field Sorting, Formatting & Data Validation, Sound Tools, Group Tools, plus 10 more tools!

Each Set of Tools $99+Shipping Call (203)926-1116

HyperMedia Publishing Group™

Simply the best by the best.

Hyperlite, Kids Logo & HyperMedia Publishing Library trademarks of IPSIG

HyperCard is a trademark of Apple Computer Inc.

FREE CATALOG

Featuring HyperFuel™ Our exclusive collection of HyperCard stackware.

Bible-Stack™ Bible "KingJames" & "NIV" versions; Old and New Testament, on HyperCard™. Also in text, MacWrite and Word. The screen is in book form, chapters & verses are called on screen instantly with a keystroke. You can make your sermons or topics of any kind, at a fraction of the time, by copying from Bible-Stack™, & pasting to another stack or word processing program & printing it out. Word search 1 min. ‑7 sec. Plays "Hallelujah" $149. Canadian, no other charges. Alpha & Omega, PO Box 1057, Station A, Surrey, B.C. Canada V3S 4P5. 604/576-1617. 732-7771

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Macworld Catalog

Services

Computer Insurance

Data Security Insurance

The “all risk” Personal Computer Policy from DSI includes essential coverage not available with other policies: protection against loss of data (even form accidental erasure), loss of custom programs & fraud. As low as $35 a year. Coverage can be bound by telephone 9 - 4 Mtn. time.

Data Security Insurance, 4800 Riverbend Rd. P.O. Box 9003, Boulder, CO 80301, 303/442-0900, 800/822-0901

Data Conversion

TAPE/DISK CONVERSIONS

Conversion services to or from over 1250 computer systems:
• Magazines • Mini Computers
• PC Computers • Typesetters
• Word Processors

CALL THE INDUSTRY LEADERS

PIVOR COMPUTER SERVICES, Inc.
(312) 450-6010
166 Arlington Heights Rd #MC
Buffalo Grove, IL 60089

Desktop Publishing

Waldman Graphics

NYC / NJ / Phila DESIGNERS
We help top-notch designers achieve high resolution typesetting & graphics using desktop tools. Keep your standards while lowering your costs. Original electronic art and PostScript special effects our specialty.
1270 & 2540 dpi pages from Linotype L300s
Repro, Pos. & Neg. film • Disk or modem • Color separations • Scitex system • Award-winning progress, printing, binding & mailing
18 messengers • Adobe dealer

We are the most knowledgeable people you will talk to. Call Mary Ann Ostberg for more information about our superb services:

Type/Imagesetting

Island Color Productions has so many advantages:
• High-resolution typesetting
• Linotronic imagesetting
• Laser printing
• Computer graphics & design
• Speedy turnaround time
• From MAG, IBM or any ASCII file
• Whether keyboard, disk, or modem

Why not take advantage of us?
Island Color Productions, 11 Stony Brook Ave., Stony Brook, NY 11790
516/751-0430 (24-hr. modem on line)

Recharge Dealerships!!
Laser Charge Co., 17782 Jollyville Rd., Austin, TX 78759, 800/223-8134 or call collect 512/335-8191

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Instant Link: Macintosh Products, Manufacturers, Services

The Macworld Catalog

TONER CARTRIDGES
Remanufacturing $44.50. PC $34.50. Colors $64.50. 100% satisfaction. New cartridges from $89.50. Series II. Bulk 24 hours in & out.

2 DAY AIR
$44.50 for Laser cartridges
800-777-8444

CIRCLE 696 ON READER SERVICE CARD

TONER Cartridges
Better than New!
- 20% More Toner
- Darker Print
- 100% Guaranteed
Willow Products Corp.
3457 Willow Ave. Pgh., PA 15234

CIRCLE 630 ON READER SERVICE CARD

Long Life Laser Cartridge Recharge
LASTS 30-50% LONGER!
FACTORY LIKE METHOD—NO HOLES CUT!
For Apple, H.P. & 25 more using Canon EP Engines.
100% Money Back Guarantee In writing!
SEND $38.50 + $3.00 SH
With Each Cartridge To:
Texas Toner Cartridge Co.
11408 Audella Rd., #470, Dallas, TX 75243
214/475-5006

CIRCLE 546 ON READER SERVICE CARD

National Laser Recharge
Save your money! Let us recharge your toner cartridges for HP Series 1 & II, Apple, Canon, QMS & others. All Canon, PC models 100% Guaranteed Factory-Like recharge method. No drill & fill!
Long Life method for only $49 incl. s/h. Up to 7 charges per cartridge Color avail. We buy empties—$10. Send cartridge w/check or Money Order To:
National Laser Recharge
1413 W. Loop 281, Ste. 101
Longview, TX 75604
214/297-0200

CIRCLE 720 ON READER SERVICE CARD

Desktop Architect
Professional detailing system by architects. Pre-drawn components to assemble custom details with minor editing. Parts kits combine bitmapped and object-oriented graphics. Includes wall and cross sections, details and interior elevations. 8" x 10" format for working drawings. $189.00 Super Paint required.
Desktop Architect Co.
634 N. High St.
Columbus, OH 43215
614/469-9906

CIRCLE 728 ON READER SERVICE CARD

The Macworld Catalog

Graphic Astrology
The Gamma Series...
State of the Art!
The Gamma Edition $199.50
Natal Interpreter $199.50
Gamma & Interpreter $325.00
Gamma Basic $9.50

Astrology for Everyone!
Time Cycles Research
27 Dimmock Road
Waterford, CT 06385
(203) 444-6641

CIRCLE 731 ON READER SERVICE CARD

SuperMailer
Mailing List Manager
- Single & Multilist to 200,000 Names
- Full Import & Export Capability
- Unlimited Search & Sort Capability
- Prints Avery & Cheshire Labels
- Laser & Imagemaker Printing
- Zip + 4 and Carrier Routes
- Versatile Mail Merge
- Password Protection
- Phone & Fax Numbers
- "Telephone Book" Sorting
- International Addresses
- Customized on Request

$149.55 Single User - to 18,000 Addresses
AJL Systems
100 Colony Square, Suite 200, Atlanta, GA 30301
Inquiries: 404-872-4330 To Order: 800-633-2877

CIRCLE 784 ON READER SERVICE CARD

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Strategic Business & Marketing Plans

BizPlanBuilder™ Quickly and easily create an effective business/marketing plan for senior management, investors or clients. A comprehensive and proven framework — Over 85 pages of outlines, headlines, structured sentences & paragraphs, lists, suggestions...already typed & formatted in 29 MacWrite™ & MS WORD™ files. Includes spreadsheet financials in Excel™

Marketing & Sales Oriented

Everything you will need to organize, describe, promote & support your venture. Similar to reverse engineering where the best elements of good plans are cut & pasted together.) No blank pages. Follow the tutorials & edit into a finished plan. Includes manual. Preferred by investment capital experts, corporate managers & experienced consultants.

Also available:
- Investment Capital Sources
- Domestic & International Marketing
- Employee Handbook Template

Tools For Sales™

Reading images to Better Merchandisers
11135 Wilshire Drive • Los Angeles Hills, CA 90022
800-442-7373, 310-341-9191

$99.50 + $3 Shipping & 7% Tax (CA) 30-day acceptance / return.
Site licenses available. Visa MC Amex

50 Resume Designs

MacResume™ Professional Resume Templates

For yourself or your clients produce comprehensive resumes FAST. Save many hours of formatting. All files in Microsoft® Word.

2 Disk Set with Catalog of Designs
800-422-9010, ext. 8091

$59.95 MacResume® 415 NW 21st
Portland, OR 97209

Business Plans & Forecasts

Business Plan Toolkit™ Build a complete professional business plan. Includes sample outline, tests, spreadsheets, charts for financial analyses, budgets, forecasts, and practical, easy-to-follow manual. $99.95

Optional HyperCard business plan text guide, $19.95.

Financial Forecasting Toolkit™ Simplify cash flow and financial planning with models, charts, macros, and practical manual. $69.95

Sales and Market Forecasting Toolkit™ Improve your forecast with proven methodologies using models, charts, macros, and manual. $69.95

All toolkits require Excel, Works, or MultiPlan. Charts and macros with Excel only. Add $5 Shipping & handling per order. CA residents add 7% tax.

Palo Alto Software
(415) 32 5-3190
260 Sheridan Ave, Suite 219
Palo Alto, CA 94306
(800) 336-5544

50 Resume Designs

MacResume™ Professional Resume Templates

For yourself or your clients produce comprehensive resumes FAST. Save many hours of formatting. All files in Microsoft® Word.

2 Disk Set with Catalog of Designs
800-422-9010, ext. 8091

$59.95 MacResume® 415 NW 21st
Portland, OR 97209

Business Plans & Forecasts

Business Plan Toolkit™ Build a complete professional business plan. Includes sample outline, tests, spreadsheets, charts for financial analyses, budgets, forecasts, and practical, easy-to-follow manual. $99.95

Optional HyperCard business plan text guide, $19.95.

Financial Forecasting Toolkit™ Simplify cash flow and financial planning with models, charts, macros, and practical manual. $69.95

Sales and Market Forecasting Toolkit™ Improve your forecast with proven methodologies using models, charts, macros, and manual. $69.95

All toolkits require Excel, Works, or MultiPlan. Charts and macros with Excel only. Add $5 Shipping & handling per order. CA residents add 7% tax.

Palo Alto Software
(415) 32 5-3190
260 Sheridan Ave, Suite 219
Palo Alto, CA 94306
(800) 336-5544

50 Resume Designs

MacResume™ Professional Resume Templates

For yourself or your clients produce comprehensive resumes FAST. Save many hours of formatting. All files in Microsoft® Word.

2 Disk Set with Catalog of Designs
800-422-9010, ext. 8091

$59.95 MacResume® 415 NW 21st
Portland, OR 97209

Business Plans & Forecasts

Business Plan Toolkit™ Build a complete professional business plan. Includes sample outline, tests, spreadsheets, charts for financial analyses, budgets, forecasts, and practical, easy-to-follow manual. $99.95

Optional HyperCard business plan text guide, $19.95.

Financial Forecasting Toolkit™ Simplify cash flow and financial planning with models, charts, macros, and practical manual. $69.95

Sales and Market Forecasting Toolkit™ Improve your forecast with proven methodologies using models, charts, macros, and manual. $69.95

All toolkits require Excel, Works, or MultiPlan. Charts and macros with Excel only. Add $5 Shipping & handling per order. CA residents add 7% tax.

Palo Alto Software
(415) 32 5-3190
260 Sheridan Ave, Suite 219
Palo Alto, CA 94306
(800) 336-5544

50 Resume Designs

MacResume™ Professional Resume Templates

For yourself or your clients produce comprehensive resumes FAST. Save many hours of formatting. All files in Microsoft® Word.

2 Disk Set with Catalog of Designs
800-422-9010, ext. 8091

$59.95 MacResume® 415 NW 21st
Portland, OR 97209

Business Plans & Forecasts

Business Plan Toolkit™ Build a complete professional business plan. Includes sample outline, tests, spreadsheets, charts for financial analyses, budgets, forecasts, and practical, easy-to-follow manual. $99.95

Optional HyperCard business plan text guide, $19.95.

Financial Forecasting Toolkit™ Simplify cash flow and financial planning with models, charts, macros, and practical manual. $69.95

Sales and Market Forecasting Toolkit™ Improve your forecast with proven methodologies using models, charts, macros, and manual. $69.95

All toolkits require Excel, Works, or MultiPlan. Charts and macros with Excel only. Add $5 Shipping & handling per order. CA residents add 7% tax.
The Macworld Catalog

Communications

Session HP CRT Emulators
The Session family of HP terminal emulators lets your Mac talk to the HP3000, 9000, and 1000. Business Session™ (formerly Mac 2624; $199) emulates an HP 2992 block mode CRT. Graphic Session™ ($299) adds HP 2993 graphics. Color Session™ ($399) emulates the HP 2397. File transfer included.

Totem Graphics
5109-A Capital Blvd.
Tumwater, WA 98501-4415
(360)352-1811
CIRCLE 713 ON READER SERVICE CARD

PacerLink (was pcLINK)
Connects Macs to VAX (VMS and ULTRIX), Stratus and UNIX systems. Supports serial line, remote modem, direct Ethernet, and AppleTalk bridged to Ethernet communications media. Provides terminal emulation (VT220, VT100, VT240/241), file transfer, virtual disk, and print services. PacerShare extension enables the VAX/AMS system to act as an AppleShare compatible file server.
Pacer Software, Inc.
7911 Herschel Ave. #402, La Jolla, CA 92037, 619/454-0505

Burroughs emulation
Contact™ emulates TD/MT/TET and T27 terminals. Sophisticated data capture – all screen data can be used by spreadsheet, database or word processor... CANDE file transfer, fully à la Mac interface, soft keys, multiple pages & addresses, password protection... Soon: advanced file transfer.

Aventine Software Inc.
1139 W. Charest Blvd., Ste 300, Quebec, Qc.
Canada, GI1N 279 - Tel. (418) 682-3088
CIRCLE 717 ON READER SERVICE CARD

Desktop Publishing

MacPalette
By Microspot prints multicolored graphics & text from most Macintosh® software using the ImageWriter II. MacPalette will colorprint documents from MacDraw, MacDraft, MiniCAD, MacProject, MacWrite, JAZZ, Microsoft Chart, Word, Excel etc. (not MacPaint.) It prints black as a true black instead of mixing a black. $69.
CompSerVCo, 800 Freedom, Slidell, LA 70458, 800/272-5533 or 504/649-0484

Brainchild Grade™
Brainchild Corp., avail. through the Kirkdo's Academic Courseware Exchange. To order, call 800/235-6919, 800/292-6640 (in CA)

Educational

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Kieran

MacAnatomy
A complete electronic atlas of human anatomy in MacPaint document form. The drawings may be modified and merged into MacWrite documents using the Clipboard. Comprised of four volumes, available singly or as a collection. MacMedia Publications Inc., 5805 Westheimer, Houston, TX 77077, 713/977-2655

Algebra Homework Tutor
Revolutionary Homework Tutor™ lets you do your algebra homework or classwork on a Mac. Checks each step you enter, gives hints, poses practice problems, solves and explains examples, and prints completed homework. Easy editing, standard Mac interface and too much more to tell. Send for free brochure.
Missing Link Software, Box 3280, South Amboy, NJ 08879, 201/721-2569

Teacher's Rollbook
Teachers: The first program that handles all your record keeping needs. Grade averaging and reporting, • Full attendance records and totals • Records disciplinary actions • Class size reports • Up to 515 students per file • Remembers birthdays & checked out items • Requires Mac 512K, +, SE, II, 2 drives • $149 • Demo $10
Current Class Productions, 22824 Bereudo Ave., Torrance, CA 90502, 213/326-4246

Make Learning Fun!
An all new edition of the Macintosh Educational Software Collection
• Hard-to-Find & Best Sellers
• HyperCard /Shareware
• Over 150 Titles
• All Subject Areas
• Teachers, Students, Parents
Send for Free Catalog!
CHARIOT • 3659 India St. • San Diego, CA 92103 (619)298-0202

MacAnatomy
A complete electronic atlas of human anatomy in MacPaint document form. The drawings may be modified and merged into MacWrite documents using the Clipboard. Comprised of four volumes, available singly or as a collection. MacMedia Publications Inc., 5805 Westheimer, Houston, TX 77077, 713/977-2655

TEST GENERATION AND SCORING!
LXR-TEST™ - the only complete testing system for the Mac! Rated "best testing tool on the market." Logic eXtension Resources 9651-C Business Center Drive Rancho Cucamunga, CA 91730 (714) 980-0046 AppleLink: D0026

Memory Expansion SIMM Kits For
Macintosh™ Plus, SE and Macintosh™ II Easy-to-install 1MB plug-in modules that let you add 2 to 16MB of memory. Ideal for “memory gobbling” software applications and the new Multimedia multitasking environment. AVAILABLE NOW! CALL FOR PRICING! 1-800-678-DRAM in Kansas (316) 624-4856

MacKids™
Call or write for your free catalog of Macintosh™ educational programs. Written especially for preschool to elementary students. $39.95 each, VISA/MC accepted.

CALL FOR PRICING!
Memory Expansion SIMM Kits For
Macintosh™ Plus, SE and Macintosh™ II Easy-to-install 1MB plug-in modules that let you add 2 to 16MB of memory. Ideal for “memory gobbling” software applications and the new Multimedia multitasking environment. AVAILABLE NOW! CALL FOR PRICING! 1-800-678-DRAM in Kansas (316) 624-4856

Schematic Entry/Digital Simulation
DesignWorks™
Fully integrated and fully functional schematic and simulation on the Macintosh, featuring:
• fully interactive digital simulation with logic analyser style timing display
• fully compatible with Douglass CAD CAM™ PCB layout
• full 7400, 4000, 5000, analog libraries
• full high level language PLD support when used with LPLC logic compiler
• dot-matrix, laser, pen plotter output
• user definable device symbols with full simulation
DesignWorks 5685 LPLC 5535
Low-cost educational versions also available
Capilano Computing
3415 NE 85th Street
Seattle, WA 98105
(604) 669-6343

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
IEEE 488 Interfaces

Macc488 - NuBus IEEE board for MacII
MacSCSI488 - SCSI/IEEE controller
Mac488BP - Serial/IEEE controller
MacDa488 - IEEE plotter interface
MacDriver488 - IEEE language driver

Call or send for your FREE Technical Guide

(216) 439-4091

STRUCTURAL-SURVEYING

NEW! COGO MAC... for surveying & land & road layout.

- Entries edit and adjust traverse interactively.
- All information is displayed graphically at all times.
- Points, lines, curves, boundaries and traverses can be added, changed, copied, pasted, and duplicated.
- FRAME MAC: BEAM MAC II: BEAM MAC for structural analysis of 2-D frames, trusses, and beams.
- MacCOGO for calculating structural properties.

All programs have full Macintosh interfaces.

Money-back guarantee, free support from $145-$559.

Compuering Inc. - (416) 738-4601
113 McCabe Crescent
Thornhill, Ontario L4J 256 CANADA

CIRCLE 660 ON READER SERVICE CARD

Circuit Maker 2.0

NEW!... Multi-board circuit design program.

- Complete multi-board circuit design with full on-screen simulation.
- Trace mode shows the state of every node in the circuit as the simulation runs.
- Also trace logic switches and waveform display.
- Define your own symbols and devices and save them in a library.
- Routes and waveforms can be copied to the clipboard.
- Includes library of built-in components used in devices plus all IEEE switches, RAMs, PROMs, pulse generators, and more.
- High-quality laser or dot-matrix printout of circuit and waveforms.
- Optional LED library provides 65 additional devices.

CIRCLE 744 ON READER SERVICE CARD

Scientific Packaging Plot

SoftWare Plot produces publication-quality plots using multi-column ASCII file (e.g., program outputs, text editors, spreadsheets). Linear or logarithmic for plots in either axis, overlays, zoom, on-screen measurements, custom labels and tokens. Number of points limited only by disk space. Laser-Writer and big-screen compatible.

$99.95 + $5 s/h.

SoftWare Products, 7230 Oldler St., Lanham, MD 20706
301-577-9207

CIRCLE 650 ON READER SERVICE CARD

Road Design

MacRoad is a fully interactive road design program that allows you to:
- Design cross sections using a palette of edge & surface types
- Design vertical gradings graphically
- Produce a schedule of quantities
- Adjust the grading & immediately see the effect on the cross sections & quantities
- Produce drawings on a range of printers or pen plotters

Creative Engineering, 6 Antill St., Wilston Queensland 4051, Australia, +61 73566271

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Football Fans!
Are your teams going to win this week? Use the Analyst™ desk accessory and find out. Predict college and professional game winners plus the point spread. Fun, easy to use. 60% accuracy guaranteed or your money back. A great gift for the fan! $19.95. Runs on any Macintosh.

Vertical Solutions, PO Box 7535, Olympia, WA 98507, 800-942-4008

Tired of Arcade Games?
New real simulations: Rommel's DESSERT WAR • MIDWAY or SOLOMONS (center action) • Rome's glory in SASSARIAN or EAGLES IN THE SAND • WESTERN CAMPAIGNS • THE ARMY OF NORTHERN VIRGINIA (Civil War) • NORWEGIAN SEA or U.S. Invasion in RED STARS (U.S./Soviet clash). $24.95 each game or $49.95 for two. 30% Minimum, VISA and MC Accepted. Allow 4-6 weeks.

SJP Enterprises PO Box 246 MCHenny IL 60050

Circle 710 on Reader Service Card

Instant Link: Macintosh Products, Manufacturers, Services

The Macworld Catalog

The PostScript™ Type Sampler
A one-stop source for samples of PostScript™ typeface in a single reference book

- Over 800 PostScript™ Type Faces
- 17 Different Type Manufacturers
- Typesset on the L300 @ 1270 DPI
- 8 1/2 x 11 pages in 3-Ring Binder
- Samples Printed on 68# Coated Stock Only

$49.95

PFS-Order Dept MW
702 Twinbrook Parkway
Rockville, MD 20851
(301) 424-1357

Circle 615 on Reader Service Card

Custom Laser Typography

NeoScribe International, PO Box 633, East Haven, CT 06512, 203-467-9880

Circle 561 on Reader Service Card

Fund Raising

MacTrac™ Fund Raising
MacTrac™ software allows accurate tracking of donors, prospects, gifts, and pledges. MacTrac™ features use defined codes and powerful extraction, mail merge and reporting functions. Automatic pledge and renewal reminders complete a fully featured program which requires minimal training.

Technology Resource Assistance Center, 124 University Ave., #310, Palo Alto, CA 94301, 415/321-0662

Hyper Family-Tree™
The HyperCard stack that lets you easily record and graphically display genealogy information. Auto-link lets you click to navigate through generations of your ancestors. Super fast search. Automatic pedigree charts, family lines, and birthday calendars. Print & export functions. $19.95 plus $5 s/h. VISA/MC orders welcome.

Leister Productions, 44 Hill Blvd., Mechanicsburg, PA 17055, 717/909-1768

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.

Genealogy

MacGene™ new (ver. 3.10)
80% faster & 100% complete. Designed specifically for the Mac. One program for data entry, find, list & charting. Features: History, Hints, Mail-List, Family Tree, Pedigree, Statistics, Biography, etc.

- LDS compatible
- Mac's & Mac-AL
- MORE NOTES
- User fields
- Custom Report
- Import/Export
- No copy protection
- $49.95, manual
- $3-back guarantee.

Applied Ideas, Inc., PO Box 3225, Manhattan Beach, CA 90266, Free info: 213-545-2906

FAMILY ROOTS™
Do it YOUR way! Huge variety and capacity for your family history. Makes pedigree charts, person sheets, group sheets, and indices. Phased releases will add searches and much, much more. Standard Mac screens/mouse. Free brochure and sample printouts. Satisfaction guaranteed. Currently $95, add $22.50 per each new release (total $118) MC/VIISA/AE.

Quicksearch, Box 216, Lexington, MA 02173, 617/641-2930, 800/637-4007

Circle 602 on Reader Service Card

Financial

TaxTrac
TaxTrac is a Federal Individual Income Tax Planner for both professional and home use. Designed and used by a tax attorney & CPA. TaxTrac includes: 5 year projections, what-if analysis, AMT calculations, passive loss limitations, marginal and average tax rate calculations, updated for recent tax law changes. Requires Excel™. Also available for IBM-PC. $39.95 + $5 s/h. MC/VISA.

Softfile, Inc., 8753 Park View, Milwaukee, WI 53226, 414/797-4400

Circle 648 on Reader Service Card

Beverly Hills 1.5
"Best ImageWriter™ fonts available!"

- Provides better quality photocopies
- 11 sizes: 6-12, 14, 18, 24 & 36 pt.
- 72 fractions from 1/32 through 9/32
- Horizontal lines of varying length
- 2/1 pixel leading/spacing adjustment
- Additional mathematical symbols
- Two manuals provided on-disc
- Save cost of expensive printer; only $15 ($15.98 in CA) + blank disc!

ADH Software
P.O. Box 67129
Los Angeles, CA 90067-0129

Circle 615 on Reader Service Card

Downloadable LaserWriter Fonts

FOR SCIENCE

Downloadable LaserWriter Fonts

For Foreign Language Texts

Miyawashi Corp., photographs, etc.

ASCII 166-1664 A 2-24-12

 siguientes

Latin Typeface Typography

160 Packard Road, Suite 5
Ann Arbor, Michigan 48104

(313) 665-1989
Compatible with all Macintosh systems

Circle 615 on Reader Service Card

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.

315
Family Heritage File
Most powerful genealogy program on the Mac. Rated "Best" by Macworld. Licensed vers. of Personal Ancestral File, produced by the LDS Church.
• Mac user interface
• Supports all Macs & hard disks except 128k
• Exports data to word processors/databases/modems
• Reports: Pedigree, Family Group, Individuals, Marriages, Surnames, Documentation, etc. $149 + $3/s/h (Utah res. +6%). Demo $7.
StarCom Software Systems, Windsor Park East, 25 West 1480 North, Orem, UT 84057, 801/225-1480

CADMOVER™
GRAPHIC TRANSLATION UTILITY FOR MACINTOSH® CONNECTIVITY
IGES SNAP! DFU MINICAD MACDRAW
SPACE EDIT MSC/pal
KANDU SOFTWARE CORP. 703-532-0213
CIRCLE 661 ON READER SERVICE CARD

MGM Station—Prof. CAD
By Micro CAD/CAM, Inc. is a high powered CAD program for the Mac similar to AutoCAD. MGM boasts over 140 powerful functions including: x-y coordinate input, polar or digital data input, 100 power zoom accuracy to 4 decimals, tangent drawing tools and much more! $799. Demo disk and/or VGR tape available.
CompServCo, 800 Freedom, Sldell, LA 70458, 800/272-5533 or 504/649-0484

MiniCAD 3.0
By Diehl Graphsoft boasts 1000+ power zoom, symbol library, 40 layers, auto-dimensioning, double-line tool, clip & add/intersect polygons tools, object snap, fillet & trim lines tools, object sizer & locator, 9 decimals accuracy, full 2-D & 3-D modes, etc. It reads MacDraw & MacDraft files. $295. Demo avail.
CompServCo, 800 Freedom, Sldell, LA 70458, 800/272-5533 or 504/649-0484

MacPlot & MACCAD
MacPlot by Microspot is a powerful plotter driver that will plot any object-oriented graphics produced on the Mac in up to 30 colors/pens. MacPlot supports over 50 plots. MacCAD is a series of 12 separate architectural & engineering template symbol libraries for use with MacDraw, MacDraft, MiniCAD, etc.
CompServCo, 800 Freedom, Sldell, LA 70458, 800/272-5533 or 504/649-0484

GraphPainter™
For desktop publishing to data analysis. Does scatter, line, bar, column, overlays, log, semilog, all 3-D, multiaxis, multiseries & more. You control scaling, grids, markers, patterns, etc. Finish with the paint tools & 7 curve fits. I/O with popular programs and LaserWriter.
SilK + req. $60, MCVISA.
Brasel Software, PO. Box 1274, Chesterfield, MO 63005, 314/256-3317

MacRAIL®
Software That Takes You Beyond Simple Image Processing & Display.
• MacII Application for Image Capture, Enhancement, & Analysis
• Point & Click for Over 70 Image Analysis Algorithms & Measurement Tools
• Feature Extraction, Gray Scale, Edge, Vectors. Area, Convolutions, Morphology
• Distance & Location Computations with World Space Calibration
• Written in High Level Interpretive Language
• C & Assembly Packages May Be Linked with Option
• For Industrial, Medical, Scientific, Defense & Microscopy Image Processing Applications

Automatix
508.667.7900
1000 Tech Park Drive, Billerica, MA 01821
CIRCLE 705 ON READER SERVICE CARD

Health
Nutritional Software
Take steps to eat more sensibly. Analyze diets for nutritional content (calories, sodium, etc.) NutriCalc Plus™ includes 32 nutrients, 1700+ foods (3000 avail.). Does RDA comparison, energy analysis, tracks histories, $225. NutriCalc™ analyzes 8 nutrients, 900+ foods, plots progress, analyzes recipes. $65. Both have brand names & fast foods.
NCP
Canbe Corporation, 4435 S. Rural Rd. #331, Tempe, AZ 85282, 602/821-2310

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
Analyze Diets, Menus... so much more with the FOOD PROCESSOR II!

- This TOP-rated software has the best database of any system on the market today! Acclaimed by schools, colleges, hospitals, fitness centers & businesses.
- 2400-3000 foods - 30 nutrients.
- $250
- CALL OR WRITE TODAY FOR FREE DEMO DISK!

ESHA Research, P.O. Box 13028, Salem, OR 97309, 503/585-6242 or 585-7755


dThe Right Time System
The Stock, Index & Futures programs generate accurate Buy/Sell signals for individual stocks, indexes and commodities. The software was developed by an expert portfolio manager for his own personal use & are now available for any smart trader who wants to make quick profits. Call or write for free info.

T.B.S.P. Inc., 2265 Westwood Blvd. #793, Los Angeles, CA 90065, 213/312-0154

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
**Medical Office Mgmt.**

**Tess System** software for insurance and billing. Expandable line to grow with your needs. Our $650 package outperforms software selling at three times that price. Multi-user & electronic claims available. Call for demo software, VHS tape, or documentation. System prices from $650 to $5000. Wabash Medical Resources, Inc., 4/27 Sibleton Court, Indianapolis, IN 46254, 317/299-7800

**Plotter Drivers**

**Printer choice on your Mac**

**The PRINT-LINK™**
For graphic printing with a wide variety of ink jet or dot matrix printers. (8 & 24 pin)

**MAC DAISY LINK™**
For letter quality printing, with typewriters, daisywheel printers and lasers (in Qume or Diablo emulation).

Cables optional $22.95

GDT Softworks Inc. P.O. Box 1865, Point Roberts, WA 98281
Inquiries: (804) 291-9121 To Order: 800.663-6222

**Time Saver Payroll™ V4.0**
NOW EVEN BETTER! • COMPLETE FULL FEATURED Payroll system.
• Salaries, hourly, comm. & tips wages • 11 deductions, incl. fed., state & local taxes • 401k deductions • Tax tables easily edited by user • Monthly & quarterly reports, incl. 941, FUTA/940, SUTA • Prints checks and W-2 forms • Flexible — easy to use! Requires Microsoft Excel $99.50 + $3 s/h. MCVISA/Chk. Demo $15 + $3 s/h (applied to purchase).
Western Software Associates, 110 El Dorado Rd., Walnut Creek, CA 94595, 415/921-3999

**Music/Midi**

**Call 1/800/FOR MIDI**
MIDI for everyone! Start your computer/MIDI system today with discount prices & expert help from FUTURE MUSIC. You don’t have to be a PRO—most of our customers are just “plain folks” with a home computer and a love of music. Call for FREE CATALOG of Hardware, Software, Synthesizers, 4-tracks and more. All major brands avail. Future Music Inc., 489 E. Plumb Lane, Reno, NV 89502, 702/632-6434

**Two Powerful Programs!**

**Aatrix Payroll**

**Aatrix Payroll Plus**
Features include everything in Aatrix Payroll 3.01 as well as Payroll Ledger, 10 income sources, Employer contribution & Tip sections. Prints form 1099 & miscellaneous checks. Itemizes different hourly types and tracks vacations, holidays, sick pay & anniversary dates. And more! $295.

For either program call or write:
Aatrix Software, P.O. Box 5359, Grand Forks, ND 58206-5359, Order line: 800/426-0854

**Mac to MIDI Made Easy!**

***Make the Right Choices***
We have designed MAC based systems for headline superstars and 1st time users. We offer: • Expert advice • Complete systems design. We sell: • All MIDI interfaces, software, accessories • All major synths & samplers • At discount prices. Why settle for less than the best?
TekCom Corporation, 1020 N. Delaware Ave., Philadelphia, PA 19125, 215/426-6700

**Programming Tools**

**POWER DEVELOPMENT TOOLS**
• Programmer’s EXTENDER
  Vol 1: Macintosh User interface
  Vol 2: lists, printing, graphics, tiling, popups
• EXTENDER GRAPPAK
  high quality color graphs - bar, line, log, customizable symbols, grid patterns
Invention Software 313-996-8108

**The Biggest Small Investment You Can Make.**

Take advantage of the direct link with your buyers that maximizes exposure at a low cost. The Macworld Catalog reflects the expanding corporate Macintosh audience whose purchasing activities increasingly include mail order. The cost-effective direct response advertising available monthly in The Macworld Catalog links you instantly with nearly 500,000 qualified buyers. Get into the link. Call 800.888.8622 and place your ad now!

800.888.8622

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
The Good Stuff
Compact public domain library contains just the good DAs, Educational, Fonts, Games, Graphics, Sound & Music, Stacks, and Utilities. All are SF and MultiFinder compatible. Complete library of 16 double-sided disks for $120. (You would spend $500 to $1,300 to search competitors' 100+ disks for the same good stuff.) Library is licensable to clubs. Catalog is $1.

Abacus
At Abacus you pay only $5.00 for a double sided Sony disk of public domain and shareware software. While we cater to all models of the Mac with a huge selection in all categories, what truly sets us apart is the amount of Mac II specific software we offer. With close to 20 megabytes of color programs, files & images for the Mac II, we can't be beat. Send $1 (refundable) for catalog.

Each PAK only $25.00
Each PAK on 4 double sided disks. Save even more, any 3 for $69.95; any 4 for $89.95; or any 6 for only $129.95!

ORDER TOLL FREE! CUSTOMER SERVICE
(800) 356-3551 (913) 271-6021

Add $4.00 per order ($8 Canada, $10 foreign) in U.S. orders add 5% state sales tax. Thousands of satisfied customers in over 50 countries now trust Budgetbytes for their choice of Macintosh Public Domain and Shareware. You'll find the best source, the best selection, and of course, the very best prices. Choose from over 1,000 programs on over 600 disks, and never pay more than $3.50 per single sided, or $6.00 per double sided disk. Ask about the bonus disk offer on our budget mail order line. Just great software at honest prices. Order today and get our new 300 page catalog, absolutely FREE. Or send $2.50 (refundable from your first order) to the Budgetbytes office and get starting more bytes for your buck today.

Budgetbytes
2231 SW Wanamaker Rd, Suite 102, Topeka, KS 66614

Real Estate
REMS Investor Series
CCIM recommended. Multi-year cash flow projections and analysis, amortization, depreciation, tax calculations, and export to Excel. REMS Investor 3000 imports from Excel, handles partnerships, ground leases, participation loans and more. Not a template. Call for free demo.

REMS Investor 2000
REMS Investor 3000

Good Software Corp.
13601 Forest Rd., Suite 508W, Dallas, Texas 75240
800-272-GOOD

Metropolis
Software
1415 El Bell Rd
Los Altos Hills, CA 94022
(415) 322-2001

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
New from RealData —

Real Estate Investment Analysis, Version 6.0

Real Estate Investment Analysis has been our best-selling product since it was introduced in 1982. Many software products have come and gone over the years, but RealData and our Investment Analysis have stood the test of time. Now Version 6.0 adds new power to this popular program.

What can it do? Real Estate Investment allows you to make ten-year projections of the income, expenses, cash flows, resale and tax implications of your property. It performs virtually all of the complex Tax Reform, financing and rate-of-return calculations for you in just seconds. It also includes a lease analysis and annual operating statement.

Real Estate Investment Analysis, Version 6.0 runs with Microsoft Excel or Works on the Mac 512 or greater — just $250.

To order, call or write today. MC, VISA, AMEX, Welcome or send $2 for our catalog of real estate software for the Mac and PC. 78 North Main St. South Norwalk, CT 06854 (203) 255-2732

Property Management

Comprehensive program for managing residential and commercial properties. Many management reports, including operating statement, delinquent rent, lease expiration, and transaction register. Provides check writing, check reconciliation, posting late fees, recurring expenses — $395. Investment analysis — $245.

Yardl Systems, 813 Reddick St., Santa Barbara, CA 93103, 805/966-3666

Loan Amortization

AmiPack is a straightforward loan-amortization software package designed by a CPA & tax attorney. AmiPack supports variable rates, graduated, skipped, & principal-only payments. Also includes balloons, negative amortizations, customized schedules, loan analysis, & more. $29.95 + $5 s/h. MC/ VISA.

Soffletit, Inc., 875 Park View, Milwaukee, WI 53226, 414/797-4490

Tidal Predictions


MarketMaster for Mac

Automatic Sales Inquiry Follow-up! Enter leads whenever you get them and MarketMaster™ contacts the right people the right way at the right time. Prints letters & envelopes, phone lists, scripts, and NEVER FORGETS! Easy to learn and use. Frees salespeople to SELL and supports them to SELL MORE! Additional locations: 10559 Caminito, Cascara, San Diego, CA 92115, 619/281-6174

MarketMaster™, the complete point of sale software system for apparel stores with up to 10 locations. Sales, Cash, Inventory, A/R, A/P and General Ledger. Decisive and timely information for the apparel retailer who has a passion for success.

RockWare Inc., 4251 Kipling, Suite 100, Wheat Ridge, CO 80033, 303/423-6171, Telex: 9102504964

Retail

S49.50

square, skipped, & principal-only amortization

Loan Analysis

signed by a CPI & 1ax attorney.

Security

The world's leading software manufacturers depend on Softguard copyright protection systems. Your FREE DISKETTE introduces you to SuperLock™ — invisible copyright protection for Macintosh and IBM-PC (and compatibles).

• Hard disk support
• No source code changes
• Customized versions
• LAN support
• New upgrades available.

(408) 773-9680

COPY PROTECTION

CIRCLE 677 ON READER SERVICE CARD

Scientific

Equations Made Easy

Expressionist™ 2.0

A powerful application and desk accessory that generates equations for word processing and Desktop Publishing.

Hollberg Development
PO Box 151501
San Diego, CA 92115
(619) 287-7444

Geological Software

Great graphics, low prices!

• Lithologic log plotting
• Gridding • Contouring
• Piper/Stiff plots • Oil & Gas economics • Stereonet plots
• Plutonic tectonics • Geophysical modeling, + much more for the Macintosh & PC — $50—$1500. Call or write for FREE catalog of easy-to-use software products.

RockWare Inc., 4251 Kipling, Suite 100, Wheat Ridge, CO 80033, 303/423-6171, Telelex: 9102504964

CIRCLE 614 ON READER SERVICE CARD

CIRCLE 610 ON READER SERVICE CARD

For your ad to appear on The Macworld Catalog screen, call 800/888-8622.
**Utilities**

**Multistat**

Comprehensive Statistics with Graphics
- Full Mac interface: hierarchical menus
- Powerful data editing & transformation
- Full range of descriptive statistics
- Parametric statistics include T-tests, ANOVAs (one and two way), simple & multiple regression, proportion etc.
- Non-parametric statistics include chi-square, Fisher exact, McNemar, Mann-Whitney U, Spearman correlation, Wilcoxon, Kolmogorov-Smirnov etc.
- Graphics include pie charts, scatter plots, line graphs, and error bars etc.
- Pseudodata generator for training uses
- 512K + external drive.

**MacLabeler Plus**

Label Construction Set™
- The ultimate disk labeler
- $79.95
- It's easy...label your disks automatically with a click of a button.
- It's flexible...Design and save your own Label Templates.
- It's powerful...Put 10 kinds of fields anywhere you want:
  - Disk name
  - File / Folder names
  - Desktop icons
  - DA's & System fonts
  - Space and HFS/MFS
  - Date & Serial 
  - Imported graphics
  - Custom text
- Give each field a font, style, color, custom width, etc.
- Fill these fields by inserting disk.
- Set to manual or automatic modes.
- Border or borderless labels.
- Built-in print queue.
- For MacPlus, SE, or Mac II.
- For LaserWriters or ImageWriters.
- 60 pin-feed QuickLabels included.

**DiskQuick**

- Catalogs hard disks and floppy.
- Powerful "Subset" file locator.
- Shows info box comments.
- Exports catalog to database.
- 512k to Mac II.
- IW or LaserWriter
- MacGuide rates it a 96...Essential for anyone who uses a hard drive or owns more than two floppy disks.

**CLR ANOVA**

Analysis of variance program that can compute up to a 10-way design with repeated measures and unequal n. Marginal means, plots of interactions, simple effects, range tests, contrasts, and more. Full Mac interface. Can read text files entries separated by spaces, commas, or tabs. $75 + S3.75

**RATS! Version 2.1**

Best-selling econometrics software program. Now available on the Mac. Multiple regression, including stepwise, 2SLS, logit, probit, and much more! Forecasting with ARIMA, VAR. Exponential smoothing, model simulations, support for daily-weekly data. $300. VISA/MC.

**Word Processors**

**Multi-Window Outlining**

with Idealliner 2.5:
- Organize your work in an Outline window, changing subordination with a keystroke, moving whole sections of topics at once. Write in Text windows, with undo, tools. WYSIWYG Preview, custom topic numbering; multiple clipboards, on-line tutorial. $40.00; $3.00 for demo.

**Japanese Software**

- New ECGWord 3.0 is Japanese WP software. Converts romanji or kana to kanji/kana sentences automatically. Supports JIS level I and II.
- New EGBook 1.2 is a DTP software. It supports vertical Japanese text format. $599. EGBook & ECGWord bundle set. $799. All comes with Kanji Table 2.0 and EG Bridge 3.0 3MB RAM req. for Mac Plus & SE. 4MB RAM req. for Mac II. Developed by EIGOSOFT Corp.

**Print Envelopes on Your MAC.**

Print envelopes to enclose your letters by copying & pasting the letter's name & address block. Or, print envelopes using names & addresses stored in HyperCard stacks. ncp.

**Mailing Lists**

MAILING LIST

Mac Users

On labels, tapes, diskettes... or by modem.

Choose from hundreds of thousands of users!

Only 5¢ per name, with no charge for selecting, sorting, media, or delivery.

Semaphore Corporation, 207 Granada Dr., Agios, CA 91003

(408) 688-9200
### Product Index

#### Software
- **CAD/CAM**
  - 166 Aventur, 218
  - 123 Bitstream, Inc., 267
  - 151 Innovative Data Design, Inc., 181
  - 200 Micro CAD/CAM Systems, Inc., 52
  - 229 Paracomp, 175

- **Communications**
  - 179 C景色, 275

- **Educational**
  - 149 Arora, 285
  - 375 Computer Research Corp., 151

- **Utilities**
  - 297 Shana, 80

#### Hardware
- **Printers**
  - 74 Sopris Software, Inc., 28

- **Others**
  - 318 WordPerfect, 271

#### Accessories
- **Floppy Disk/holders**
  - 256 Royale Data Products, Inc., 250

#### Mail Order
- 5 Beverly Hills Computer, 261
- 32 CBA Computer Sales, 291
- 153 CMO Icon Review, 200-201
- 273 Crank Technologies, 91-93
- 360 Direct Micro Products, 40
- 358 Diskette Connection, 256
- 338 File, Mac, Inc., 259

#### Miscellaneous
- **Hardware**
  - 290 IBM Personal Computer, 185

#### Video
- 45 Open Mac Enterprises, 260

#### Miscellaneous
- **Hardware**
  - 290 IBM Personal Computer, 185
Get more information on products you're interested in—simply return one of these cards today. There's no cost. And no obligation.

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Company

Address

City, State, Zip (zip code needed to ensure delivery)

Phone: Area code/Number

<table>
<thead>
<tr>
<th>(201-400)</th>
<th>(401-600)</th>
</tr>
</thead>
<tbody>
<tr>
<td>201-202</td>
<td>203-204</td>
</tr>
<tr>
<td>401-402</td>
<td>403-404</td>
</tr>
</tbody>
</table>

Check this box and fill out the appropriate information to subscribe to Macworld. You will be billed $24.00 for a 1-year subscription (U.S. only).
## Advertiser Index

<table>
<thead>
<tr>
<th>Reader service number</th>
<th>Reader service number</th>
<th>Advertiser</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>22</td>
<td>Biax, 24</td>
</tr>
<tr>
<td>36</td>
<td>37</td>
<td>Atrix, 11</td>
</tr>
<tr>
<td>51</td>
<td>51</td>
<td>Avid, 11</td>
</tr>
<tr>
<td>74</td>
<td>74</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>92</td>
<td>92</td>
<td>Arcour, 11</td>
</tr>
<tr>
<td>109</td>
<td>109</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>126</td>
<td>126</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>146</td>
<td>146</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>163</td>
<td>163</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>180</td>
<td>180</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>207</td>
<td>207</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>225</td>
<td>225</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>242</td>
<td>242</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>260</td>
<td>260</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>285</td>
<td>285</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>304</td>
<td>304</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>320</td>
<td>320</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>340</td>
<td>340</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>360</td>
<td>360</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>380</td>
<td>380</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>400</td>
<td>400</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>420</td>
<td>420</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>440</td>
<td>440</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>460</td>
<td>460</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>480</td>
<td>480</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>500</td>
<td>500</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>520</td>
<td>520</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>540</td>
<td>540</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>560</td>
<td>560</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>580</td>
<td>580</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>600</td>
<td>600</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>620</td>
<td>620</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>640</td>
<td>640</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>660</td>
<td>660</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>680</td>
<td>680</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>700</td>
<td>700</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>720</td>
<td>720</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>740</td>
<td>740</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>760</td>
<td>760</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>780</td>
<td>780</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>800</td>
<td>800</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>820</td>
<td>820</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>840</td>
<td>840</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>860</td>
<td>860</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>880</td>
<td>880</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>900</td>
<td>900</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>920</td>
<td>920</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>940</td>
<td>940</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>960</td>
<td>960</td>
<td>Apple, 11</td>
</tr>
<tr>
<td>980</td>
<td>980</td>
<td>Apple, 11</td>
</tr>
</tbody>
</table>

---

**Don't Forget!**

Send for the latest edition of the free Consumer Information Catalog. The Catalog lists over 200 selected federal publications of consumer interest on subjects like health, nutrition, federal benefits, money management. The Catalog is free and so are many of the booklets. Just send your name and address, no strings attached.

Write today:

**Consumer Information Center**
Department DF  
Pueblo, Colorado 81009

---

**How Do You Get a Job Without Experience? AND How Do You Get Experience Without a Job?**

Most young people have one answer to this problem. They avoid it until they're out of college. But they could be getting solid work experience while they're still in college. With your company's help, others are too. We're Co-op Education. A nationwide program that helps college students get real jobs for real pay, while they're getting an education. But we can't do it without you. Those real jobs have to come from real companies. Like yours.

For more information on how you can participate in this valuable program, write Co-op Education, Box 7756, Boston, MA 02115.

Not only will you be giving students a chance to earn money and pick up the most valuable kind of knowledge, you'll be giving yourself a chance to pick up the most valuable kind of employee.

**Co-op Education. You earn a future when you earn a degree.**

---

**Macworld** 321
Develop your ideas in Digital Darkroom.

1. A classic arch becomes the anchor for this surreal composition. After eliminating unwanted areas, a stair-step design is added.

2. After being cut from its background, a skyscraper is added. A false bottom is created with simple retouching.

3. With the help of automated paste controls that replace tedious pixel editing, the waves wrap around the arch.

Imagine a computerized darkroom...in your Macintosh.® Software that gives you more control over grayscale images than even the most skilled photographer. That's Digital Darkroom.™ Unique "intelligent" tools eliminate much of the work in creating dramatic compositions, whether you're a beginner or a professional. You can automatically select objects using the Magic Wand, or blend one image into another with simple slider controls. You can freely slant, stretch or rotate your image to get precisely what you want.

For detailed retouching, you have brushes and filters that blur, sharpen, smudge or create complex textures and other special effects. You can even outline shapes in your images automatically with AutoTrace.™

4. Using brightness and contrast controls, dramatic clouds are salvaged from an underexposed original and then pasted into the background.

5. Finally, the children step out of an otherwise ordinary photo — with the help of the Magic Wand automatic selection tool — to add the key dramatic element to the composition.

And when it's just right on-screen, the exclusive Advanced Halftone printing option will give you the smoothest grays and sharpest detail you've ever seen on a 300 dpi laser printer — even on non-PostScript® language printers.

From simple retouching, to the wildest flights of imagination, develop your ideas — in Digital Darkroom.

Suggested retail price: $395.
Special introductory price: $295.
System requirements:
Macintosh Plus, SE or Macintosh II
Silicon Beach Software, Inc.
9770 Carroll Center Road, Suite J
San Diego, Ca 92126 • (619) 695-6956

Digital Darkroom and AutoTrace are trademarks of Silicon Beach Software, Inc. Macintosh is a registered trademark of Apple Computer, Inc. PostScript is a registered trademark of Adobe Systems Inc.

Circle 298 on reader service card
Where to Buy

This listing provides company addresses and phone numbers for products mentioned in this issue. Allow several weeks for responses to Reader Service Card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

Reader Service


6 APL-800WD. Advanced Digital Information Corp., 1437 N.E. 87th St., Redmond, WA 98073, 206/881-8004.

751 Apple Tape Backup 40SC. Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014, 408/996-1010.

752 AppleCD SC. Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014, 408/996-1010.

753 AUTO-SYNC 1019/SP. Microwire, Inc., 1943 Providence Ct., College Park, GA 30337, 404/991-2246.


756 Copyrights, Trademarks & Patents. Aardvark Development Labs, 14400 Ellia Blvd., #150, Houston, TX 77014, 713/872-8085.


761 Emac-60T. Everex, 4866 Kat Rd., Fremont, CA 94538, 415/498-1111, 800/821-0806.

762 Epson Serial Interface Card. Hanzon Data, Inc., 22032 23rd Dr. SE, Bothell, WA 98021, 206/487-1717.

763 Extend. Imagine That, Inc., 7109 Via Carmela, San Jose, CA 95139, 408/365-0305.


765 FlexiDrive 10. Irwin Magnetics, 2101 Commonwealth Blvd., Ann Arbor, MI 48105, 313/593-5900.

766 Focal Point. Activision/Mediagenic, 3885 Bomanion Dr., Menlo Park, CA 94025, 415/329-0800.

767 FullWrite Professional. Ashton-Tate, 2011 Hamilton Ave., Torrance, CA 90502-1319, 213/529-8000.

768 Grappler CMac/GS. Orange Micro, Inc., 1400 N. Lakeview Ave., Anaheim, CA 92807, 714/779-2772, 800/228-8029.

769 HyperTape. General Computer Corp., 580 Winter St., Waltham, MA 02154, 617/890-0880, 800/634-9757.


771 Infinity 10/Infinity 40 Turbo. Peripheral Land, Inc., 47800 Westinghouse Dr., Fremont, CA 94538, 415/657-2211.
<table>
<thead>
<tr>
<th><strong>Where to Buy</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mac Lock Security Kit.</strong> Mac Products, 20231 San Gabriel Valley Dr., Walnut, CA 91789, 714/595-4838.</td>
</tr>
<tr>
<td><strong>MacBack 60.</strong> Peripheral Land, Inc., 1740 Army St., San Francisco, CA 94124, 415/282-1111.</td>
</tr>
<tr>
<td><strong>MacDraw II.</strong> Claris Corp., 440 Clyde Ave., Mountain View, CA 94040, 415/960-1500, 800/334-3535.</td>
</tr>
<tr>
<td><strong>MacEnhancer.</strong> SoftStyle, a division of Phoenix Technologies, 660 Kalanianaole Hwy., Honolulu, HI 96825, 808/396-6368.</td>
</tr>
<tr>
<td><strong>MacKablit.</strong> Secure-It Inc., 18 Maple Ct., East Longmeadow, MA 01028, 413/525-7039, 800/451-7592.</td>
</tr>
<tr>
<td><strong>MacTell.</strong> Baseline Inc., 838 Broadway, New York, NY 10003, 212/254-8235, 800/242-7546.</td>
</tr>
<tr>
<td><strong>MegaDrive 1020.</strong> Jasmine Technologies, Inc., 1740 Army St., San Francisco, CA 94124, 415/282-1111.</td>
</tr>
<tr>
<td><strong>MegaTrend/2.</strong> Intecolor Corp., 225 Scientific Dr., Norcross, GA 30092, 404/449-5961.</td>
</tr>
<tr>
<td><strong>MicroDynamics MARS.</strong> Micro Dynamics, Ltd., 8555 16th St., Silver Spring, MD 20910, 301/598-6300, 800/654-7638.</td>
</tr>
<tr>
<td><strong>Microsoft Word.</strong> Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, 206/882-8080, 800/334-3535.</td>
</tr>
<tr>
<td><strong>National Gallery of Art Laserguide.</strong> The Voyager Company, 2139 Manning Ave., Los Angeles, CA 90025, 213/475-3524.</td>
</tr>
<tr>
<td><strong>Nova T60.</strong> Microtech International, Inc., 29 Business Park Dr., Branford, CT 06405, 203/488-7744.</td>
</tr>
<tr>
<td><strong>PC Viewer Model PCV 6448+2.</strong> In Focus Systems, Inc., 7649 Mohawk St., Tualatin, OR 97062, 503/692-4908, 800/327-7231.</td>
</tr>
<tr>
<td><strong>Printer Optimizer.</strong> Applied Creative Technology, Inc., 10529 Olympic Dr., Dallas, TX 75220, 214/358-4800.</td>
</tr>
<tr>
<td><strong>Printworks for the Mac.</strong> Softstyle, a division of Phoenix Technologies, 660 Kalanianaole Hwy., Honolulu, HI 96825, 808/396-6368.</td>
</tr>
<tr>
<td><strong>Safeware.</strong> The Insurance Agency Inc., 2929 N. High St., Columbus, OH 43202, 800/848-3469.</td>
</tr>
<tr>
<td><strong>Sentinel.</strong> SuperMac Technology, 295 N. Bernard Ave., Mountain View, CA 94043, 415/964-8884.</td>
</tr>
<tr>
<td><strong>Spectra 60 Plus.</strong> Spectra Micro Development, PO Box 41795, Tucson, AZ 85717, 602/884-7402.</td>
</tr>
<tr>
<td><strong>Super 3D.</strong> Silicon Beach Software, Inc., PO Box 261-380, San Diego, CA 92126, 619/695-6956.</td>
</tr>
<tr>
<td><strong>SuperModem 2400.</strong> Supra Corp., 1133 Commercial Way, Albany, OR 97321, 503/967-9075.</td>
</tr>
<tr>
<td><strong>Symantec Utilities for Macintosh.</strong> Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014, 408/253-9600.</td>
</tr>
<tr>
<td><strong>Tape 60 Plus.</strong> Relax Technology, 3101 Whipple Rd., #22, Union City, CA 94587, 415/471-6112, 800/848-1313.</td>
</tr>
<tr>
<td><strong>TapeStack.</strong> CMS Enhancements, Inc., 1372 Valencia Ave., Tustin, CA 92680, 714/259-9555.</td>
</tr>
<tr>
<td><strong>TeleNode.</strong> DataSpace Corp., 185 Riviera Dr., Unit 9, Markham, Ontario, Canada L3R 5J6, 416/474-0113, 800/387-0492.</td>
</tr>
<tr>
<td><strong>TG-4000.</strong> Tallgrass Technology, 11100 W. 86th St., Overland Park, KS 66214, 913/492-6002, 800/825-4727.</td>
</tr>
</tbody>
</table>
End Financial Hassles.
Quicken, $49.95

Introducing the fastest, easiest way to do your personal finances and small business books.

Quicken for the Macintosh*

Eliminate Bookkeeping Chores Forever
Quicken is so automatic it does your financial work for you. To pay bills just tell Quicken the amounts. It does 14 automatic bookkeeping steps and hands you the printed checks.

At tax time, Quicken gives you the itemized reports supporting each tax deduction. Need to find a check you wrote months ago? Quicken finds it in 3 seconds flat.

Finish Financial Work in Seconds
Quicken is extremely fast. It does in seconds what used to take minutes or hours.

<table>
<thead>
<tr>
<th>Quicken</th>
<th>$49.95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dollars &amp; Sense*</td>
<td>$14.95</td>
</tr>
<tr>
<td>MacMoney*</td>
<td>$19.95</td>
</tr>
<tr>
<td>Hand Written</td>
<td></td>
</tr>
</tbody>
</table>

No Accounting Hassles
Before Quicken, computerizing your books was difficult, even on a Mac. Accounting jargon, inflexible rules and tedious procedures were standard.

Quicken has changed all that. Like Macintosh, Quicken uses a familiar visual metaphor, a checkbook right on your screen. So there are no strange rules to learn. Absolutely no “debits” No “credits” No “ledgers” No “forced closes” Nothing in your finances changes. Finally there is bookkeeping with the soul of the Mac.

Flexible Enough for Personal or Business Use.
Quicken works for individuals. For service and manufacturing businesses. For doctors, consultants, designers and property managers. For anyone who wants relief from routine bookkeeping hassles.

Order Now and Get Two Free HyperCard* Stacks
- Check Designer—put clip art or logos on your checks.
- Custom Reporter—produce a wide variety of customized financial reports.

Specifications:
- Compatibility: Exports data to SYLK format for use in spreadsheets like Excel®
- Hardware: All Macintosh with 512K RAM. All printers, including laser printers.
- Capacity: Number of bank accounts—unlimited. Number of transactions—unlimited. Number of income/expenditure categories—unlimited. Amounts to $9,999,999.
- Other: Not copy protected.

Try Quicken for 30 days free!

New! Checks for laserprinters. Prints checks on all printers.

I want to try Quicken on your no-risk 30-day guarantee. If I don’t save time, eliminate hassles and get the clearest picture of my finances, I will return it within 30 days for a full refund.

Quicken for Macintosh: $49.95 plus $3.00 shipping and handling. California residents add sales tax.

Call 800-624-8742 (In California call 800-468-8481)
or send this coupon with your check or credit card number to:

Intuit
540 University Avenue
Palo Alto, CA 94301

Name ____________________________

Address __________________________

City____ State____ Zip____

I want to try Quicken on your no-risk 30-day guarantee. If I don’t save time, eliminate hassles and get the clearest picture of my finances, I will return it within 30 days for a full refund.

Quicken for Macintosh: $49.95 plus $3.00 shipping and handling. California residents add sales tax.

Call 800-624-8742 (In California call 800-468-8481)
or send this coupon with your check or credit card number to:

Intuit
540 University Avenue
Palo Alto, CA 94301

I want to try Quicken on your no-risk 30-day guarantee. If I don’t save time, eliminate hassles and get the clearest picture of my finances, I will return it within 30 days for a full refund.

Quicken for Macintosh: $49.95 plus $3.00 shipping and handling. California residents add sales tax.

Call 800-624-8742 (In California call 800-468-8481)
or send this coupon with your check or credit card number to:

Intuit
540 University Avenue
Palo Alto, CA 94301

I want to try Quicken on your no-risk 30-day guarantee. If I don’t save time, eliminate hassles and get the clearest picture of my finances, I will return it within 30 days for a full refund.

Quicken for Macintosh: $49.95 plus $3.00 shipping and handling. California residents add sales tax.

Call 800-624-8742 (In California call 800-468-8481)
or send this coupon with your check or credit card number to:

Intuit
540 University Avenue
Palo Alto, CA 94301

I want to try Quicken on your no-risk 30-day guarantee. If I don’t save time, eliminate hassles and get the clearest picture of my finances, I will return it within 30 days for a full refund.

Quicken for Macintosh: $49.95 plus $3.00 shipping and handling. California residents add sales tax.

Call 800-624-8742 (In California call 800-468-8481)
or send this coupon with your check or credit card number to:

Intuit
540 University Avenue
Palo Alto, CA 94301
**Where to Buy**

**800 The Manhole.** Activision/Mediagenic, 3885 Bohannon Dr, Menlo Park, CA 94025, 415/529-0800.

**801 The Muzzle.** Ergatron, Inc., 1621 E. 79th St, Minneapolis, MN 55420, 612/854-9116, 800/329-9839.

**802 The NightWatch.** Kent Marsh Ltd., 1200 Post Oak Blvd., #210, Houston, TX 77056, 713/623-8618, 800/325-3587.

**803 The Print-Link.** GDT Softworks Inc., 4664 Lougheed Hwy., #188, Burnaby, BC, Canada V5E 0B7, 604/291-9121.

**806 Universal Printer Buffer.** Jonathon Freeman Designs, P.O. Box 880114, San Francisco, CA 94188, 415/822-8451.


**810 WORM-800.** Laser Optical Technology, 1803 Mission St., #403, Santa Cruz, CA 95060, 408/426-7171.

**811 Your Faithful Camel.** The Voyager Company, 2139 Manning Ave., Los Angeles, CA 90025, 213/475-3524.

**812 Zhonghua.** Cathay Europa Trading Company, P.O. Box 599A, Biddeford, ME 04005, 207/967-5358.

Public domain software and shareware are available through online information services: user groups (call 800/538-8696 ext. 500 for information on a local user group); or mail-order clearinghouses such as Budgetbytes (800/355-3551 for orders, 913/271-6022 in Kansas), Educomp (800/843-9497, 619/259-0255 in California), or the Public Domain Exchange (800/351-8125, 408/496-0624 in California).

---

**The next discovery could be yours... on an EARTHWATCH expedition**

Working with volunteers of all ages, help monitor coral reef in Belize... Help survey Inca architecture and landscaping in mountainous Peru... Help an archaeologist survey a newly discovered Maya ceremonial center.

**Dozens of expeditions on six continents**

Right now, over 100 Earthwatch expeditions are being mounted in every scientific discipline, bound for points throughout the world. They'll be led by outstanding people, scientists who need your help. As a team member, you'll be helping to fund the expedition you accompany. You can expect an intense learning experience with a lot of challenges. You'll be taught in the field by professionals. A background in science isn't necessary. You'll learn as you go.

**Join Earthwatch as a member**

As an Earthwatch member, you'll receive a subscription to Earthwatch Magazine, the colorful chronicle of Earthwatch activities throughout the world. It contains descriptions and photos of all the expeditions. You'll also receive the Expedition News, the quarterly report of the latest findings from the field and news of upcoming expeditions.

You don't have to go on an expedition to be an Earthwatch member. But you do have to be an Earthwatch member to go on an expedition.

Don't delay. Whatever your interest, it all begins with membership. Your tax-deductible contribution of $25 will make you a member.

**EARTHWATCH**

(617) 926-8200
Dept. 900 • Box 403 • Watertown, MA 02272

326 November 1988
Our Silentwriter™ LC890 is the first desktop publishing printer that gives you both popular standards for creating graphics and type: true Adobe PostScript® and LaserJet Plus emulation.

That alone would be enough to cause headlines. But we also added many more features to simplify desktop publishing. Like both Apple and IBM compatibility. PC Week stated, "the LC890 is actually better than having both an Apple LaserWriter Plus and an HP LaserJet Plus on your desk." Equally impressed, PC Magazine awarded it an "Editor's Choice." And cited it in their "Best of 1987" issue.

And because the Silentwriter has a simple, trouble-free printing mechanism, it will be creating headlines for years to come. In fact, it's twice as reliable as ordinary lasers, with an average life of 600,000 pages.

If you don't require the power of our LC890, consider the rest of the family. The LC850 for text applications and the LC860 Plus for text and less complex graphics.

To start producing your own headlines, call 1-800-343-4418 (in MA 617-264-8635). We'll send you reprints of all the great reviews and the name of the NECIS dealer nearest you.
# Macworld Best-Sellers

## Business Software

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>33</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>21</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>29</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>19</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

## Education Software

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>21</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>25</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>24</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

## Entertainment Software

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>25</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>21</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

## Networking/Data Communications

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>25</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

## Hard Disks

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

## Add-in Boards

<table>
<thead>
<tr>
<th>Months on chart</th>
<th>Last month</th>
<th>This month</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

## Product Watch

Editors' choice: Other recent or forthcoming products of particular interest.

- **HyperScan** *Apple Computer scanner software*
- **Mathematica** *Wolfram Research math analysis software*
- **PhotoMac** *Avalon Development Group color image processing program*

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order suppliers. Covers sales during July 1988.

*Does not include hard disks installed at the factory.*
Our users love WriteNow—a claim our competition can’t easily make for their products.

How do we know? Because our users tell us—on registration cards, on the telephone, on bulletin boards, and in letters.

We’ve heard dramatic stories about how WriteNow has significantly reduced training and support costs. And how clean, fast, and enjoyable it is to use. And how WriteNow got the job done when our competition sputtered.

You see, at T/Maker we feel a great word processor is more than just a stockpile of features. It’s the usability of those features—how easy they are to learn and use, and how they feel under your fingertips when doing real work. And from their overwhelmingly terrific response, it’s clear our users agree.

WriteNow 2.0 is the user’s choice for best Macintosh word processor—and we’ll show anyone our customer registration cards to prove it!
10 reasons why you should switch to
New Turbo Mouse.

1. Fly across even the biggest screen with automatic acceleration. Turbo Mouse® senses the speed at which you're working and moves the cursor further when you move faster.

2. No rolling room required. With the Turbo mouse ball on top, you move only the ball, not the whole mouse.

3. Three times as precise as a mouse. New patented "optical levering" technology offers 200 CPI pin-point precision.

4. One button is for regular clicking, the other is a click lock. You choose which is which.

5. Advanced two-button design allows for either right or left-handed use!

6. Only 4" by 6", Turbo Mouse fits neatly beside any Macintosh® or Apple IIgs® keyboard.

7. Turbo Mouse offers a second mouse port. Turbo Mouse ADB offers a second ADB port.

8. Perform one of seven functions—Save, Print, Open, Close, New, Quit, or Undo when you click both buttons at once. (Only in Turbo Mouse ADB.)

9. Turbo Mouse ADB, #6236C, works with Mac SE, Mac II, or Apple IIgs. Turbo Mouse, #62358, works with Mac or Mac Plus. Both have a suggested retail of $169.95.

10. It's easy to find. For a Turbo Mouse dealer near you, just call 1-800-535-4242, or 212-475-5200. Circle 192 on reader service card.

© 1988 Kensington Microware Ltd.