Special: MAC CLONES

After 7 years Apple has competition for the Mac, page 116
The largest word history got there
When we introduced Microsoft Word six years ago, we weren't planning on making history.

We had just one goal, and a fairly simple one at that: to make a word processor that suited people's needs.

Then again, we knew that the people we wanted to suit were a wildly diverse, independent lot: Mac® users. So it made sense to let them tell us exactly what to put into Word.

Which they did.

First, there were some folks who didn't like tabbing much. Fair enough. For them, we developed Tables—an easier way to set up side-by-side paragraphs, columns of numbers, even forms. No tabs. No hassle.

Then we heard from a few more people. "Love the Tables gig," they said. "Now, about this text-numbers-graphics combo all in one document..."

We made that simple with "warm links." Once you've linked Microsoft Excel data to a document, keeping that document updated with the latest Microsoft Excel figures is easy. Just click your mouse.

Then there were those senders of mail, who didn't want to click-click-click-click-click.

So we built support for Microsoft Mail right into Word. Now, with just a click, everyone stays in the loop. And work in progress stays in progress.

As it happens, listening to what Mac users want is a pretty good way to design software.

How else can we explain Word version 4.0 being the most popular word processor in Mac history?

And those cards and letters are still coming. "Listen," someone'll say. "In case you're working on the next Word..."

Which we are. In fact, if you've got some input for us, feel free to drop us a line. Or if you'd like to find out more about Word, call us at (800) 541-1261, Department N24.

Our goal is still simple: to make Word the best word processor around. With the latest technology—translated into human terms, of course.

After all, we're only making history because we make word processors the way you like 'em.
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If all goes as planned by one adventurous company, we may soon be seeing a slew of Mac-compatibles. For insight into the technological and legal issues involved, see page 116.

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Apple Decides to Ship Backlit Portable

Apple has solved the memory-addressing problems that delayed the backlit-LCD version of the Macintosh Portable and will announce and ship the machine soon, an Apple representative said. The backlit Portable will replace the existing version, will cost about $1800 less, and will be able to address 8MB of RAM and work with third-party RAM boards. A model with 2MB of RAM and an internal 40MB hard drive will list for $4199, while a model with 4MB of RAM and the same hard drive will list for $4699. Apple will charge owners of the original Mac Portable about $1050 to add the backlighting feature to their machines if they choose to upgrade.

No Market for Lotus MarketPlace

Saying that Lotus MarketPlace is "at the apex of an emotional firestorm of public concern about consumer privacy," Lotus president Jim Manzi announced plans to cancel publication of CD ROMs containing marketing information about 120 million U.S. consumers, and to discontinue a similar database of marketing information about 7 million U.S. businesses. The MarketPlace information was to be supplied by Equifax and TRW, two large credit bureaus that compile and sell information on businesses and consumers to private companies.

Apple Seeks FCC Approval for Radio Networks

Apple has filed a petition with the Federal Communications Commission asking it to allocate a part of the radio spectrum for high-speed computer communications. If this is approved, Macs could soon be using radio waves—instead of wire-based networks—to communicate.

Radius, Fusion Introduce 68040-Based Accelerators

With Motorola finally shipping production quantities of its 68040 microprocessors, several vendors have announced accelerators using the new chip. Radius recently demonstrated a prototype 68040 accelerator for NuBus Macs and said it expects to announce a final version in the first quarter of 1991. The accelerator is designed to work with Radius's line of graphics products, integrating with its existing calibration, compression, and image-capture offerings. The price, ship date, and name of the product were not set at press time. Also, Fusion Data Systems announced the TokaMac LC, a 68040 accelerator that fits in the Processor Direct Slot of the Macintosh LC. Fusion is planning versions for the IIsi, the IIfi, and the SE/30. The TokaMac LC lists for $2995 and was slated to ship in late February. For more information, contact Radius at 408/434-1010, or Fusion's distributor, Quantum Leap Systems, at 619/457-0781.

At the ACIUS Supermarket

ACIUS has grown from a one-product shop to one-stop shopping. Hard on the heels of 4DWrite, 4DCalc, and other 4th Dimension add-ons, ACIUS has announced a database server that it claims runs 30 to 100 times faster than multituser 4D. Several people can modify a database structure simultaneously, even while clients are changing the database's contents. 4D Server has features common on minicomputers, such as priority levels for clients. ACIUS is also developing a tool kit for using MacroMind Director, RadiusTV, Bright Star's InterFACE, and several other multimedia products inside 4D, and externals to communicate with Northern Telecom digital telephone switches. Pricing was not set at press time. For more information, contact ACIUS at 408/252-4444.

The Color of Control

Astral Development's first Mac product, the gray-scale image editing package Picture Publisher, emphasizes scanner and output-device calibration, even providing calibrator strips to scan in and output files to test with a densitometer. Astral's next product for the Mac, Picture Publisher Plus, is a color photo-editing package that will support color separation, blends, color masking, transparency, and other features appropriate for 32-bit color. It will provide tools for calibrating color scanners, and controls for four-color printing, including undercover removal, gray-component boost, and dot gain and ink-contamination settings. Picture Publisher lists for $295, and Plus will list for $695 or $795. Astral Development is at 603/452-6800.

Oracle Does Buttons

Oracle has licensed the HyperCard work-alike Plus from Spinnaker Software to incorporate in Oracle Card, a point-and-click application-development system and front end to Oracle servers. Oracle Card will support standard Plus features such as color picture fields, buttons that trigger scripts, and

(continues)
XCMDs. Macintosh and Windows versions, which can share Oracle Card applications, will list for $299 (documentation for programmers will cost extra); Oracle plans to develop a similar product for OS/2, OpenLook, Motif, and Nextstep. For more information, call Oracle at 415/506-7000.

New Master for the Finder
Tactic Software is launching its first home-grown product, MasterFinder, which combines most features of DiskTop, On Cue, and HandOff. It can search for files by name, type and creator, and so on, and you can batch-catalog volumes and search them when they are offline. It can show four open volumes or folders in side-by-side scrolling windows, so you can move files around easily, and it can show an outline of all nodes on a network, even across bridges. You can assign frequently used folders or files to a launch menu, and specify an application to open files that were created by an application you don’t have. MasterFinder comes in both DA and application form and lists for $99. For more information, contact Tactic at 305/378-4110.

New Vitamins for Virex
Virex 3.0 users can key in codes supplied by Microcom each time a new virus is discovered, to update the utility’s detection capability. With previous versions you had to wait for Microcom to ship an update. Version 3.0’s INIT can now repair as well as detect virus-affected files, and the new version can batch-search folders and ignore nonexecutable files. Virex 3.0 lists for $99.95. For more information, contact Microcom at 919/490-1277.

Worlds of Information
Educational software developer PC Globe is preparing Mac USA, a collection of demographic, economic, and many other kinds of information about the United States that does simple thematic mapping and bar charting. For example, you could chart average income in all the major cities in Texas, or create a colored map showing percent of voter turnout in the last election. Mac USA will list for $69. Future products will have data and maps for the whole world and provide a way to add your own data to the database. For more information, contact PC Globe at 602/730-9000.

Reset Preferences
Preferred Software appears to be emerging from its time of trouble, after passing through two management purges. Preferred still publishes Database, Vantage, Exposure (now Exposure Pro), and several other products, and is working on new products. FlashCrypt is intended to be a convenient, high-speed encryption tool. DoubleTalk is a full-featured telecommunications program with a scripting language. DoubleTalk can be used to build a BBS, can be driven from inside HyperCard, and has a proprietary Zmodem protocol that Preferred claims is faster than standard Zmodem. Later, DoubleTalk will have a run-time and a Windows version, and support modemless communications over Ethernet (and maybe AppleTalk); the modemless version could be a platform to build an electronic-mail package on. DoubleTalk 1.1 is shipping now at $149.95 ($249.95 for two copies). Pricing and ship dates for FlashCrypt and later versions of DoubleTalk have not been set. For more information, call Preferred at 901/683-3383.

16-ppm Kodak Printer Is Also a Copier
Eastman Kodak has begun shipping the Ektaplus 7016PS, a network printer that produces 16 pages per minute and can double as a 6-ppm convenience copier. The printer can also connect to as many as four networks. The Ektaplus 7016PS comes with one serial and one parallel port but can be upgraded to four ports, including a LocalTalk connector. It comes with a PostScript controller with 4MB of RAM and also includes IBM Proprietary, HP-PCL, HP-GL, and Epson and Diablo printer emulations. The Ektaplus 7016PS lists for $6995. For more information, contact Kodak at 800/344-0006.

NEC Ships Monitor with Reduced Magnetic Fields
NEC Technologies is offering a 14-inch color monitor designed to reduce the emission of possibly hazardous VLF and ELF magnetic fields. The NEC MultiSync 3DS works with a wide variety of personal computers, including the Mac II series. The monitor’s design includes extra shielding, a cancellation yoke, and grounding wires to reduce the magnetic fields. Its suggested retail price is $1099. For more information, call NEC at 708/860-9500.

The Virtual Vise
SuperDisk, from new kid on the block Alysis, automatically compresses files every time you save to fit more files on a hard disk with no loss of data. SuperDisk is an INIT-cdev combo that compresses any file or the contents of any folder or volume that has .s following the name, and it has optional password-protection as well. Alysis claims that SuperDisk will run about four to five times faster than DiskDoubler, and about as fast as hardware-based DoubleUp. SuperDisk will list for $89. For more information, contact Alysis at 415/566-2263.

Macintosh LC Supports VGA Monitors
Apple recently revealed that the Macintosh LC can support the VGA monitors common in the IBM PC market, giving users access to less expensive color displays of somewhat lower than Macintosh quality. Apple said that the LC supports the VGA standard’s different scan rate and that the only requirement is a cable specifically designed to make the connection. Apple said it expects such cables to be available from third-party vendors.
Another new model year. And Canvas is still miles ahead. Lucky you. With brand new models of both the world's top-ranked drawing programs to choose from. Simultaneously.

And MacDraw® Pro isn't a bad try. In fact, it reminds us of another drawing program we've always had the utmost respect for: Canvas 2.1. Unfortunately for Claris, our new Canvas 3.0 includes enough major enhancements to leave their latest effort idling somewhere back in the dust. Again.

Let's take a look under the hoods. Canvas 3.0 gives you more high-end text handling features. Like binding to curves. Stretched margins. Text-wrapping outside — and/or inside—irregular objects, and full kerning & tracking control. Even conversion of PostScript® Type 1 fonts to customizable Bézier outlines.

MacDraw Pro doesn't.

Canvas 3.0 gives you more technical drawing features. Like custom dynamic hatching. Custom parallel lines & curves. Custom dashed lines. curves & borders. Automatic dimension lines. Area & perimeter calculations. And a Smart Mouse™ drawing aid.

MacDraw Pro doesn't.

Canvas 3.0 gives you more design/illustration features. Including unparalleled Bézier curve editing power—from multi-point selection & editing to automatic object conversion, combining and blending. Magnetic guidelines. Center line auto tracing of scanned images. And full bitmap editing in 24-bit color.

MacDraw Pro doesn't.

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Okay, get ready. This is it.
Imagine if you could interview a customer on your own camcorder. Then cut to, say, a product shot. Overlay some animated text. Add a voiceover or maybe some background music.
And then, as if that weren't enough, print it all to videotape so you could show it on any VCR. Sound good so far? It should.

It's what we call Desktop Video Publishing. And it's now possible with MediaMaker. The first software that lets you produce a video as easily as you publish a page.
For starters, MediaMaker pulls together all the different media you've chosen. Like graphics, Mac sounds, CD audio, animation and video clips. Then lays out all these elements over time.
so you can be sure everything is in sync.
And last, but definitely not least, prints your whole creation to videotape.
Note again the word videotape. Never before has it been possible to print to video. To actually create a walking and talking sales brochure. Or educational guide. Or training manual.

All humility aside, we think it's the next revolution in desktop communication.
Call 800-266-0909 for a MediaMaker videotape, demo disk, or dealer nearest you.
Plan to be amazed. After all, revolutions like this don't come along every day.

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Circle 22 on reader service card
MacInTax... the best selling tax product for the Macintosh.

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- Now with Forms Guide, a step-by-step interview that leads you to the specific tax forms that apply to you.
- Graphic tax forms on screen eliminate confusion and minimize learning time.
- Display and access multiple forms on screen — simultaneously. Watch instant calculations and linking between forms, and work just like you would at your desktop.
- Reach complete IRS instructions and helpful tax hints by double clicking the mouse on any line item.
- Completeness Checking and Auto-Find functions direct you to errors, missing information and estimates — for correction prior to final submission.

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For information, call: 1-800-622-6829.

All forms shown above were printed using MacInTax. No other tax preparation program can do this!

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Macworld Expo '91

World's Largest Computer Flea Market

BY JERRY BORRELL

For a week last January, San Francisco had the feeling of the world's largest computer flea market. Not since the heyday of Jim Warren's Computer Faire (where Steve and Steve first introduced the Apple 1 to the public) has the City by the Bay been so dominated by one event.

There was no sign of an economic recession at the exposition as visitors thronged the two major exhibit halls, gawking at the latest products and purchasing enough computer equipment to outfit a small city. Throughout the four days there were lines at Dr. Mac, ComputerWare, Educorp, Computer Selection, and at other booths where Mac products were actually sold. And no wonder—at ComputerWare you could buy a 100MB hard drive for $699, a 195MB model for $999, Adobe Photoshop for $475, T/Maker's SmartBundle for $199.

A festive atmosphere prevailed. People waddled out with shopping bags full of products. Marketeers barked carnival style at passersby. Microsoft cheerleaders had visitors chanting enthusiastically for product giveaways. Several companies offered product training to groups of attendees on the show floor. There were even some Classics and LCs in evidence. Developers forgot to curse the exposition's organizers. And Apple, once the center of the Macworld exhibits, seemed lost in the crowd of developers seeking to support the Macintosh. More people than we have ever seen at a Macworld.

Video Products Lead

Announcements made in San Francisco, and those that will precede the August Macworld Expo, show that video is taking a dramatic lead in cutting-edge technology for the Macintosh. Light Source demonstrated its video editing system. Electric Image was showing software (now shipping after kicking around for a couple of years) that's designed to do titling in 3-D for video. Digital E/X announced its intention to produce a software-only version of its award-winning video software. Bravo—selling turnkey systems for more than $20,000 is antithetical to current Mac trends.

SuperMac showed SuperSqueeze, video compression based upon the C-Cube Microsystems microprocessor. E-Machines also announced real-time compression-decompression. A host of smaller developers, led by Commotion, challenged larger companies' leadership in this area with software that accomplishes the same result without a hardware assist. Apple was mum about its video software but demonstrated a Sony product with a built-in video interface that hinted at a future relationship in the video product arena. RasterOps pushed its technology further by introducing a $1000 24-bit board with acceleration and video overlay. The old pioneer, Mass Microsystems, introduced a 24-bit video overlay board with a really neat interface, but one that's a little behind the technology of products from RasterOps and Radius.

RasterOps also stole SuperMac's thunder by showing a wall of Barco display monitors organized to act individually or to work together in monolithic, single-display fashion. The first shipping products to expand the display capacity of the LC, Classic, and si were shown. Lapis, Mirror, and Ehnau had monochrome displays for the Classic. NEC offered a color display for the si. RasterOps, in another first, had a 24-bit board with built-in acceleration for the si—a real problem, given that machine's poor power supply. Radius offered a connection for the Pivot monitor to the LC, but no two-page displays for the newest Macs. SuperMac showed its 8-bit processor direct slot-based board.

Dynamac showed a flat panel LCD screen for the si that, for some, makes that computer a portable (so did John Sculley, in a cheap shot at his own portable). In Focus Systems showed its latest LCD for overhead projectors.

Vertical Markets

One of the subtle but rewarding aspects of the show was the richness of products—the breadth of the offerings (continues)
SIX REASONS WHY LA CIE HARD DRIVES ARE THE BEST YOU CAN BUY.

1. A Quantum Difference.

Quantum drive mechanisms offer blazing-fast effective access time as low as 8 milliseconds.* No other drive mechanisms in their class (Mac® compatible) run faster, which is why they are in La Cie drives.

*Typical application access time using 64KB DisCache®

**Seagate drive mechanisms also available (capacities from 300MB to 1.2GB).
Software with a Silverlining.

Every La Cie drive includes a FREE copy of Silverlining, the #1-rated hard drive management utilities program. Silverlining drivers can get 30% more speed from a drive than the competition. It works with any drive in your system, internal or external. So one program can manage it all. Plus, Silverlining optimizes your data so it's consecutive on your drive, which makes your applications run faster.

And, Silverlining drivers are intelligent. They test the drives' functionality at startup to ensure that everything is working properly. If it's not, it protects you.

For even more protection, every La Cie drive includes a FREE copy of Norton Utilities for the Macintosh. It automatically diagnoses, reports and repairs common and dangerous disk problems. Silverlining and Norton Utilities are regularly priced at $149 each. So, you get software worth almost $300—ABSOLUTELY FREE—when you buy a La Cie drive!

A Company You Can Count On.

La Cie is a Plus Development Company (makers of the Hardcard XL), backed by $400 million in assets. That means you can trust La Cie to provide a constant source of high-quality mechanisms and components. And you can be certain that we'll be around to help you with service and support. For a long, long time.

The Most Unusual Warranty in the Business.

La Cie features a RENEWABLE 2-YEAR LIMITED WARRANTY. If anything goes wrong with your La Cie Quantum drive within two years, we'll repair or replace it within 48 hours—and then renew your warranty for another 2 years. Free of charge!

Every La Cie drive is backed by toll-free support from customer service and technical assistance experts.

+Restrictions apply. Please contact La Cie for complete warranty information.

Award-Winning Design.

Hard drives that win design awards? Who says intelligence has to be ugly? The Tsunami and Cirrus hard drives have received prestigious awards from both the industrial design and computer communities.

La Cie drives are designed from the inside out. Designed to be quiet (with a ½ speed fan), lightweight (as light as 2½ lbs.), durable and reliable. Plus, they have an external termination switch, which means you'll never have to open the case for any reason! You don't win awards for these features, but you do win a loyal following.

Rave Reviews from Critics and Customers.

Frankly, there's been a lot of talk about La Cie hard drives. Leading Macintosh consumer magazines praise us. Customers write us fan letters. In fact, we're happy to let critics and customers have the last word about La Cie drives. Because they tend to be words like these:

"...the cream of the crop."—Macworld
"Of all the drives tested we recommend La Cie's drive."—MacUser
"This is an excellent drive and Silverlining is great!"—D. Jordan Burbank, CA

La Cie offers internal and external hard drives from 40MB to 1.2 Gigabytes. Choose from the award-winning Tsunami, Cirrus, and ZFF family of drives. Plus, La Cie now offers the Backet, a hard drive that attaches directly to the back of a Macintosh Plus or SE.

To order or for more information, call toll-free 800-999-0143, ext. 45

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COMMENTARY

in vertical markets. On Technology and ASD Software showed multiuser calendaring products that work over networks that are the first generation of System 7.0-related products. Mitch Kapor’s (On) product looks like a real hit. Paytron and PMC Telescyns had new versions of their single-user calendars (CalenDar, Rendezvous Plus) while Pastel Development showed a new calendar cum database (Manager).

Ethernet Products Proliferate
A reflection of the fact that almost all networked Macintosh users are beginning to suffer from network slowdowns is that many companies offered Ethernet connections to AppleTalk, including National Semiconductor, Asanté, Tri-Data (with some of the first third-party Ethernet boards for the si and LC), Shiva, Dove, Everex, Dayna, and Cayman. These companies rightfully divine that users are demanding more from a network, even if it is only an improvement in printing and sharing electronic mail.

And speaking of mail, Microsoft took the lead at the show with a new version of Microsoft Mail that recaptures some ground from QuickMail and adds a host of network-analysis features rivaled only by Farallon (in the LocalTalk world).

I also saw two new network-analysis products for LocalTalk: LocalPeek from The AG Group and Network SuperVisor from CSG Technologies. A related product from Pharos Technologies is Status Mac, a software product that enables a network administrator to check, for example, all the version numbers of applications on those machines. It’s really useful.

A lot of companies—Orchid, Dove, and Cypress Research, for example—are still trying to overcome the prejudice left in the market by Apple’s faulty entry into desktop fax (and subsequent abandonment of its product).

Accelerators Aplenty
Now that we have Macs with 68030s, naturally some people will want to have Motorola’s just-shipping 68040 processor. Radius, Quantum Leap Systems, and Total Systems are glad to oblige. Additional accelerators were shown by Newer Technology (RAM disks, caches), Acco (a SCSI II accelerator for overworked printers and scanners), Rodime, and others.

Laser and Color Printers
It’s clear from the show that the price for color and PostScript is now $9995 or less. QMS, Seiko (showing products with both A- and B-size output), Tektronix, Lasergraphics, General Parametrics, and CalComp all have such offerings. Seiko’s product, at the lowest price, is reported to be back-ordered for several months. Kodak showed a 35mm-quality thermal printer for $25,000.

Prices have also tumbled for laser printers. Printers offering better speed
Survival of the fittest.

Which color scanner is the natural selection?

When it comes to selecting the right scanner, be forewarned. It's a jungle out there. You may not get the quality you were promised.

The La Cie Silverscanner has evolved beyond all that. Just look at this comparison between the Microtek 300ZS and the La Cie Silverscanner. Each image was scanned at default settings with no corrections. This entire ad was then created and separated using Adobe Photoshop, QuarkXPress 3.0 and a Linotronic 330.

As you can see, Silverscanner is a more advanced species of scanner which provides superior color, gray scale and line art over other similar scanners. La Cie gives you more with OCR compatibility, fast color previews, versatile scanning controls, and up to 1200 dpi.

As a bonus, Adobe Photoshop Limited Edition, Aldus PrePrint and La Cie's exclusive plug-in scanning modules are included FREE with every Silverscanner purchase.

Now you can let your imagination run wild. At a very conservative price. Because Tektronix introduces the first color printer that is PostScript-compatible for less than $5000.

The Phaser II SX is great for individuals or small groups. It works with Windows 3.0 or Macintosh QuickDraw and is software-based PostScript-compatible. It also delivers brilliant 300 dpi thermal-wax color as only Tektronix printers can.

For bigger businesses, we offer the new Phaser II PX. This printer is hardware-based PostScript-compatible with HP-GL and is licensed by Pantone, Inc®. It also works with Macs, PCs, and UNIX workstations. All at once.

Now, say you buy an SX, your business grows, and you end up wishing you'd gotten the PX. No
need to worry because all Tektronix printers are upgradable so you'll never outgrow them.

And in case you didn't notice, this entire ad was created by one of our printers. That includes the brilliant graphics you see above and the crisp type you're reading now. Because we have so much faith in our color printers, we let them do their own ads. No one else can make a statement this bold.

Printout for printout, ad for ad, you won't find a better color printer. Call 1-800-835-6100, Dept. 13C for more information. The rest is up to you.

Tektronix
The best and the brightest.
and B-size output were announced by several companies, including Laser-Max and QMS. Dataproducts has a new product in the wings.

Input of Color Images
Howtek and Kodak showed reworked models of their 35mm scanners, while Abaton, Umax, XRS, and Howtek had new color flatbed scanners. Nisca showed a small color scanner similar to the small Sharp scanner. Koala announced new technology for video-camera input via the SCSI port. Trufel has a new owner and a simplified product line.

Utilities
Capture from Mainstay is now in release 4.0 (saves TIFF files). MarkUp (also from Mainstay) with voice annotation is soon to ship. DiskExpress II, from AllSoft, is out. Aladdin Systems has brought out a new version of StuffIt Deluxe. Affinity Microsystems announced Tempo II+, and Central Point Software announced a new version of MacTools Deluxe.

CAD
Despite the somewhat disastrous experience of both Autodesk and VersaCAD Corporation in the Mac market (and their absence from the show), other companies continue to forge ahead. In architectural CAD, Graphisoft has taken a strong lead in the United States. There’s a new version of Innovative Data Design’s MacDraft. Schlumberger’s MacBravo looks ever better. VDI’s Presenter Professional makes Pixar’s MacRenderMan rendering routines easily usable—a boon to all of us who would like to make use of RenderMan’s exquisite rendering techniques.

Virtus showed 3-D modeling software aimed at architectural markets. DesignCAD, GraphSoft, and Engineered Software presented new versions of their CAD products. Moda-CAD was showing a stereo 3-D version of its product for garment fabrication and design.

3-D Design
Swivel 3-D Professional 2.0 has become the dominant 3-D product for the Mac. Byte by Byte’s Sculpt 3D, a perennial favorite (and nonshipping product) of mine at trade shows, is finally shipping at the price of (gah!) $2500. Levo has been sitting on a 3-D modeler written by Duane Maxwell for too long—there is a question as to whether that company will be able to publish the product. Specular International officially announced Infini-D, a 3-D modeler.

Paint, Draw, Illustration
PixelPaint Professional 2.0, the leader in the color paint market, has suffered in market share due to competition from Adobe Photoshop and has new competitors in Strata’s StrataVision and Electronic Arts’ Studio32. PixelPaint 2.1 is now shipping and with a lower price. Time Arts’ Oasis paint (continues)
I take extra pride in every drive that leaves our shipping dock because it carries the Ehman name. And because of that little extra dedication, what started in my garage six years ago, has mushroomed into the largest third party producer of Macintosh mass storage.

Today I honestly believe no one makes a better hard drive than Ehman. Our newest E-series products have all the “bells and whistles” of drives costing several hundred dollars more. Features like two extra power outlets for single switch, system bootup and dual fuse circuitry for added protection in the event of an electrical power surge.

Ehman drives are fast and quiet, but it’s our commitment to your total satisfaction that separates us from the pack. All our drives come with a 30 day money back guarantee and a two year limited warranty as well as my own personal commitment to giving Ehman customers the best. If you’re not happy with an Ehman drive I want to hear from you and I’ll make it right.

After all it’s not just a hard drive you’re getting, it’s an Ehman.
program for the Mac was downplayed at the show but is apparently shipping.

Deneba’s Canvas, which has taken over the realm of SuperPaint and MacDraw, was shown in version 3.0, a great improvement. Claris announced MacDraw Pro, with many new features, intended to retake its traditional market. MediaLab Technologies announced PictureAccess, which the company says competes effectively with Photoshop and has unique features, such as compression and communications functions.

Animation

FilmMaker, the French product at last brought to the U.S. market by Paramax, is the leader on the Macintosh. Two other animation entries were at the show: Motion Works’ AddMotion for HyperCard users, and Gold Disk’s Animation Works, a more powerful general-purpose animation package.

Image Compression

There is a race between several vendors for image-compression products. Storm Technology has a software-hardware combination that leads the available solutions. But if Radius succeeds with its ImpressIt software-only product, Storm may suffer the usual slings of a pioneer. Pinnacle Micro was also showing a hardware compression/decompression board, but no software interface. Kodak showed ColorSqueeze, another software image-compression product.

One of the greatest problems we have is how to access the various types of graphics files. Computer Friends and Radius both have software that works with their hardware systems that present viewers of various file formats with thumbnail-size representations of files, software that should be rewritten as stand-alone applications. Alternatively, Adobe should write this ability into the next version of Photoshop. Symmetry demonstrated Mariah, a picture database with a similar capability, off the show floor.

Games

My picks of the show include Vette (driving at high speed through 3-D representations of the streets of San Francisco) from Spectrum HoloByte;
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How to Master 20 Popular Macintosh Programs Without Ever Reading The Manuals

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Over the past four years I've been associated with over 50,000 people attempting to learn the Macintosh computer. I've watched as each person wages their own personal, private battle to master the computer and the most popular Macintosh programs.

I've seen their frustration, have empathized with their confusion, and understood their computer fears. I've talked to workers who have had new computers and new programs simply dropped on their desk with the directive to, "learn this." I've listened to people who have struggled night after night trying to read and understand a computer manual. Can you imagine trying to understand and master 4th Dimension from the manual?

You would be surprised at the number of people who have confided with me the fact that they've literally given up ever learning some of the programs. They simply put the box on the shelf and wrote the expenditure off as a bad investment.

Hard Earned Money Wasted

Can you imagine how much money has been wasted on programs and computers that are sitting abandoned? Right now think of the people working on Macs in your office. Do they really understand the machine? Do they know what to do when it goes down? How many programs are each of your people using? Have they really mastered the programs they're using? Do they know the short-cuts and valuable techniques that will save you time, money, and increase your professionalism?

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Four years ago I founded MacAcademy. My purpose was to create a training organization that provided training similar in nature to the Macintosh itself - simple, easy to use, and effective.

Now, four years later the concept has proven to be a great success. Right now people are benefitting from MacAcademy training in over 100 cities in the U.S., in Canada, Great Britain, Australia, Japan, Hong Kong, and 22 additional countries throughout the world.

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Call (800) 755-8277 or write for our free twenty-page brochure or to place your order. Each of our end-of-day programs costs $599, any two $999, any three $1399, any four $1699, any five $1999 or all six for just $2399.

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Riddler from Threshold Publishing for the toddler with a yen to compute; Tesseract from Inline Design for those addicted to geometric puzzles on the Mac; and SpaceShip Warlock, a CD game from Mike Scenz. (Just buy this disk, will you? Let's all support Mike so that he can develop the masterpiece that is simmering away in his active imagination.) Also a new CD ROM version of Cosmic Osmo, with about 100MB of new stuff and planets from Mediagenic. PC Globe, a PC software company, was showing early versions of mapping and educational games for the Mac that have great promise.

**CD Authoring**

Meridian Data announced a Mac-based CD ROM mastering system for about $30,000, while Authorware has a new version of its authoring software in the works. Highlighted Data, producer of several works on CD ROM, is shipping a new CD ROM disc called Who Owns What, a guide to ownership of rights to movies and video for the current century. As far as laser discs go, The Voyager Company, Robert Stein's hobby and working concern, launched four new discs: on Eadweard Muybridge, Igor Stravinsky (CD ROM only), Michelangelo, and the Louvre.

**Desktop Publishing**

Aldus has finally published Silicon Beach's Personal Press software. Timeworks has a new version of Publish It called Publish It Easy, which competes with Personal Press and has a richer feature set at a lower price.

Aldus has recognized the speed problems of PageMaker 4.0 and is preparing a faster version. Ventura Publisher Macintosh Edition is at last last shipping, and Frame Technology told me about an update to FrameMaker 2.0 for the Mac.

QuarkXPress, the spoiler for Aldus, has increased its competitive drive and is actively taking PageMaker market share. Letraset, jammed into a tiny booth, drew crowds of faithful users to see its Studio line of products, with ColorStudio the most successful. The company has reorganized yet again and announced its firm intent to support the Macintosh. An
The Typist works just like your very own personal assistant. One capable of typing 500 words per minute. That includes any text or numbers, no matter what style font, font size or column format.

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There's nothing we like better than seeing some old friends get the recognition they deserve. Which is the way we feel about all the honorable mentions and winners of the 6th annual MacUser Editors' Choice (Eddy) Awards. So this month, to highlight their achievement, we're featuring plenty of Eddy (Eddy) award winners and Eddy Honorable Mentions (Eddy H.M.) along with our other winning products.

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The majority of products we carry are offered under a 30 or 60 day Money Back Guarantee. The companies participating in this program are highlighted in red. If you are not satisfied with your purchase of any of these products, call us for an authorization and return it within all of the original packaging within the guarantee period for a refund check (or credit on your credit card). We reserve the right to limit quantities on such returns.

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5882 Payroll 4.5 $175.
5833 MultiLedger 1.3 $235.

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4700 BigThesaurus 1.0 $64.
1768 Coach Professional 3.1 $124.

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Franklin Software ... 30 day MBG
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Informix
4955 Wingz 1.1A $245.

Intuit ... 30 day MBG
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8941 Topdown 2.1 $219.

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6964 Correct Grammar 2.0 $55.

MainStay ... 30 day MBG
7718 MacFlow 3.5 $169.
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2796 Managing Your Money 4.0 $135.

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7820 Random House Encyclopedia $68.

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2884 Works 2.00C $179.
4969 Word 4.0B $245.
2865 Excel 2.2A $245.
5454 The Microsoft Office $525.

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8010 EndNote Plus 1.0 $145.

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4228 For the Record 2.0 $31.
2381 WillMaker 4.0 (not valid in LA) $37.
Dick, and Fred

FontMonger

FontMonger ... 30 day MBG
8878 FontMonger 1.0—Converts type formats between PostScript Type 1 (for use in Adobe Type Manager), Type 3 & TrueType (for System 7.0). Generates customized typefaces & characters such as obliques, fractions & small caps . . . $63.

FontMonger

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Satori Software
3320 Bulkhailer 3.25 ............ 75.
Sensible Software ... 30 day MBG
3375 Sensible Grammar 1.5 .... 51.
Shana ... 30 day MBG
8810 Informer Manager 1.0 ... 99.
8922 Designer v. 1.0, 4 ....... 159.
Stdream Int'l ... 30 day MBG
8175 HyperTax Tutor 1.0 ...... 62.
8279 HyperTax Tutor/Mac/In Tax Bundle ... 39.
Softstream/BLOC ... 30 day MBG
7269 Accountant, Inc. 2.0 ... 345.
Eddy H.M. - Best Financial Management

Softview
3470 MacInTax Personal Edition 1990 ... 59.

Software Discoveries ... 30 day MBG
6118 Recordkeeper Plus 3.1 ... 85.
Survivor Software ... 30 day MBG
3269 MacMoney 3.5 ... 59.

Symantec ... 30 day MBG
3422 More 3.0 ... 265.
Eddy - Best Presentation Product

Symmetry ... 30 day MBG
6009 KeyPlanner 1.0 ... 243.
Synergy ... 30 day MBG
6617 KaleidesGraph 2.1 ... 145.

SYSTAT, Inc. ... 30 day MBG
7410 SYSTAT 5.1 ... 599.

Teileware ... 30 day MBG
7616 M.Y.O.B. 3.0 ... 145.

Timeslips II Accounting Link 1.0 ... 52.
2998 Timeslips III 2.0 ... 195.

T/Maker ... 30 day MBG
3639 WriteNow 2.2A/Grammatik Mac ... 117.
8206 SmartBundle ... 215.

WordPerfect ... 30 day MBG
3600 WordPerfect Mac 2.0 ... 279.

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Abbott Systems ... 30 day MBG
8052 Cheshire 1.0 ... 63.
Eddy H.M. - Best Utility
Adobe Systems
Adobe Type Library (Vol. 1-184) ... call
6957 Adobe Type Reunion 1.0 ... 38.
5750 Adobe Type Manager 2.0 ... 55.
8794 Adobe Type On Call ... 59.
6053 Adobe Plus Pack ... 109.
6156 Adobe Plus Pack/ATM ... 159.
6998 Adobe ATM/TypeAlign Pack ... 89.
8042 Adobe Type Sets 1-2-3 Bundle ... 199.
8171 Adobe Illustrator 3.0 (w/ATM) ... 349.
Eddy H.M. - Best Graphics Program
6644 Adobe Photoshop 1.07 ... 499.
Eddy - Software Product of the Year
5001 StreamLine 2.0 ... 125.
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Aldus/Silicon Beach ... 30 day MBG
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3506 SuperPaint 2.0A ... 135.
8611 SuperPaint/Personal Press Bundle ... 279.
3980 Digital Darkroom 2.0 ... 259.
3507 Super3D 2.0 ... 279.
7068 PageMaker 4.0 ... 499.
8053 Design Team (PM, FH & PrePrint) ... 889.
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5425 Art Importer 2.0 ... 89.
6499 Metamorphosis 1.5 ... 89.
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7784 Color MacCheese 1.05 ... 57.

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8881 Thunders 7-A truly interactive spelling & thesaurus program for all applications...$57.
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8882 1-Shot Workdesk—A powerful spreadsheet combined with a forms generator...$57.

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### Frame Technology
7050 MacRecorder Sound System 2.0.2—159.
7628 Comic Strip Factory 1.6—37.

### Foundation Publishing
6770 MacRecorder Voice Digitizer...89.
2199 MacRecorder Sound System 2.0.2—159.

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2199 MacRecorder Sound System 2.0.2—159.

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2199 MacRecorder Sound System 2.0.2—159.
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- Aladdin Systems ... 30 day MBG
  6169 Shortcut 1.0 ... 46.
- Aldus/Silicon Beach ... 30 day MBG
  5100 SuperCard 1.5 ... 199.
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- Mac Tools Deluxe 1.0 ... 79.
- Connectix ... 30 day MBG
  7830 Maxima 1.0 ... 45.
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- Virtual 2.02 (for Mac II, incl. PAMMU) ... 188.
- HandOff II 1.1.3 ... 57.
- Eddy H.M. - Best Utility

- Dantz Development ... 30 day MBG
  5256 Retrospect 1.2 ... $148.
- 7945 FileGuard Extended 2.5.2 ... 265.
- Edgy H.M. - Best Connectivity Software
- 7946 Remote (10 Pack of units) ... 148.
- Design Science ... 30 day MBG
  7887 MathType 2.0 ... 89.
- DigitalTalk ... 60 day MBG
  5166 SmallTalk 5 Mac 1.1 ... 124.
- Dubl-Click Software
- 7974 ClickChange 1.04 ... 41.
- 1824 Calculator Construction Set 2.0.9.6 ... 45.
- Fifth Generation ... 30 day MBG
  4287 PYROI 4.0 ... 25.
- 3955 Suitcase II 1.2.6 ... 49.
- FastBack II 2.5 or DiskLock 2.0 ... 118.
- 8284 SuperSPOOL 5.0 ... 62.
- 8286 SuperLaserSpool 2.02 ... 93.
- ICOM Simulations
- 4084 On Cue 1.3 ... 35.
- 4085 TMON 2.8.4 ... 86.

- JAM Software ... 30 day MBG
  6089 Smart Alarms 3.0 with Appointment Diary 3.1 ... $159.
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- Microsoft ... 30 day MBG
  4471 QuickBasic 1.0 ... 64.
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  6105 HyperX 4.0 ... 99.
- Multi-Ad Services
- 8850 Multi-Ad Search 1.0 ... 129.
- Now Software ... 30 day MBG
  6925 Now Utilities 2.0 ... 75.
- 6739 Prototyper 3.0 ... 184.
- Olduvai
- 4503 MultiClip 2.0 ... 72.
- ON Technology ... 1 year MBG
- 6385 On Location 1.0 ... 75.
- Palomar Software ... 30 day MBG
- 8210 Plottergeist 1.1 ... 199.

- JAM Software

- Microsoft

- Multi-Ad Services

- Now Software

- ON Technology

- Palomar Software

- traditional language.
## EDUCATION & RECREATION

### Accolade
- Strategic or Balance of the Planet 
  ea. 29.
- Ishido: The Way of the Stones 
  ea. 32.
- Jack Nicklaus Greatest 18 
  ea. 32.

### Activation
- Manhole 
  ea. 27.
- Jack/Moon Beach 
  ea. 30 day MBG
- Dark Castle or Beyond Dark Castle 
  ea. 32.
- Ars Nova 
  ea. 30 day MBG
- Practica Musica 2.2 
  ea. 33.

### Beacon Technology
- Games of the World (KJ or NI) 
  ea. 25.
- Hyper Bible 2.0 (KJ or NI) 
  ea. 25.
- Bogas Productions 
  ea. 125.

### Bright Star Technology
- Super Studio Session w/Music Library 
  ea. 99.

### Broderbund Software
- Type 1.0 
  ea. 27.
- The Playroom 1.1 (CP) 
  ea. 29.
- Eddy H.M. - Best Recreation Program 
  ea. 29.
- Carmen Sandiego Series (CP) 
  ea. 29.
- SimEarth 1.0 
  ea. 40.
- SimCity 1.2 (CP) 
  ea. 41.
- SimCity Supremo 1.2G 
  ea. 42.
- GeoWall/42 
  ea. 42.
- Dark Castle or 
  ea. 27.
- Crystal Quest 2.2 
  ea. 29.
- Messiah Starlight or Sky Shadow 
  ea. 29.

### Centron Software
- MusicProse 2.0 
  ea. 29.
- MusicProse 3.0 
  ea. 29.
- Finale 2.6 
  ea. 29.

### Davidson & Associates
- Math Blaster 1.0 (CP) 
  ea. 29.
- Math Blaster Mystery (CP) 
  ea. 29.
- Alge-Blaster Plus 
  ea. 35.

### CD-ROM

#### CD-ROM

<table>
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<th>Product Name</th>
<th>Price</th>
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<tr>
<td>Personality 1.1</td>
<td>$49</td>
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<td>SmartScrap</td>
<td>$34</td>
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<td>THINK C 4.0</td>
<td>$165</td>
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<td>THINK Pascal 3.0</td>
<td>$165</td>
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<td>Symantec AntiVirus for Mac</td>
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<td>ZBasic 5.0</td>
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<td>Mathematica Enhanced 1.2</td>
<td>$699</td>
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<td>myDiskLabeler 1.1</td>
<td>$42</td>
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<td>Prograph 2.0 Compiler</td>
<td>$245</td>
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<td>StickyBusiness</td>
<td>$48</td>
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<td>CDA-431 CD-ROM Drive</td>
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### Macintosh Applications

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<th>Price</th>
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<td>LaserWriter Label Pack (CP)</td>
<td>$29.60</td>
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<tr>
<td>myDiskLabeler III 3.0</td>
<td>$42</td>
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<tr>
<td>CDR35 CD-ROM Portable Drive</td>
<td>$349</td>
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<tr>
<td>XM 3201 CD-ROM Drive</td>
<td>$779</td>
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<tr>
<td>MediaTracks Multimedia CD Pack</td>
<td>$59.99</td>
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<td>Webster's Dictionary</td>
<td>$259</td>
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<tr>
<td>Music Production Kit</td>
<td>$599</td>
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<tr>
<td>Passport Designs</td>
<td>$159</td>
</tr>
<tr>
<td>Finale 2.5</td>
<td>$549</td>
</tr>
<tr>
<td>ProArt Trilogy</td>
<td>$189</td>
</tr>
</tbody>
</table>

### System Requirements

- Eddy H. M.: Best Development Tool
- Eddy · Best Recreation Program
- Eddy · Best Utility
- Eddy · Best Compress ion Product
- Eddy · Best Compression Program
- Eddy · Best Desktop Publishing Application
- Eddy · Best Graphics Program
- Eddy · Best Illustration Tool
- Eddy · Best Image Gallery
- Eddy · Best Layout Tool
- Eddy · Best Page Make-up Tool
- Eddy · Best Publishing Application
- Eddy · Best Quotation Tool
- Eddy · Best Script Tool
- Eddy · Best Spelling Tool
- Eddy · Best Text Processor
- Eddy · Best Typewriter
- Eddy · Best Utilities
- Eddy · Best Word Processor
- Eddy · Best Write Tool

### Other

- LaserWriter Label Pack (CP) | $29.60 |
- myDiskLabeler III 3.0 | $42 |
- CDR35 CD-ROM Portable Drive | $349 |
- XM 3201 CD-ROM Drive | $779 |
- MediaTracks Multimedia CD Pack | $59.99 |
- Webster's Dictionary | $259 |
- Music Production Kit | $599 |
- Passport Designs | $159 |
- Finale 2.5 | $549 |
- ProArt Trilogy | $189 |

### Education & Recreation

- Full-color picture
- Imports into other presentation desktop publishing applications
- Complete picture-making
- All aspects
- Complete undclete, isolate bad sectors, recover, and restore deleted files

### Software Bridge

- Full-color picture
- Imports into other presentation desktop publishing applications
- Complete picture-making
- All aspects
- Complete undclete, isolate bad sectors, recover, and restore deleted files

### Macintosh Applications

- LaserWriter Label Pack (CP) | $29.60 |
- myDiskLabeler III 3.0 | $42 |
- CDR35 CD-ROM Portable Drive | $349 |
- XM 3201 CD-ROM Drive | $779 |
- MediaTracks Multimedia CD Pack | $59.99 |
- Webster's Dictionary | $259 |
- Music Production Kit | $599 |
- Passport Designs | $159 |
- Finale 2.5 | $549 |
- ProArt Trilogy | $189 |
against all the rest

International Business Software
6591 DataCard T 1 (3 user)-Honorable Mention-1990 MacUser Editors' Choice Award for Best Work-Group Product. Parallel processing performance, centralized server access, & practically unlimited storage—needs no dedicated hardware $199.

Individual Software
Training for Word or PageMaker ea. $35.

* INLINE DESIGN ... 30 day MBG
5870 Bomber 1.3 (includes headphones) 32.
6622 Darwin's Dilemma 1.0 32.
6639 Tesseract 1.0 32.
6748 Learning Company ... 30 day MBG
2670 Reader Rabbit 2.2 (CP) (ages 4-7) . 30.
5453 Talking Math Rabbit 2.0 (ages 4-7) . 30.
6830 Leister Productions ... 30 day MBG
7126 Reunion 2.0 35.
6646 Microsoft ... 30 day MBG
2868 Flight Simulator 1.02 (CP) . 32.
5841 Moriority Revenge (CP) . 32.
* MYSERLING TREMENDOUS ... 30 day MBG
8259 Turbo Math Facts 1.1 36.
8263 Word Quest 1.0 32.
8257 PreSchool Pack 1.0 36.

Passport Designs
8253 TRAX 2.0 59.
8254 Computer Music Creativity Kit 189.
3117 Master Tracks PRO 4 4.1.4 319.
8250 Encore 1.3 379.
Eddy H.M. - Best Music Product
8880 Alchemy 439.
3155 MIDI Interface 85.

Penton Overseas ... 30 day MBG
Vocabulary Levels I & II (French, Italian, Spanish, German, Russian, Hebrew, & Japanese), ea. 35.
8260 Word Training Systems ... 60 day MBG
We carry over 60 learning levels from beginner to advanced for Quark XPress, Excel, Persuasion, FileMaker II/Pro, PageMaker, Illustrator, FreeHand, Word, HyperCard, and the Mac . ea. 52.

Postcraft
6466 Citadel 28.
6661 KanjiMaster - Beg. (Japanese) ea. 39.

Premier Technology
3397 Sierra On-Line 23.
3397 Leisure Suit Larry (CP) ea. 34.
3397 World Tour ... Beginner to Advanced (Spain, Franc, Germ, It.) ea. 29.
3397 Pronunciation Tutor ... Beginner (Spanish, French, German) ea. 39.
3611 KanjiMaster - Beg. (Japanese) ea. 99.

Sierra On-Line
3397 Leisure Suit Larry (CP) ea. 34.
3397 World Tour ... Beginner to Advanced (Spain, Franc, Germ, It.) ea. 29.
3397 Pronunciation Tutor ... Beginner (Spanish, French, German) ea. 39.
3611 KanjiMaster - Beg. (Japanese) ea. 99.

Software Tools
8228 Wizardry II (CP) ea. 29.

Spectrum Holobase ... 30 day MBG
4519 Mavis Beacon Typing 1.3 (CP) ea. 32.
4558 Life & Death (CP) ea. 32.

StudyWare
ACT, GMAT, GRE, or SAT Prep. ea. 29.
8098 LSAT Prep for the Mac ea. 35.

Symantec ... 30 day MBG
6748 Norton Utilities for the Mac 1.0-1990 MacUser Editors' Choice Award for Best Utility. "Has redefined the state of the art of data-recovery software. An excellent collection of tools that speed up disk-related work!" ... $84.

Toyo ... 30 day MBG
7824 Nemo's Go Master 4.7 ... ea. 41.
7823 Nemo's Go Master Deluxe 4.7 ... ea. 85.

XOR ... 30 day MBG
8061 MacSki 1.01 ea. 40.
6040 MacGolf Classic (CP) ea. 52.

NETWORKS & COMMUNICATIONS

Abston ... 30 day MBG
6266 InterFax 24/96 Modem 349.
Applied Engineering
8365 DataLink Express ... ea. 175.
8393 DataLink/Mac or Mac Portable ea. 209.
8398 DataLink LC ea. 265.
8382 QuadraLink ea. 208.

Beagle Bros. ... 30 day MBG
7691 Flash 1.1 ea. 127.

Softsync/BLOC ... 30 day MBG
7129 Accountant, Inc. 2.0-Honorable Mention-1990 MacUser Editors' Choice Award for Best Financial Management Pkg. Integrates General Ledger, Payables, Receivables, Payroll, Inventory and Project Management ... $345.
The Eddies have

Berkeley Systems ... 30 day MBG
5737 After Dark 2.0-F New! Over 30 displays &
SOUND. Ticking clocks, thunder, munching
worms. Use company logo, messages. Great
Fish, Flying Toasters, & MultiModule. Random
display, & password sleep .................. $22.

*CE Software ... 60 day MBG
5173 QuickMail 2.2.3 (10 user) .......................... 315.
*CompuServe ... 60 day MBG
1675 Macintosh Membership Kit 1.03........ 23.
1673 CompuServe Navigator 3.0...................... 49.
1674 Membership Kit/Navigator Bundle ........... 69.
*DataViz ... 60 day MBG
1823 MacLink Plus/PC 5.0 ......................... 117.
4842 MacLink Plus/Translators 5.0 ............. 98.
Dayna Communications
8719 EtherPrint .................................. 349.
Eddy - Best Connectivity Hardware
8720 DaynATalk (5 Pak) ............................ 389.
8721 DaynATalk (10 Pak) ............................ 695.
*Dove Computer ... 60 day MBG
6758 DoveFax Desktop 1.1.1 ....................... 299.
*Dow Jones ... 30 day MBG
5295 NewsRetrieval Membership Package 28.
EveryWare
8077 AllShare 1.0 .................................. 139.
*Farallon Computing ... 30 day MBG
5707 Timbuktu 3.1 ................................. 95.
Eddy - Best Connectivity Software
4867 Timbuktu 3.1 30-Pack ..................... 1285.
4866 Timbuktu/Remote 2.0 ................. 123.
8707 LIason 3.0 .................................. 259.
6273 PhoneNET StarConnector 10-Pack ... 129.
4869 PhoneNET StarConnector 10-Pk (DIN-8) 198.
2206 PhoneNET StarConnector 300 ........ 825.
6687 PhoneNET StarConnector-EN ........ 1589.
6766 MediaTracks ................................. 189.
Eddy H.M. - Best Multimedia Software
6768 MediaTracks Multimedia Pack .......... 319.
*Freesoft ... 60 day MBG
6115 White Knight 11 ................................ 85.
*Global Village ... 30 day MBG
8946 TelePort A300 ............................... 129.
Eddy - Best Communications Product
8945 TelePort/FAX .................................. 185.
Hayes
2300 Smartcom II 3.2 ......................... 84.
2307 Smartmodem 2400 ...................... 349.
5991 V9600 baud Modem ...................... 689.
Insignia Solutions
7557 Access PC 1.0 ............................... 62.
7058 SoftPC-AT/EGA Module ................. 125.
4089 SoftPC 1.3 ................................. 245.

Intel Corporation
5119 2400 EX Modern .......................... $179.
6420 2400 EX MNP Modern .................. 229.
International Business Software
8581 DataClub (3 user) 199. 8580 (10 user) 539.
Eddy H.M. - Best Work-Group Product
*Kennect Tech. ... 30 day MBG
5631 Rapport 1.3.4 .............................. 195.
7588 Drive 360 (51/4") ......................... 249.
7590 Drive 1200 (51/4") ......................... 249.
5632 Drive 2.4 (31/2") (incl. FastBack II) .... 325.
*Microcom ... 30 day MBG
7465 CarbonCopy Mac (Twin Pack) ........ 169.
8027 MacModem V.32 ......................... 689.
*Novotech ... 60 day MBG
3002 TurboNet ST (DIN-4) ................. 30.
8751 TurboNet ST (12C) ..................... 279.
6272 NuVoLink SC .............................. 389.
*Orchid Technology ... 30 day MBG
6949 OrchidFAX Modem 1.06 .............. 429.
*Practical Peripherals ... 30 day MBG
3102 2400 baud External Modem .......... 179.
5285 PM2400SA MNP Modern ........... 209.
7934 PM9600SA Modern 1.28 ............ 489.
3089 Mac Communications Pack 1.5 .... 225.

Farallon Computing ... 30 day MBG
5707 Timbuktu 3.1-1990 MacUser Editors'
Choice Award for Best Connectivity Software.
Allows a Mac to view and control other Macs
on a network simultaneously. A great
brain-stomoting tool ................. $95.

*Preferred Publishers ... 30 day MBG
8943 DoubleTalk (7 Pak) 79. 8942 (2 Pak) 129.
*Prometheus ... 30 day MBG
8762 Travel Modem ......................... 195.
3350 2400 mini for Mac ................. 149.
8348 24/96 Minifax ......................... 199.
8349 Maxfax .................................. 295.
8709 2400 Plus ............................... 219.
8738 9600 Plus ............................... 589.
Eddy H.M. - Best Communications Prod.
*Shive ... 30 day MBG
3444 NetSerial 3.3 ......................... 275.
3437 NetBridge .................................. 409.
4942 TeleBridge ................................. 409.
3443 NetModem V2400 3.3 .................. 339.
6917 NetModem V32 (V42 & V42 bis) ... 1169.
Eddy H.M. - Best Connectivity Hardware
6519 EtherGate ................................. 1619.
8189 FastPath IV ............................... 1889.
*Siaka/TOPS ... 30 day MBG
4188 TOPS Teleconnector (DIN/8) ........ 23.
3720 TOPS Flashcard ....................... 155.
6264 TOPS Networking Bundle 3.0 ...... 187.

*Software Ventures ... 30 day MBG
3455 MicroPhone II 3.0 ...................... 215.
*Solutions, Inc. ... 60 day MBG
6720 FAXGATE Plus 1.1.2 ................. 239.
*Synergy ... 30 day MBG
6618 VersaTerm 4.5 .......................... 88.
6619 VersaTerm PRO 3.5 ..................... 174.
*Traveling Software ... 60 day MBG
3729 LapLink Mac III Connectivity Pac .... 33.

INPUT/OUTPUT
*Abaton ... 30 day MBG
7432 Scan 300/GB (reqs. Scan Kit) .... 999.
Includes free ProPoint ($79 value).
American Power
5695 UPS 1105E ............................... 209.
6686 UPS 370ci ............................... 329.
Caere
8124 Typist .................................. 479.
4476 OmniPage 2.1 .............................. 495.
Omnispell 1.0 or Omnifile 1.0 ea. 69.
Chinon
8814 DS-3000 Scanner w/Dig. Darkroom 699.
8815 DS-3000 Scanner w/ OmniPage ... 1099.

Kennect Technology ... 30 day MBG
8966 Mac/ReaderMan-Honorable Mention-1990
MacUser Editors' Choice Award for Best 3D
Modeling/Rendering Proj. Combine with any 3D
program to create photographic-quality images
with the most advanced rendering software $549.
Dear MacConnection,

As usual, I'm extremely happy with every aspect of your company. Yesterday I ordered additional memory for my SE and after watching the video twice, it was installed and working in less than 20 minutes. Pretty exciting for a homemaker! And to think, our local computer stores wanted $60 - $65 to do the job! The video instructions really made the difference. Also, thank you for being ecologically minded. Your catalogs are beautiful (better than before).

And I sure don't miss the "peanuts."

Diana Robinson
Diamond Bar, CA

"Pretty exciting for a homemaker!"
Get ’em here!

ACCESSORIES

Apple Computer
7748 Personal LaserWriter Toner Cartridge... $89.
1115 LaserWriter II Toner Cartridge ....... 105.
   ★ Avery ... 60 day MBG
4807 Laser Labels 1" x 2½" (Qty. 3000) . 24.
5392 Disk Labels 3½" - Laser(Qty. 630) . 29.
4665 Address Labels 3½" x 1⅛" (7350) . 15.
4511 Transparencies 8½" x 11" (Qty. 30) . 22.
★ Basic Needs ... 60 day MBG
7413 Mac Icloco Monitor Stand ......... 48.
★ Computer Coverup ... 60 day MBG
1723 ImageWriter II Cover ......... 8.
★ CoStar ... 30 day MBG
7453 The Organizer Jr ..... 79.
6091 The Organizer ........... 199.
Curtis Manufacturing
8046 MVP Mouse ........... 89.
★ Goldstein & Blair ... 30 day MBG
2267 The Macintosh Bible (3rd Ed.) .... 19.

Quantum
40 Meg & 80 Meg Internal Drives for Mac SE, SE/30, IIx, IIc & IIfx ... call
SuperMac Tech.
7451 Dataframe XP 200 Hard Drive .......... 1399.
5451 Dataframe XP 330 Hard Drive .......... 2249.
★ Total Systems ... 30 day MBG
32-bit RAM Exp. Module ... call
68982 Math Coprocessors ... call

STORAGE MEDIA

★ Sony ... 60 day MBG
3297 3½" DS/DD Disks (10) ........ 12.
6148 3½" DS/DD Disks 3 Pak (30) .... 29.
3298 3½" HD Disks 1, 44 Pack (19) .... 19.
6375 3½" HD Disks 3 Pak (30) .... 49.
★ MacConnection ... 60 day MBG
6592 44 Meg Removable Cartridge .... 75.
★ MAXELL ... 60 day MBG
2792 3½" DS/DD Disks (10) .... 13.
2793 3½" HD Disks 1, 44 Meg (21) .... 21.
★ 3M ... 60 day MBG
3943 40 MB Data Cartridge ........ 19.

Prometheus ... 30 day MBG
8739 9600M Plus—Honorable Mention—1990
MacUser Editors’ Choice Award for Best
Communications Product: 9600 bps (V.32) modem
w/9600 bps send/receive fax. Supports V.42 bis.
MNP5. Includes software & cable ........ $599.

Megaworks
9" "Rival Monochrome System for SE, SE/30 or II—
MacUser’s Editors’ Choice in large screens. Also
includes coupon book with over $3000 in
savings on special 3rd party products. ca. $1199.

Get Timeslips III Accounting Link 1.0—Extend the
power of your Timeslips III package. Accounting
Link provides customized income reports linking
billing & payment data from Timeslips III to many
accounting programs .... $52.

TIMESLIPS ... 30 day MBG
8939 Timeslips III Accounting Link 1.0—Extend the
power of your Timeslips III package. Accounting
Link provides customized income reports linking
billing & payment data from Timeslips III to many
accounting programs .... $52.

Targus ... 60 day MBG
3617 Mac Plus/SE Carry Case ........ 55.
★ Tripp Lite ... 30 day MBG
6200 Isobar 6 ( surge suppressor, 6 outlets) 59.

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
on the shipment(s) that complete the order
(in the U.S.).
• No sales tax. except Ohio residents (please add
applicable tax).
• All U.S. shipments insured; no additional charge.
• APO/FPO orders shipped First Class Mail.
• International orders U.S. $250 minimum.
• Upon receipt and approval, personal and company
checks clear the same day for immediate shipment
of your order.
• Corporate P.O.s accepted subject to credit approval.
• COD max. $1000. Cash or certified check.
• 120 day limited warranty on all products. Defective
software replaced immediately. Defective hardware
repaired or replaced at our discretion. All items
subject to availability. Prices and promotions subject
to change without notice.
• Your order lines are now open 24 hours a day Monday
through Friday, and Saturday 9:00 AM to 5:30 PM EST.
You can call our business offices at 603/446-7711
Monday through Friday 9:00 AM to 5:30 PM EST.

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Continental US: Barring events beyond our control, all
credit card orders shipped in weekdays by 3:15 AM EST
will ship Airborne Express for delivery the next
business day. Which means same day delivery for
orders placed between midnight and 3:15 AM EST.
(Some orders may ship by UPS, freight for next day
delivery). Saturday delivery available to many areas
upon request. Some areas require an additional day
delivery. The total freight charge on any order placed
with MacConnection is only $3.

Hawaii, Alaska, Canada, Puerto Rico and U.S.
Virgin Islands: Call 800/334-4444 for information on
shipping and charges.

All other areas: Call 603/446-7711 or FAX
603/446-7791 for information.
come out ahead.

Computer Friends

8271 ColorSnap 32+ ........................................ $649.
*CoStar ... 30 day MBG
6900 LabelWriter ............................................. 185.
*Datedesk ... 30 day MBG
6901 Switchboard (modular keyboard) , 159.
Eddy H.M. - Best Input Device
MAC-101 Keyboards .................. ea. 129.
*DayStar Digital ... 30 day MBG
8556 FastCache for Mac Iicl .................. 279.
8556 40 MHz PowerCache Iicii ........ 549.
8555 50 MHz PowerCache Iicii ........ 1689.
8553 SCSI PowerCard ........................................ 1095.
25 MHz PowerCard 030 (for lxic) ea. 1095.
40 MHz PowerCard 030 (for lxic) ea. 1389.

GDT Softworks

6256 PrintLink Collection 4.0 .... 59.
6514 JetLink Express 2.0 .............. 89.
8960 ParaLink Express .................. 99.

 Hewlett-Packard

6514 HP DeskWriter Printer ............ 759.
6754 HP LaserJet III (with toner) ...... 1699.

Kodak

6730 DICONIX M150 Plus Printer ...... 489.
*Kraft Systems ... 60 day MBG
7519 KM50 ADB Joystick ................. 42.

Magnavox

6690 14'' Color Monitor with Micron Xceed
for SE/30 (640 x 480) special $499.

MegaGraphics

7841 16'' 24-bit Color System for Mac II 4895.
19'' F rivalry Sys. SE, SE/30, or Ilii ea. 1199.
19'' 8-bit System for SE/30 or II ea. 4295.
7840 12'' 24-bit Color System for Mac II 6395.
18'' GS System for SE/30 or II ea. 1989.

Micron ... 30 day MBG
7149 Xceed Iici-128 Cache Card ........... 239.
6680 Xceed for SE/30 (640 x 480) .... 329.

MicroSpeed ... 30 day MBG
6620 MacTRAC ............................................. 62.
Eddy H.M. - Best Input Device
6621 MacTRAC ADB .................. 75.

RasterOps

7457 Video ColorBoard 364-1990 MacUser
Editors' Choice Award for Best Desktop Video
Product. "Full 24-bit color display and live video in
a small affordable package!!" $975.

Mouse Systems ... 30 day MBG
7560 Trackball ADB .......................... 69.
Little Mouse or Little Mouse Plus, ea. 74.

Nutmeg Systems ... 30 day MBG
7459 ColorBoard 264 for SE/30 ........ 659.
7457 Video ColorBoard 364 ............ 975.
Eddy - Best Desktop Video Product
7468 ClearVue/GS System for Mac II ... 1699.

Sophisticated Circuits ... 30 day MBG
8009 PowerKey 65. 8008 Wake-Up Cable 32.
TheComplete PC
6104 Half-Page Scanner/400 ............ 295.
Thunderware
4994 LightningScan 400 ................. 385.

Shiva ... 30 day MBG
6917 NetModem V3.2-Port Desktop modem
MacUser Editors’ Choice Award for Best
Connectivity Hardware. This shared modem
now includes V.42 and V.42 bis for higher
performance, speed, and reliability ........ $1169.

Konica

3990 30 + Meg Hard Drive .............. 389.
5133 20 + Meg Hard Drive ............... 329.
3990 30 + Meg Hard Drive ............... 389.
3991 45 + Meg Hard Drive ............... 449.
5276 60 + Meg Hard Drive ............... 489.
5276 60 + Meg Hard Drive ............... 489.
5456 45 Meg Removable Drive ........... 649.
5736 45 Meg Removable Cartridge ....... 79.

Dayna Communications

8722 DaynaFILE 360k Drive ............... 449.
8722 DaynaFILE 1.2 5/4’’ Drive .......... 449.
8927 DaynaFILE 1.44 MB Drive ......... 629.
8726 DaynaFILE Dual 360k & 1.2 MB .... 669.
8724 DaynaFILE Dual 360k & 1.44 MB .... 739.

Snow Computer ... 60 day MBG
5998 Macintosh SE Upgrade ....... $499.
8166 MacSnap 524XE .................. 199.
8167 MacSnap 524XS (w/SCSI Port) .... 249.
6649 MacSnap 599XSE (4 MB) .......... 299.
6652 MacSnap 599XSE (4 MB w/SCSI Port) .... 365.

Peripheral Land, Inc. (PLI)

8335 PLI TurboFloppy 1.4 ....... 309.
8336 PLI TurboFloppy 1.4 .......... 449.
8336 PLI DOS Floppy ................. 469.
8333 PLI Sony 40 Turbo Ext. Drive .... 489.
8327 PLI Infinity 40 Turbo .......... 749.

Total Systems

8653 Galileo I Video Board (for Mac SE) $449.
7817 16 MHz Mercury 030 (for Mac SE) . 369.
8624 16 MHz Mercury 030 (for Mac Plus) 499.
7816 20 MHz Gemini 030 ............... 799.
8708 25 MHz Gemini 030 w/o copro. . 999.
7814 33 MHz Gemini II 030 ............ 1199.
8371 40 MHz Gemini II 030 ............ 1339.

MEMORY & DRIVES

SIMMS ... 2 year warranty
Includes free instructional video tape
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1107 1 Meg SIMMS (80ns) .................. 57.
8316 2 Meg SIMMS Set (80ns) ......... 99.
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Applied Engineering

8361 1.44 Meg High Density Drive .... 229.
8369 MacRam Portable with 1 MB , 399.
939 MacRam Classic with 0, 1, or 3 MB , call

Applied Engineering

8369 MacRam Portable with 1 MB , 399.
8369 MacRam Classic with 0, 1, or 3 MB , call

389 (for Mac Plus)

8726 DaynaFILE Dual 360k & 1.2 MB .... 669.
8724 DaynaFILE Dual 360k & 1.44 MB .... 739.

Dove Computer ... 60 day MBG
Marathon 030 Upgrades ............... ea. 529.
8166 MacSnap 524XE .................. 199.
8167 MacSnap 524XS (w/SCSI Port) .... 249.
6649 MacSnap 599XSE (4 MB) .......... 299.
6652 MacSnap 599XSE (4 MB w/SCSI Port) .... 365.

KMC-101 Keyboards ................ ea. 129.

Super MacPlus/Se/30 329.
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On the Macintosh, creation and storage go hand-in-hand. You create. Then you store. Pretty soon, your hard disk is full of files—each one vulnerable to a hard disk crash. Retrospect will protect your creativity. And offers more than any other backup software: Archiving. Archive files to keep your storage needs in check. Retrospect supports almost any storage device and has compression, encryption, and full file selection. Run it automatically with a built-in calendar.

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That's All, Folks

If you want the location of a company mentioned here, try looking it up in our product databases on AppleLink (international) or on the Macworld forum on America Online. And if all else fails, write me and I'll find it for you.
“With QuarkXPress, we increased our productivity 300 percent.”

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Taco Bell is an international quick-service restaurant chain headquartered in Irvine, California. Its graphic design division supports corporate communications efforts serving its employees around the world. In 1990, Taco Bell won the International Association of Business Communicators’ Special Communications Award, for the Pepsico Sharepower Magazine, produced with QuarkXPress.

If you want to increase your productivity, visit your local dealer for more information.

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Circle 295 on reader service card
Too Small
13-inch Apple Display

Turn your Macintosh into your own Personal Color Workstation with an E-Machines 16-inch display. ColorPage T16, the full-page 16-inch Trinitron display judged best for two years running by MacUser Labs, gives a whopping 70% more working space than you get on an Apple 13-inch RGB, one full-page including the margins. That's room enough to view an entire year's budget or a complete presentation slide at a glance. E-Machines' TX, the two-page 16-inch Trinitron display packs 19-inch...
HOW MUCH IS YOUR USED APPLE WORTH?

As much as $500 when you trade in one of the listed products for any 16-inch or 19-inch E-Machines color display system. See how much cash you can get for your Apple. Just take this card to your dealer, or for the name of your local E-Machines dealer, call 1-800-344-7274

Apple Displays:
- Macintosh 12" Monochrome Display
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- Apple Macintosh Portrait Display
- Apple Two-Page Monochrome Display

Apple Video Cards:
- Macintosh II 1-bit Video Card
- Macintosh II 4-bit Video Card
- Macintosh II Portrait Display Video Card
- Macintosh II Two-Page Monochrome Video Card
- Macintosh II 8-bit Video Card
- Macintosh Display Card 4 • 8
- Macintosh Display Card 8 • 24

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Get up to $500 cash back for your Apple display and graphics card when you buy an E-Machines color display system. Details on back.
performance in an amazingly affordable 16-inch package, and with exceptionally sharp detail.  
Both 16-inch displays offer 8-bit as well as the most affordable 24-bit large screen color for desktop video and true color applications.

E-Machines, The 16-inch Display Company also offers a complete line of monochrome, gray scale and color display systems.
You don't need to wait hours to change tapes.
You don't need to wait months for other storage technologies to catch up.
One 8mm tape drive will already deliver more than they promise.
It's the digital CY-8200, now with optional data compression. And you can get it exclusively from Contemporary Cybernetics Group.
With data compression, the CY-8200 can quadruple the amount of data you can load on an 8mm cassette that fits neatly in your shirt pocket. Meaning the already tremendous savings in man hours, media costs, storage and shipping are multiplied by four.
Until now, the best 8mm drive on the market stored an impressive 2.5 GB per tape at speeds up to 15 MB per minute.

Our data compression option allows you to write up to 10 GB per tape at up to 60 MB per minute. Completely unattended.
Of course, the data compression feature is switch-selectable, so you can turn off data compression to read and write standard 8mm tapes.

Plus it's a simple upgrade for the best tape drive built: our CY-8200. Offering a complete range of standard interfaces, a 2-line, 40-column display option, and optional security card encryption. And assuring you of full support and a 12-month warranty from the leader in advanced 8mm helical scan technology.
The CY-8200 with data compression will remain the best value in data storage for a long time to come. So now you've got many good reasons for calling us today at (804) 873-0900 and no good reason for waiting.

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You can get it exclusively from Contemporary Cybernetics Group. Plus it's a simple upgrade for the best tape drive built: our CY-8200. Offering a complete range of standard interfaces, a 2-line, 40-column display option, and optional security card encryption. And assuring you of full support and a 12-month warranty from the leader in advanced 8mm helical scan technology.

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Circle 188 on reader service card
Ethical E-Mail

Prodigy's editorial control of E-mail is a blatant example of how corporations, by owning the means of communication, can stifle the free exchange of ideas [The Iconoclast, January 1991]. Prodigy should be boycotted by anyone who is uncomfortable with being told to shut up and shop.

Technological advances will be accountable to human needs only if humans make them accountable. Steven Levy deserves the highest praise for his sensitivity to the ethical issues involved in online services. Macworld deserves thanks for providing Levy with a national platform. Prodigy's censorship deserves greater public exposure and debate.

Eric Hebs
Fort Worth, Texas

Censored Comments

Regarding Steven Levy's January 1991 article, "In the Realm of the Censor," I would like to relate my experience with Prodigy. I am an assistant sysop on CompuServe, and help run a beer and home-brewing forum on CIS. We had an interesting thread going about Prodigy a while back. It seems that whenever anyone so much as mentioned anything with the word CompuServe in a Prodigy message, the censors would delete the message. These guys were simply explaining that there was a beer and home-brewing forum on CompuServe. As it stands now, there is no way to even tell these poor s**ds that an alternative exists. Talk about trying to eliminate the competition.

Dan Fink
via CompuServe

Prodigy Has Its Say

Prodigy never intended to build a high-volume E-mail network, or a no-holds-barred bulletin board. There were plenty of those already. The Prodigy service was founded on three key marketing principles: give the service broad appeal, make it easy to use, and make it inexpensive. It's incredible that Steven Levy can say that compared to time-metered online services and other modes of long-distance communication, 25 cents to send a four-page personal message is "prohibitive" and "onerous." Prodigy is simply recovering the costs incurred by a small minority so we can keep the cost to the majority a bargain at $9.95 a month in the annual subscription.

Prodigy is a family-oriented electronic publisher. As such, we exercise editorial discretion over what appears in public areas of the service. Like Macworld, Prodigy does not guarantee publication of anyone's comments.

Here are some examples of member comments we've chosen not to publish: "Here's how to avoid paying for HBO: climb the telephone pole outside your house and..." "You can't get pregnant if you don't have an orgasm." Censorship? We don't think so. That's just caring about our customers.

Ultimately, the marketplace will decide what it wants. In the first 90 days after message charges were announced, the number of Prodigy service members mushroomed by a quarter million to more than 700,000.

Brian Ek
Prodigy
White Plains, New York (continues)
Steven Levy replies: Brian Ek's comments only confirm what I said about the Prodigy service—a
online service that denies the promise of telecommunications by limiting the interactivity of its users. My column did note that when Prodigy was conceived, the communications services were
cosiously given short shift. This is why the system architecture makes it fairly costly for users to send E-mail to each other. If the U.S. government can physically transport a first-class letter across the country for 25 or even 29 cents, isn't it reasonable that a computer system could move a few bits around for much less? Next, Prodigy costs not $9.95, but $12.95 a month unless users pay a year in advance. Finally, Prodigy's "editing" goes far beyond the extreme examples cited. Users report their comments have been quashed for political content, for instance. And even G-rated comments that are deemed contrary to Prodigy's business interests are not permitted. That's not "caring about our customers" but censorship.

Silicon Valley Hamlet

Regarding your January 1991 cover picture of John Sculley, is that "Warrior King" or is it Hamlet?
F. A. Statery
Santa Monica, California

Macworld Said What?

When I first read the "Year in Review" and came across those uncensored words, I laughed until my sides hurt. I think it is great that Macworld let the four-letter s-word by. It was appropriate and humorous. Besides, who at Apple does not say that word? Sinistar
via America Online

Review Revolt

Here is my review of your "Year in Review." Both of the subscriptions coming into my office will be canceled as a result of the profanity in the article.
James E. Talmage
Byron, Georgia

Paper Chase

I am seriously concerned about the amount of wood that has to be cut down for the five or six renewal/subscription cards you put in each Macworld magazine. I recently discovered that you use roughly 809.4 square centimeters of card stock for these forms per month. If your circulation is indeed over 340,000 copies per month, that amounts to approximately 3,308,577,904 square centimeters, or more than 1485 metric tons, of card stock just for the magazine's renewal/subscription forms.

This may mean nothing to you, but it means a lot to me. I suggest you think about what you are doing to our adulthood and to our children's future by this misuse of resources. Most people put these notices directly into the trash. I certainly hope you are not using Canadian trees, because we need our forests for more than garbage.
Andrea MacNish
Vancouver, British Columbia

As a magazine, we are very concerned about the environment and have recently founded a program we call Macworld Earth Conservancy, with the mission of promoting ecological responsibilities (continues)
Don’t use a Mac anywhere without a Kodak Diconix M150 plus printer. Especially now that it’s more affordable than ever!

Just think of all the things you can do if you have a Diconix printer with your Macintosh Portable or Classic computer. Those last-minute improvements on the presentation. The letters and reports that could be on their way right now. And, because it’s so small and quiet, it works as well on the desktop as it does on the road.

It’s all easy with the Kodak Diconix M150 plus printer. One of the world’s smallest, lightest (3.1 lbs.), quietest printers, it’s easy to carry. And it prints high-quality outline fonts, using Adobe Type Manager™ software, and presentation graphics as well. Go ahead, give in to temptation. Call for the name of your nearest dealer in the U.S. or Canada: 1 800 344-0006, Ext. 405.

Macintosh computer and new Kodak Diconix printer

WHAT’S ONE WITHOUT THE OTHER?

KODAK

The new vision of Kodak

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ity among Macworld readers, employees, and advertisers. One of our projects is the Macworld Grove tree planting and habitat restoration, on which we're collaborating with the California Nature Conservancy. We have also recently reduced our print order to the barest minimum, and will monitor our needs to see if further reductions are possible.—Ed.

Stymied by Style

While I am willing to respect Rod McKuen's high praise for the Discis Books [Reviews, December 1990], I'm simply not willing to allow my "eight-year-olds and up" to be taught that Thomas' is the correct possessive form of the name—or that poet Sean o huidgin sets a good example of correct capitalization of proper names. I deplore the fact that a "Knowledge Research" company contributes to the degradation of the language.

Phil Martin
Tijetonboro, New Hampshire

The possessive of Thomas that you mention was not produced by Knowledge Research but by the editorial staff at Annick Press in Toronto, who published the book.

The editor we spoke with there said that when in doubt, they use the Queen's English, and that Thomas' followed by a word beginning with an s (snowsuit) falls into that category.

About sean o huidgin, you won't find our editors listed that way on our masthead, although we might have to reconsider if one of them were named e. e. cummings.—Ed.

Color Comparison

We at Adobe want to comment on Lon Poole's recent comparison of Letraset ColorStudio and Adobe Photoshop ("Pictures Perfected," January 1991). The article states that Tom Knoll, one of the authors of Photoshop, achieved more believable results in one hour with Photoshop than creators of ColorStudio Mark Zimmer and Tom Hedges did in two hours and 20 minutes and that Letraset employee Tony DeYoung did in two hours with ColorStudio. Despite a clear explanation of the retouching techniques used by both teams, Poole credits operator skill as the sole reason for the superior results achieved by the Photoshop team.

While John Knoll is, admittedly, a competent retoucher, we think the article's conclusions ignore the very evidence this text was supposed to bring to light: which product performs best for this type of retouching work. We think the printed results of this comparison speak for themselves. Unfortunately, the article still leaves readers a bit confused and leaves it up to them to make their own decision.

Steve Gutman
Mountain View, California

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

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The Gold Card is so fast that you will not see any performance decrease when storing data. The only thing you will notice is an increase in your available storage capacity. The card is as easy to use as creating a new partition on your storage device. All data that is placed in the Gold Card partition is compressed and decompressed on the fly. Software for the Gold Card also provides full Disk Repair and Disk Recovery utilities.

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"Build a better mousetrap and you'll catch more mice."

"Recently, our RM42 SyQuest drive was awarded 4 mice by the editors of MacUser magazine. When Tim Maroushek, our Product Manager, was given the challenge of designing the new M-series line, he didn't design it with awards in mind. His objective was to build a superior quality drive with the latest technology, and to do it at prices that would represent the best value in the marketplace. After all, as Tim says, "...the 4 mice rating is great, but I'd rather make a difference by creating a better value at a lower price.""

We feel that the recognition we're receiving is a direct result of the feedback from our customers and the editors, coupled with the attitude and efforts of our development team. Together they were able to take the feedback we'd gathered and design and build the M-series line into the best value in the marketplace.

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SyQuest Drive Mechanism is the defect standard for Macintosh removable media
External Termination Block is supplied to let you terminate your drive from the rear panel, the way Apple recommends.
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Dual AC Convenience Outlets: are mounted safely away from the SCSI connectors' building clips to protect you from electrical shock.
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International Power Supply automatically adjusts for 110 or 220 volt and has a built-in protective fuse.
Polyurethane Polymer Feet keep your desk scratch-free.
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Filtered AC Receptacle filters incoming power, and stops RF interference from traveling to your electrical system.
Rear Panel Fuse Holder has an extra fuse tucked away in a hidden compartment, should you ever need it.

So how were we able to design so much into our drives and still offer such competitive prices? The answer is our factory-direct strategy. By cutting out the Dealers' mark-up and the Reps' commission, we both save money. As always, you have my 30 day "love-it-or-return-it" guarantee. So take advantage of this risk-free opportunity to find out for yourself why our drives deliver more mice for the price. Order Today! Most orders ship the same day, so you could be using your new Mirror drive tomorrow."

Ronald E. Eibensteiner
President/CEO
Timothy R. Maroushek
Product Manager

Designed For Editors And Users Alike.
We made over 40 improvements to our M-series drives. We beefed up our cabinet, added features like diagram, radically updated our disk management utilities, and bundled award winning utilities from CE Software and Microlytics. We did all of this and still lowered our prices!

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MediaManager™, Mirror's exclusive disk management software, includes a utility to format your drive and a Control Panel device that allows you to customize attributes of each volume, such as password protection and auto-mounting. On fixed drives, MediaManager™ lets you partition your drive into smaller volumes for improved efficiency. And our DriveSpanning feature allows several drives to be viewed as one contiguous volume. In other words, two 650Mb drives can be turned into one 1.3Gb volume!

Exclusive! VolumeBackup™ Software With Every Drive.
VolumeBackup's sophisticated scripting feature lets you create custom backup procedures that automatically back up your data when it's most convenient (like while you sleep). Back up to floppy, tape, another drive, or a SyQuest cartridge.

FREE! Award Winning Microlytics and CE Software...A $500 Value!
With every drive, we're including a collection of over a dozen CE Software utilities that includes QuickKeys Lite, DiskTop (v3.04), MockPackage, Ask, and LaserStatus. And we've included Microlytics GoFer™, a high-speed text search and retrieval utility, and Inside Information™, the first hierarchical dictionary for the Macintosh. Several of these wonderful utilities received MacUser Eddy awards and MacGuide Golden Gavel awards.

Our DriveCare Technicians
Repair Our Competitor's Drives!
Since DriveCare's introduction in August 1988, our Technicians have repaired thousands of drives from almost every one of our competitors. And their data recovery expertise has earned them a place in the hearts of many MIS managers.

All of our drives are covered by generous warranties and come with free lifetime technical support by the same professionals that have made our DriveCare third-party repair service an institution.
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Mirror Technologies helped pioneer Macintosh mass storage back in 1985. Since then we have developed the most comprehensive line of storage and back-up solutions available. We offer internal and external hard drives, 45Mb removable drives, tape and DAT back-up, rewritable optical, and CD-ROM. Each has benefited from the efforts that earned our RM42 its 4 Mice rating.

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MP designates a Quantum drive mechanism.

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Since we know you’re pressed for time, we’ll skip the standard introduction and get straight to the point.

• Double Helix is the fastest multiuser relational database for Indexed Search:

Matching Records

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When speed testing the top Mac databases, Double Helix in multiuser mode won hands down.

the Macintosh. This, you should know, is not our personal assessment, but rather the conclusive results of MacUser magazine’s June 1990 speed-test. And of the four top databases, in five key commands, Double Helix finished first. By considerable margins.

WELCOME TO THE WORLD’S VERY FIRST MAC-BASED CLIENT/SERVER DATABASE.

• What makes Double Helix so fast?

Technically, it’s because of our advanced client/server format. Unlike file servers, which slow your system down by shuffling copies around the network, client/server lets all users work directly off a master. This keeps network traffic down. And productivity up.

In addition to speed, client/server provides another crucial benefit: total referential integrity. In other words, when one user makes a change to the master, the whole network gets updated—in real-time. On your screen. Right then and there. So everyone has the same data. And everyone’s in sync. The end result: a group that’s always working in one direction—forward.

• By the way, and for the record, we were the first ever to introduce a Mac-based client/server. And while it was revolutionary at its debut in 1986, it is, remarkably enough, still revolutionary today.

IMMEDIATE GRATIFICATION, RIGHT FROM THE START.

• Here is—and we quote—what MacWorld said in May 1990: “If you need a working database by Friday morning, and it’s now Wednesday afternoon...your best bet is Double Helix.”

Talk about fast. With Double Helix in hand and no prior knowledge at all, you can, in a matter of hours, mold Double Helix to conform to your individual needs. And as your needs change, so can, with minimal effort, your applications.

DOUBLE HELIX IS THE MOST AFFORDABLE MULTIUSER SYSTEM AVAILABLE. HONEST.

• How do we figure? For one, the multiuser application is already included in every Double Helix box. And unlike other databases, it doesn’t require any special fileserver software or hardware, saving you additional and quite substantial start-up costs. So with Double Helix, there’s nothing more to buy. Nothing more to install. And nothing more affordable.

THE FASTER YOU GET GOING, THE FASTER YOU GET GOING.

• We’ve just spent the last 456 words talking about how fast and affordable Double Helix is. Now you can spend the next 14 numbers confirming it all for yourself. Call 1-800-323-5433, ext. 234 and we’ll send you out a test flight demo and Quick Start instruction guide of your choice right away. After all, if you stayed with us this long, you’ve got no time to waste.

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Circle 238 on reader service card
ART BEAT

by Cathy Abes

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

Artist: A veteran Macworld illustrator who has used PixelPaint Professional and SuperPaint extensively, Scott Baldwin decided to try using Paracomp's Swivel 3D Professional about six months ago and has since used it to produce four illustrations for Macworld.

Hardware: Mac IIcx with 8MB of RAM and a 105MB Cirrus internal hard drive, SuperMac ColorCard/24, Kurta 12-inch-by-12-inch graphics tablet, Jasmine Removable 45 (SyQuest) drive.

Software: Swivel 3D Professional; Adobe Photoshop; PixelPaint Professional.

How It Was Done: For the illustration that opens our "Getting Started with Hardware Upgrades" column, Baldwin began in Swivel 3D Professional by creating the red engine block. He used the Extruded Object tool to create an object that he could then edit into the shape he wanted. Once the object was created, he worked on it in each of the four views Swivel provides: Object View (a wire-frame representation showing the object's position in the real world); Top Section, Side Section; and Cross Section.

Baldwin used Swivel's ability to embed objects within other objects for making the fan that's attached to the engine block. After he created the fan's central cylinder, Baldwin created one blade and duplicated it three times. Then he dragged all four blades toward the cylinder until they intersected it. Once the blades were embedded in the central cylinder, Baldwin examined them from different views—front, side, and top—to see how they were positioned relative to one another in three-dimensional space. After rotating each blade until it was accurately positioned, he used Swivel's Lock Link tool to lock the blades together so they would stay in the same position relative to one another when he moved them around—as if they were glued together.

Like the engine block itself, the circular air cleaner that sits on top of the engine block was also made using the Extruded Object tool. Baldwin edited the Cross Section view by making it into a Q shape: starting with a circle, he pulled out a little piece of it to make the tail of the Q. The top and side sections were rectangles whose proportions he altered slightly. The smaller circular object that sits on top of the larger one was created as a circle in the Cross Section and as rectangles in the Top and Side views, which made it a cylinder. To attach the cylinder to the Q shape, Baldwin grabbed the cylinder and moved it sideways and up and down in space until it was in the right spot, and then he embedded it in the Q shape. Finally, he locked the two objects together as he had with the fan blades.

To create the chains, Baldwin first created one link of the chain, then duplicated that and rotated it 90 degrees relative to the first link and duplicated those two. He continued duplicating chain links and changing the angle of each link until the entire chain was created. Then he used Swivel's ability to link objects together to make all the chain links into one composite object—the entire chain. That enabled him to move the chain around without changing the individual links' shape, proportion, or position relative to one another. To wrap the chain around the engine block, he rotated (continues)
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The air cleaner began as a cylinder from which a small extension was pulled out. The smaller cylinder was created separately and embedded in the larger one.

After he had created all the objects, Baldwin used Swivel’s six World Views (right, left, top, bottom, front, and back) to help position the objects accurately. To further fine-tune their positions, he then used Swivel’s View Angles feature, which simulates different types of camera lenses: Wide, Very Wide, Moderate, Narrow, and Orthographic. Baldwin used this last view because it eliminates depth-of-field distortion, making it easier to align objects.

Once all the objects were properly positioned, Baldwin added color. In a Swivel file, you can use up to 16 different colors and a range of lighter tints and darker shades of each color. Each object can be assigned one color as well as what Swivel calls an environment map, which is actually a two-dimensional surface such as wood or chrome that is combined with the color and mapped onto the 3-D object.

The Macintosh shape started out as a cube in Swivel. Because he couldn’t create the Mac’s recessed screen and inside view in Swivel, Baldwin created them in PixelPaint Professional. Under Swivel’s Effects menu, he chose Anti-Alias to smooth out the edges of all the objects. Next he chose Paint-Type and 24bit PICT under Output Style (Edit menu), then Export File (File menu). As a result, the file was saved as a 24-bit PICT file with antialiasing.

In PixelPaint, Baldwin added the screen and the inside of the Mac, the background, the rivets on the engine block, and the black oil slick coming out of the engine. He also did the gradations on the fan blades and cleaned up various edges. Finally, he made a few minor color adjustments in Adobe Photoshop.

The final Swivel image lacks a few details, most notably the Mac’s screen and recessed interior. Also missing are the rivets on the engine block.

The final image after the missing elements were added in PixelPaint Professional and minor color adjustments were made in Photoshop.
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Tea for Two
A TALE OF CORPORATE INTRIGUE INVOLVING SONY AND APPLE

BY STEVEN LEVY

It was a lofty ethical struggle, all right, when I was offered an all-expenses-paid junket to Japan, courtesy of the Japanese Trade Ministry. Would I be compromised by the cushy first-class accommodations, and perhaps the stray geisha? After a deep examination of my soul (which consumed somewhat less time than a font change on a 10-page Word file), I decided of course not! Even if I was, well, just a tad sullied by the proposition, could I really in good conscience deprive my readers of the opportunity to benefit from my newfound knowledge of the Land of the Rising Sun?

Certainly not! Oh, the sacrifices I make. And my instincts paid off. If I had taken the so-called high road and remained home, I would not be reporting the biggest scoop of my career.

How big? Read on.

This most extraordinary encounter occurred on the single free afternoon we reporters were allowed in Tokyo. I planned to spend it, like every other technology journalist who visits Japan, in the legendary Akihabara, the quarter of the city that specializes in electronics. I had heard that this was Wirehead Heaven, with every storefront brimming with esoteric and unspeakably cool items not yet rolled out in the United States. Indeed, it was everything I had hoped.

I turned to find three men in business suits smiling and bowing. “Are you Levy-san?” one asked.

I admitted as much.

“Please accept an invitation to tea from Mr. Akio Morita.”

“You would not be referring,” I asked, “to the chairman of Sony?”

The three men nodded vigorously.

They led me to a waiting limo, and after a brief ride I was escorted to a large glass-and-steel building and told to take the elevator to the 39th floor. To my astonishment, when the doors opened I found myself in a large, high-ceilinged space in which a traditional Japanese rock garden had been constructed many stories above the city. Kneeling in front of a tea bowl was the familiar figure of Morita, who had built the vast Sony empire. He looked up in welcome.

The Art of Tea

Fortunately, I have been trained in the art of tea, and knew how to make my way across the room, kneel properly, and utter the appropriate praises about the setting. “That tea bowl,” I said, “is profound yet insouciant. Kind of luxuriously nonchalant.” He beamed his approval at my (continues)
grasp of the subtle contradictions inherent in his culture. After we executed the elaborate, centuries-old tea ritual—altered only by the fact that the tea-making apparatus, apparently a result of very-large-scale circuit integration, was the size of a postage stamp—we ceremoniously smacked our lips and talked business.

"What do you think," he asked, so softly I was straining to hear him, “of Sony Corporation owning Apple Computer?”

In true Zen fashion, I responded to his question with a query of my own. “Are you planning a takeover of Apple?” I stammered. I held my breath anticipating his reply.

“No,” he said.

I let my breath out. I sipped the tea.

“We already own it.”

I spit out the tea.

“We have owned Apple Computer for several years now,” said Morita. “It was a major stock transfer, executed secretly. The Apple executives cooperated, mainly because they realized that Apple would be unable to continue its executive salaries and perks indefinitely. After all, the cash reserve was only a billion dollars or so—and the way executives move in and out of Apple, who knows how long that would last? Since Apple very much valued its reputation as a company whose executive salaries are the envy of its more rational competitors, the officials decided that they would link with Sony. Also, they figured that if we owned them, they would never have to design their own disk drives and repeat the Lisa debacle.

“As far as Sony was concerned, we had long coveted the company. Besides, those of us who use a Macintosh couldn’t figure out any other way to get customer support from Apple. Every time we called them with a problem, they said, ‘Go to your dealer.’ So we decided to buy them, and now the people in Cupertino are our employees. Now they not only help us when we have a system crash, but they accept our calls collect.”

I’ve Got a Secret

“That is impressive,” I said. “But why was the deal done in secret?”

“We very much feared the reaction of the American people. After all, Apple is a legend, as American as Rockefeller Center and Bruce Springsteen. The two Steves in a garage, and all that. If Americans felt that the Japanese owned its computer industry, there might be trouble. So we devised a scheme. We would clandestinely buy Apple but then arrange it so that the company would be so poorly managed that it would sink. Only then would we appear as a white knight, saving American jobs.”

I wanted to know what he meant by mismanagement.

“Take for instance Apple’s marketing. Even a simpleton could understand that the main advantage of an Apple computer was its interface—its integration and its ease of use. All one would have to do was explain to (continues)
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the consumer why Macintoshes were superior. Then everybody would want one, and people in business who didn’t use a Macintosh would suffer shame. But instead of that, Apple decided to show pictures of cars that flew.”

“Gee,” I said, “I thought the misguided advertising was just the kind of blunder that any big company could make.”

Morita snorted. “Hah! Do you really think that a marketing genius like John Sculley would make such mistakes? He is the mastermind of the Pepsi generation! He approaches marketing as an art form, much the same way Leonardo painted. Haven’t you read his book? It’s all in there. Don’t insult him by thinking that he could err so thoroughly in selling his computers.”

I conceded the point. But I asked for more proof of this astonishing scheme.

“Surely. Every Japanese businessperson knows the major advantage we have over Americans. It’s not that we work harder—in fact, we have been constantly astonished at how Apple employees, at least those who actually work with computers, spend all their hours at work. No, American businesses suffer because of lawyers who draw managing and creative energy into meaningless legal battles. So at Apple, we simply let the lawyers run wild. They sue everyone in sight. And they insist on approving everything that happens at Apple. And with the lawyers dictating the security rules at Apple, we’ve managed to make the employees all paranoid!”

I agreed there was no better way to stop a company dead in its tracks than to unleash the lawyers.

“But you know what was really funny?” Morita said thoughtfully. “Some of the lawsuits were launched just to tangle things up—and to our surprise they weren’t thrown out of court! Who would have thought that our copyright claims to the Mac interface would still be alive, when at the same time Xerox has been denied any claim to copyright—and Xerox invented the interface! Really, your American legal system is remarkable.”

**Mysteries Resolved**

The plan was indeed ingenious. “And if any of the executives figured out what was happening, it didn’t matter,” said Sony’s Big Sushi. “They were gone in the biannual ‘reorganization!’”

“So that’s what happened to Gassee,” I said. “But Akio-san, tell me, does the Macintosh Portable figure in this?”

“Naturally. Of course we had to lend Apple some of our expertise in devising small-scale technology. As novices in making portable computers, the Apple engineers couldn’t have possibly figured out how to muck up a product so thoroughly without some guidance. So we concocted a plan for the ideal portable and had them do the opposite.”

I thanked him for explaining that mystery; previously I had been unable to make head or tail of Apple’s poor excuse for a portable computer.

*(continues)*

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"But wait a minute," I said. "What about the low-cost Macs? That seemed a pretty smart thing to do. How does that fit into your plan?"

Morita looked pained and fell silent for what seemed an eternity. Finally, he spoke. "Levy-san, you have correctly perceived what has turned out to be our chief difficulty. Explaining it will require a story." He poured more tea, took a deep draught, waited for me to follow suit, and continued.

"The beauty of our plan was to be total integration of all forms of software—now that Sony owns CBS Records and Columbia Pictures, we can merge those forms of entertainment with the information-processing power of personal computers. But then we learned that by owning Apple Computer, we were unable to participate in those areas. This time the lawyers worked against us."

"Are you referring to the lawsuit filed by Apple Records, the Beatles' former company?" I asked. "The one where Apple Computer, in exchange for continued use of the name, signed away its rights to process music on computers?"

"The same," said the venerable master. "It could have ruined all our efforts. The only way we could settle matters was to take on a partner. And this new player felt that our efforts to weaken Apple were excessive. She insisted that we abandon the linchpin of our plan—to keep Macintosh prices high and never attain healthy market share. In order to placate her, we accepted. And now it will be years before the company is sufficiently weak for us to announce our takeover. Even the silly commercials we ran when the new computers arrived—the one where the teacher invokes the Industrial Revolution and falls again to explain why a Macintosh is a good computer—didn't discourage people. They want Macintoshes."

I sighed in sympathy. "That's not all. We have to cope with the constant interference from this partner. Phone calls all the time. Try this, change that... it drives me wild. Even dropping in unannounced."

Double Fantasy
As if on cue, the elevator doors opened. Morita-san flinched. Through the doors walked a well-known, diminutive figure with aviator sunglasses—Yoko Ono.

"Akio, you don't fool me," she said, not bothering with formalities. "The reason why you can't supply dealers with enough Mac Classics is that you're still trying to weaken the company. Forget it! Let's get Apple strong again!"

"See what I mean?" he said to me. Yoko hardly stopped for breath.

"And those stupid advertisements—they ruined the World Series for me! Well, don't worry, I have a new jingle for Apple that will turn things around. It was dictated to me last night by John."

"John Lennon came back from the dead and dictated an Apple jingle to you?" I asked.

"No, silly, John Sculley. He's a marketing genius—haven't you read his book?"

I admitted that I had.

She pulled out a small Casio keyboard and began singing in that unmistakable fractured soprano:

"Imagine there's no Windows, It's easy if you try..."

At that point Morita leapt to his feet, overturning the tea bowl. "Stop it!" he cried. "I said I would go along with the joke—only if you didn't sing." He turned to me. "We don't own Apple. We never did. It's only an April Fools' joke! I'm sorry we had to put your readers through this."

"We had you going there, though, didn't we?" said Yoko, grinning widely.

I admitted that they did. We all had a good laugh, as good a laugh as three people can share considering that we were really not together, and that the rock garden 39 stories over Tokyo was only a knee-slapping construct of my imagination. After promising my companions that I would inform my readers several times—this is an April Fools' joke, this is an April Fools' joke, this is an April Fools' joke—I got up to leave.

It was time to defrost my Ice-Man.

Steven Levy, a Macworld columnist, is currently writing a book on artificial life.
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Jasmine officials say that the company is back on its feet, making a profit, answering its phones, and providing good products at good prices. But some Jasmine customers say the company refuses to honor its warranties and is still impossible to reach. I met with Jasmine officials recently at their modest Sunnyvale, California, offices to get a progress report on the company and find out why consumer complaints continue to surface. The answer, at least in part, is that Jasmine Technologies is a different company, both legally and in practice, from the fat-cat vendor that was forced to file for protection from creditors nearly one year ago. The reorganized company moved from expensive new offices in San Francisco to more affordable space in Sunnyvale in October. The employees, some 125 before reorganization, have been trimmed over time to about a quarter of that number. And tech support and service have also been cut, all in an effort to bring Jasmine back to life.

In the process, Jasmine has essentially decided to cut its losses on old customers and concentrate on drumming up new business. During the reorganization proceedings in May, for example, new Jasmine officials pledged to honor the warranties on all existing Jasmine drives. But now the company says it can't do warranty work on its old 20MB model. Jasmine used a manufacturer's warranty from MiniScribe to cover repairs to its 20MB drives, but then MiniScribe itself went into bankruptcy proceedings and declined to uphold its own warranties. That put Jasmine in a tight spot. The MiniScribe mechanisms are difficult to fix and often break promptly after repairs, according to David Guo, Jasmine's product director. And up until November, Jasmine was still losing money and could ill afford to put cash into MiniScribe repairs. It's a matter of survival, according to the company. "We had to concentrate on new sales and new customers in order to break even," said CEO Marc Frouin.

That decision didn't endear it to Macworld readers like Rick Levine of Chicago. "I'm not asking for much," wrote Levine. "All I ask is they either honor the warranty [or] replace the equipment ... so I can feel that the $1000 or so I've spent over the past three years with the company wasn't for nothing." After Levine wrote to several consumer agencies with his complaint, Jasmine repaired and returned his drive. But apparently some 220 other Jasmine customers won't be so lucky. According to Guo, about 30 percent of the 20MB model owners have opted to upgrade their drives at a discount representing savings of $70 to $140, depending on the upgrade. Other owners are being referred to DriveSavers (415/883-4232) of Novato, California, and Mipro III (415/306-1100) of Redwood City, California, for repair service. (DriveSavers charges $125 for the repair, with a 90-day warranty on the drive; Mipro charges $145, with a 9-month warranty on the mechanism.

(continues)
Conspicuous Consumer

Jasmine says this is a short-term issue because the remaining 20MB drive warranties should have expired by February of this year. But that’s not the only problem readers have complained about. Why has it been so tough to get through to tech support? Why haven’t drives been repaired quickly?

According to Jasmine, the move to Sunnyvale created a backlog, but of greater impact was a vicious cycle that kept the tech-support lines busy. The department was overwhelmed by people calling to get the status of their drives—250 calls were coming in per day. “If we can’t fix the drives, people are going to call, but if people call, we can’t fix the drives,” said Guo, who was hired in October to help solve the problem. He said that people hired to do tech support were spending two-thirds of their time making repairs.

Guo established a new tech-support policy to answer every phone call, even if it meant slower service, in an effort to improve service overall. So Jasmine implemented a call-back service late last year in hopes of “eliminating phone-tag and having the wrong person call back . . . And people don’t have to worry about additional long-distance charges, since Jasmine returns the phone call,” said Guo. (This was not Levine’s experience in November, but I had no problems getting through when I called in January.)

Another change is in the breadth of tech support. “Jasmine tech support used to provide a lot of tech support on non-Jasmine questions, such as questions about software INITs,” said Frouin. “Ninety percent of the time it wasn’t about the drive. We’re not a Macintosh-support organization, we’re a Jasmine-support organization.” Frouin argues that the small profit margins of the drive business can’t support greater service.

“I understand why people are upset,” said Nathan Schulhof, vice president for sales and marketing. “If I were a user, I wouldn’t accept Jasmine’s answer.” Schulhof said that the company tried to repair the drives at first, but the drives often failed again, making customers even angrier at Jasmine after waiting months for a repaired drive. He told me that Jasmine officials do care about their customers, offer the best prices possible, and work hard to create new innovative products. With that, he showed me a prototype of Jasmine’s nifty new pocket-size drive, which uses a 1-inch mechanism. He also discussed the inexpensive libraries of popular software that Jasmine will be offering as an option with its drives.

As I was writing this column, I called David Guo for an update. At that time there were 435 drives waiting for repair, not including the 20MB models—about a three-month backlog. Some 45 repaired drives had been returned to customers that day. On the same day I received a call from a reader who bought a portable drive from Jasmine. The drive arrived without a manual and with old Jasmine address and telephone information. “What’s going on at Jasmine?” the reader asked.

Good question. Here’s another one. Why did Jasmine quote different SIMM prices on the same day? Jasmine’s supply of $39.95 SIMMs disappeared rapidly, so many readers of the January and February issues were quoted a higher price than that advertised. When pressed, Frouin said Jasmine would honor the $39.95 price until February 1. But when Macworld called to place an order on January 31, a salesman quoted a price of $44.95 per SIMM; another said the price was $54.95 per SIMM. (Current ads note that the price of memory may change.)

It’s quite remarkable that Jasmine emerged from Chapter 11—few companies do. The new officials seem sincere, concerned, and determined; and none of them were part of the old Jasmine. They remind me again and again that this is a new company legally, a start-up, supporting a huge installed base, with very few resources but now making money to the tune of $1 million in monthly sales. Fair enough. But they promised to honor all Jasmine warranties, and now they’ve broken part of that promise. So here’s a reminder that products aren’t enough—service counts, too, and consumers don’t have the same patience with the new Jasmine that they had with the old.

(continues)
The difference between our JPEG compression solution and theirs is obvious.

There's a big difference between our high performance compression/decompression solution and C-Cube's — ours is available now.

And that's not the only difference.

The Micron Xceed™ ICDP-II with Storm Technology's PicturePress™ software offers a variety of features you can't get with C-Cube's CL550™-based products. Like fully adjustable compression settings, thumbnail views, software easily upgraded to future JPEG versions, lossless compression and JPEG++™ — an exclusive feature that allows you to compress different user-selected parts of the same image at different quality levels.

Now you can compress large files down to 1/80th their original size, saving disk storage space and speeding up transmission time. And you can compress and decompress up to 50 times faster with the PicturePress Accelerator than with software-only solutions.

Like all Micron products, the Xceed ICDP-II is backed by our extended five-year warranty and toll-free, technical support hotline.

So call us at 1-800-642-7661 for more information and the name of your nearest authorized dealer. And find out how, at $995, the Xceed ICDP-II for the Mac® II family is obviously different, and obviously better.

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Our commitment to you:

After Hours Software TouchBASE
TouchBASE is a database to keep track of personal and business contacts. It's handy all the time because it is a desk accessory. TouchBASE can print envelopes, labels, address books, fax cover sheets, and reports. It's even a multi-user product so you can share your database on a network or use it all by yourself.

TouchBASE .................. $85

Fuji Floppy Specials
DS/DD 10 pk Rainbow ....... $9
DS/DD 10 pk Rainbow ....... $7
HD Rainbow 10pk ............ $15
White Supplies Last

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Taste blends the best and most often used features of word processing, page layout drawing, and personal data management into one elegant, easy-to-use package. With multiple stationery documents, you control the document types you use most frequently.

Taste ....................... $85

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ADDMotion
ADDMotion is the first animation and color paint program to be fully integrated with HyperCard 2.0. With ADDMotion you can quickly and easily add animation, color and sound to any HyperCard stack. It can be used by anyone who wants to create exciting presentations, develop interactive training systems, or simply have fun.

ADDMotion .................. $182

LISI Sales & Marketing Manager
In this world of fast paced markets and even faster paced sales you must have the marketing software to keep up with the world. Sales and Marketing Manager is a 5 part program that improves your control of all sales and marketing. It allows you to set up individual companies or divisions. Whether you are one sales person working for many companies or one company with many divisions you can now keep full control. Ideal for $395.

Sales & Marketing Manager ................ $295

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Adobe Hotline
1-800-258-1233

Adobe Systems
Type-On-Call
CD-ROM Disk
Type On Call offers over 800 Adobe Type 1 fonts on a single CD-ROM in a new accessible format Get new fonts with a simple phone call to the MacZone. Simply by purchasing access codes over the phone, type-on-call users can obtain new fonts from the disk. Initial purchase entitles you to two free fonts of your choice and includes Adobe Type Manager 2.0. Type On Call is the quickest and easiest way to buy fonts — once you have the disk, every font is a simple phone call away!

Type-On-Call Introductory Price .................. $48

FREE with purchase of select CD-ROM packs. Call for details
Adobe Photoshop

Adobe Photoshop is the affordable Macintosh image-processing program with enough power and versatility to be used as a paint, pre-press, color corrections and darkroom system. And it does all in living 24-bit color. Whether you start with scanned photographs, slides, electronic art works from scratch, Photoshop’s full range of filters, painting, drawing and selection tools give you the artistic control and precision you’ve been missing.

Photoshop 1.07 .................................. $498

Adobe Photoshop 1.07

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Photoshop 1.07 .................................. $498

Timbuktu

Timbuktu links all the Macs on a LocalTalk network (with password protection). The Desk Accessory opens and closes files, and actually operates the software on another person’s Mac. This makes Timbuktu especially good for training others on how to use an unfamiliar application. With version 3.1 you can now send files to others or let them copy to or from yours. And, you can operate files served in distant rooms – from the comfort of your own Mac.

Timbuktu ........................................ $92

Graphsoft

MiniCad + 3.0

MiniCad+ is a product that integrates a spreadsheet and a relational database into a drawing so you can keep track of costs as the design evolves. Database information linked to a particular object stays with that object even when it is cut and pasted into another drawing. MiniCad also has a built-in programming language and a “smart cursor” to aid in the finer points of drafting.

MiniCad+ 3.0 ................................... $595
You can call in 3 rings* or shipping is FREE with your purchase

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Best Data-Management Product

Fairfield Software

ClearAccess

Utilizing a simple, graphical interface, ClearAccess allows a user to create SQL-type queries to most relational databases by just pointing and clicking on the data items they want. Queries can then be recorded as "scripts" while they are being executed. ClearAccess makes host-based data access a natural and transparent part of the user's experience.

ClearAccess $405

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Smack-a-Mac Stuffed Mac II

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Paracompe FilmMaker

The Eddy Award winning FilmMaker is the masterful animation and multimedia graphics program. This amazing application allows the user to create professional quality presentations and animations quickly and easily! Hours and hours of hours in other applications can now be done in just minutes with FilmMaker. Whether you are a professional animator or want to make stunning effects for video, or just someone who wants to put their ideas in motion - FilmMaker is the ultimate answer.

FilmMaker $438
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Classic 1MB Upgrade .......... 135
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40Mhz w/o FPU ................. 995.
40Mhz w/FPU .................. 1225.
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Bulk OS/DD (50 pk) ............ 39.

Sat & Sun 9am to 9pm Eastern Time

Prices are subject to change without notice.

Symmetry Mariah
Mariah is the first true multimedia organizer that lets you manage graphics, sounds, animation and text files together in a high-speed environment. Unlimited size and number of collections! Cut & Paste between collections and applications. Play sounds and animation. Record audio items directly. Import and export Sound and PICT resources to other applications or documents such as HyperCard.

MacPlus, SE & llcI ............. 524.
SIMMS
4mb SIMM packages come with free Novell disk software.
1mb BINS Call for lowest price.
1mb BINS for NTX ........ Call.
2mb Module for SE & llcI .... Call.
1mb BINS for Fr qt y 4 ........ Call.
2mb BINS for Fx, ox, or 220.
Quadra 113.0 .................. 84.

Mac II .................. 1590.
Gemmil (Required to install the Gemmill or Gemini II boards in any Mac below an SE model).
Includes internal fan, SCSI port.
Specify US or left vers y .... 125.

DayStar Digital
SCSI Accelerator - w/o SIMMS
SSCSI PowerCard ............ 1,025.
RAM Expansion - w/o SIMMS
RAM PowerCard ............ 625.

Dove
MacScrap Upgrades
52X/44SE (12X to 1MB) .... 195.
52X/69SE (12X to 96X) ..... 260.
59SE (12X to 4MB) ........... 390.
59SE (16X to 4SE) .......... 455.
Marathon 020 Upgrades - Bundled w/ Virtual
Mac Plus, SE, & II ........cc 524.
SIMMS
4mb SIMM packages come with free Novell disk software.
1mb BINS Call for lowest price.
1mb BINS for NTX .... Call.
2mb Module for SE & llcI .... Call.
1mb BINS for Fr qt y 4 .... Call.
2mb BINS for Fx, ox, or 220.

Mac V.30 ........................ 1150.
46Mhz oxo ...... 1275.
Quickscane ........ 45.
QuickCache II .................. 45.
Gemmill (Required to install the Gemmill or Gemini II boards in any Mac below an SE model).
Includes internal fan, SCSI port.
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Orange Micro
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Mac 80 v.3.0 .................. 444.
Orange 386 .................. 1,695.

Total Systems - Accelerators
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Gemmi
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25 Mhz oxo .......... 960.
Gemmi II
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46 Mhz oxo .......... 1275.
Quicksane ........ 45.
QuickCache II ........ 45.
Gemmill (Required to install the Gemmill or Gemini II boards in any Mac below an SE model).
Includes internal fan, SCSI port.
Specify US or left vers y .... 125.

DataCache
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QuickCache II .................. 45.
Gemmill (Required to install the Gemmill or Gemini II boards in any Mac below an SE model).
Includes internal fan, SCSI port.
Specify US or left vers y .... 125.

Hyades
Mac SE .................. 1590.
Macox .................. 1730.
Mac 86 v.3.0 ............... 444.
Orange 386 .................. 1,695.
Quark XPress 3.0

Quark XPress 3.0 boasts a more intuitive user interface, many new features, plus redesigned and reorganized documentation. New measurement and page palettes provide the user with interactive onscreen access. A library stores frequently used items, and a pasteboard provides a work area next to each page. You can group text and graphics as single elements, and rotate them a full 360 degrees in 0.001 degree increments. Color trapping ensures precise color printing. XPress was also awarded Honorable Mention in both Best Color PrePress and Best Page-Design categories in the MacUser Magazine Eddy Awards.

XPress 3.0 .......... $518

Quark Technical Support: 1-800-642-6257

Dantz

Retrospect 1.2
With Retrospect, you can remove seldom-needed files to permanent storage, and free up space on your hard disk. It works with almost any media, from floppy to rewritable optical discs. Retrospect maintains a catalog on your hard disk so you always know where to look for your archives or back up files.

Retrospect 1.2 w/10 Pk Remote .......... $264
Retrospect 1.2 .......... $143
Retrospect 10 Pk Remote .......... $149

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Zedcor DeskPaint 3.03

DeskPaint is a 98K DA that works as well with black & white images on a Macintosh Plus or Classic as it does with color images on a 1I5l or lfx (even in 24-bit color). It reads and writes PIC, TIFF, and MacPaint files it does smoothing, auto-trace, graduated fill, multiple windows, and a lot more. DeskDraw is a DA comparable to MacDraw. Some of its features include hairline, rotated text and arrows. It reads and writes PIC files capable with SuperPaint, MacDraw II and Canvas
DeskPaint 3.03 .......... $113

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STORM TECHNOLOGIES

PicturePress

PicturePress compresses and decompresses 24-bit color images 10 to 60 times, using the emerging Joint Photographic Experts Group international still image compression standard. PicturePress operates alone or can be accelerated 20 to 50 times by the PicturePress Accelerator Card. a programmable 60 MIPS image processing NuBus Card.

PicturePress .......... $120

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**Business & Presentation**

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**Meca Software, Inc. Managing Your Money 4.0**

Andrew Tobias: Managing Your Money is personal financial software that in includes powerful financial "chapters" that provide everything from basic budget and checkbook management to life insurance and tax planning, even complex portfolio management. These integrated chapters allow transactions made in one part of the program to be automatically recorded in the other chapters.

Managing Your Money .......... $134

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**Total Systems Gemini Accelerator Boards**

Put the power of the latest Macs onto your Mac SE, Plus, 512 or original 128 Mhz, with Total System's Gemini 88030 Accelerator cards. Gemini pumps up your Mac's humble 8 Mhz 68000 to dizzy-shattering 20 33.44 or 50 Mhz. The MacZone also carries other Total Systems' accelerators, including Voyager cards for your Mac.

**Gemini Boards** Starting at $765
Cutting Edge 15" Full Page Monitor
You can now eliminate all the scrolling, scrunching and squinting of small screen Macintosh computing. Word processing, financial analysis and graphics have never looked as good as they do on this full screen viewing area. The monitor can display an entire 8 1/2 x 11 inches of screen with a flicker-free refresh rate of 75 Hertz and a high resolution of 840 by 670 pixels.

$579

Sigma L·View Multi-Mode Monitor
An ergonomic monitor design offers user-oriented details like a tilting swivel base and paper white phosphor. L-View's Low-Emission design meets guidelines for electromagnetic field emissions established by the Swedish National Board for Measurement and Testing. L-View includes video card, 19" monitor, control panel software, and user's guide.

$1475

E-Machine T·16 Color Display
Spread out with almost twice the display area of the standard 13" color monitor. View your work exactly as it will be printed at actual size - 72 dpi. Save almost one half the cost of a 19" color monitor. Get the sharpest, clearest color display at any price. The T16 has excellent colors, linearity, and sharpness, and it sells for a lot less than its larger cousins. The T16 is an excellent choice for CAD/CAM or color graphics. Retail $2995.

$2275

Mega Graphics Rival B & W Monitor
The officially acclaimed Mega Graphics Rival is now available for all Macintosh models. It gives you the most crisp, most clear, and brightest image in the business, with true 'What you see is what you get.' Because the 19" screen displays two facing pages, it is ideal for use in desktop publishing, layout and word processing. The wide expanse of workspace is an enormous benefit when using CAD and spreadsheet applications.

$1199

VIDEO BOARDS & MONITORS

Micron - 8 Bit Color Cards
Resolution 640 x 480
Mac II or SE/30 ........... 345.
Resolution 1024 x 768
Mac II or SE/30 ........... 585.

RasterOps
ClearVideo/SS Gray Scale
System Mac II & SE/30 .... 1692.
Colorboards
208 (II, IIx, IIIc, IIcx) .... 290.
264 (SE/30 - 13") ....... 525.
264 (Mac II - 13") ....... 435.
264 (Mac II - 13") ....... 555.

RasterOps
Multi Media
364 w/AudioMedia ........ 1529.
364 w/Director ............ 1295.

Sigma Designs
L-View Multi-Mode
SE/30 or Mac II .......... 1475.

PageView
SE, SE/30 or MacII .......... 850.

SilverView for Mac II .... 1850.

Color Max 24 ............ 4350.

Sony - Color Melliscan
14" 1304 HSG Color ........ 825.

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Plus ..................... $679

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Rodime R45 PLUS Removable Hard Drive
The R45 PLUS has a 44 megabyte removable capacity and a fully embedded SCSI controller. Because the cartridge is removable the R45 PLUS virtually offers unlimited storage. The half-height 5.25 inch drive has a average access time of 20 milliseconds and a disk transfer rate of 10 megabits per second. The transportable, rugged cartridge media assures user security and portability. The R45 PLUS offers users an expandable systems with limitless applications.

R45 PLUS Removable Hard Drive ............ $589

Jasmine
40 mb Portable Hard Drive
Jasmine Technologies has consistently finished first in the MacUser Lab's Buyers Guide and we've been praised in every major Macintosh publication for the quality of our drives and for the ease of use in DriveWare, our custom drive utility. DriveWare provides the best SCST partitioning, password protection, error correction, diagnostic and help software. And included with this drive is two award-winning utility packages, Sum II and Virex plus over 10 megabytes of Shareware and Freeware programs.

40 mb Hard Drive .................. $299

EMAC Impact Drive
The EMAC Impact hard drives pack all the power and convenience of a full-sized drive into a compact chassis. Now all your files and applications can be stored in one easily accessible location. Impact drives come in three capacities and are built with precision-engineered drive mechanisms for whisper-quiet, high-speed operation.

80 mb Drive ......................... $805

PLI Infinity 40 Turbo Removable Hard Drive
The Infinity 40 Turbo uses PLI's turbocharged drive software to attain a 20ms access time, and with the TurboCache disk accelerator software and TurboBoost, you can achieve near zero effective average access times. This removable 45MB drive gives you infinite storage potential with removable cartridges. Each one holds 44MB and costs only slightly more per megabyte than floppy disks.

40 Turbo Removable ............ $750

Cutting Edge
20 Mb Drive
Cutting Edge hard drives represent the best value in Macintosh storage. Major enhancements include quieter fan, two power outlets and added surge protection.

20 Mb Drive $299

LaCie Tsunami
Tsunami drives come initialized with SilverLining, the standard of hard disk utility software, and SilverPlatter, Apple's system, five megabytes of public domain software and Norton Utilities are also included on the drive. Ask your MacAdvisor about the new 2+ plus warranty on Tsunami drives.

40 Mb Drive ............ $550

LaCie

EMAC Impact Drive

EMAC Impact Drive

EMAC Impact Drive

Data Storage Devices

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<td>720</td>
<td>100MB External</td>
<td>105MB Internal</td>
<td>105MB PlS External</td>
<td>120MB Internal</td>
</tr>
</tbody>
</table>
Plug this in... Supercharge all of your hard drives.

DayStar's SCSI PowerCard
A computer on a NuBus Card, that boosts performance of optical, CD-ROM, SyQuest and all standard hard drives.

Hard drives are a major performance bottleneck — even Mac IIx users are suffering. DayStar's new SCSI PowerCard breaks the bottleneck by supercharging SCSI hard drive performance. The SCSI PowerCard gives all drives the ability to perform like superfat RAM disks — getting data to and from your applications at lightning fast speeds.

World's Fastest Performance
The SCSI PowerCard works with all standard hard drives, including optical, SyQuest and CD-ROM. It's so powerful that even slow optical drives perform disk intensive tasks at double the speed of a WrenRunner IT — the world's fastest hard drive. This is true whether you plug the SCSI PowerCard into a Mac II or IIx.

A Computer On A NuBus Card
The SCSI PowerCard is much more than "just a fast SCSI chip" — it's a complete computer with processor, memory and special cache software. It has the ability to expertly cache megabytes of hard drive data in its large RAM buffer and instantly provide just what your application calls for.

Applications Run Faster
The SCSI PowerCard boosts productivity within all applications. DTP and pre-press users can scroll, paint and modify images two to three times faster. Software developers can compile application code in half the time. Rendering is twice as fast. It even triples the speed of database searches and sorts. Or, plug it into a file server — multi-user applications will run up to four times faster.

Easy, Quick Installation
It's as simple as plugging in a NuBus card. We give you an illustrated manual that takes you through step-by-step. Special software makes operation automatic, or you can customize tailoring it to meet your needs. Have a problem? Call our tech support department. They know their stuff and want to help.

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Grumbles about Ehman and Crate
As long as I'm calling companies to task for service problems, here's a quick note about Ehman Engineering. The company faced a rash of complaints about service last fall, many of them posted in its America Online forum. (My favorite exchange involved an irate customer and company head Michael Ehman, who suggested the customer was acting like "a horse's ass." But according to Ehman, that wasn't from him, but from an employee no longer with the company.)

The company concedes there have been problems but seems to be working on it. "I think what happened is that we went through rapid growth and all of a sudden there was a huge base of users. Our tech support got overwhelmed," said Michael Ehman. "The bottom line is that we sell a huge amount of stuff. When you do that, you're going to have problems."

One planned improvement is a new computer system with bar-coding capacity to keep track of all the drives. Ehman has hired a consultant to work on problems. And the company hopes to do more remote troubleshooting.

In other news, Data Storage Development, the storage company that bought the assets of Crane Technology last year and is headed by Crane's former president, Chris Lemoine, has reneged on its promise to honor Crane warranties.

Landmark VDT Legislation
The nation's most comprehensive ordinance governing the use of video display terminals (VDTs) was approved by the city of San Francisco in December. The regulations cover workers who use VDTs four hours or more per day in businesses with 15 or more employees (with some minor exceptions).

The main provisions of the ordinance make employers responsible for providing workers with adjustable chairs and adjustable monitors. Glare screens, wrist rests, footrests, and document holders will be available to workers upon request. Alternative work or rest breaks of 15 minutes are mandated after every two hours of keyboard work. And employers must provide information and training about the health and safety concerns associated with VDT use.

This landmark ordinance was some four years in the making and faced stiff opposition initially from the business community. The VDT Coalition, which is made up of several union locals and a number of injured VDT operators not represented by labor, spearheaded the effort to pass the bill as the local Chamber of Commerce worked to defeat it. But a spirit of compromise reigned, and the Board of Supervisors adopted a three-phase schedule for implementation.

New workstation equipment purchased 12 months or more after the bill's approval must meet the new standards. Within 30 months, companies must spend up to $250 per workstation upgrading existing equipment to meet the guidelines. If more than $250 worth of improvements are required, companies have an additional 18 months in which to bring their VDT workstations into full compliance.

Originally the ordinance gave employers only two years to meet the VDT standards. "Basically the business community was saying to us that the normal computer life span is four years," said Barbara Kellogg, co-chair of the VDT Coalition and a representative of the Service Employees International Union Local 790. "Many of the companies were in the process of just upgrading their equipment." Businesses argued that if they had only two years to meet the standards, they would simply upgrade existing workstation equipment, but given four years they would buy new (and presumably more ergonomic) workstation products.

One provision dropped from the original bill mandated a 5-foot distance between workstations to protect VDT operators from electromagnetic emissions. "The whole issue was dropped for legal reasons," said Kellogg. "Our attorneys told us that existing documentation and existing language was not defensible in court." Instead, the advisory committee established by the ordinance is supposed to report back to the Board of Supervisors on the methods to protect VDT users and other workers from possible emissions, as well as the impact of VDT use (continues)
But why take a chance? Sure, we’d heard about virus protection. But it was hard to believe our innocent little Mac could be a breeding ground for computer disease and disaster. Until we started sharing more data disks. And spending more time online. Suddenly it really made sense to protect ourselves.

So we decided to play it safe. The last thing we wanted was some complex paranoid program that kept interrupting us while it went on search and destroy missions. We wanted a program we could load and pretty much forget about.

That’s why we chose Rival. It automatically checks all our files as they’re opened (even INITs). If it finds any viruses it fixes them on the spot. And we can get new vaccines free from our user group or electronic bulletin board (or by subscription for a small fee).

So when it comes to virus protection, take our advice. Don’t get scared. Get Rival.

“faster and easier to use . . .”
—MacWEEK, July 10, 1990

“...has replaced SAM as my preventer and checker of choice.”
—MacUser, September 1990 (5 Mice)

on pregnancy and other health issues.

Even though the San Francisco legislation has passed, it may still be overruled. Similar legislation in Suffolk County, New York, was overturned by a court, and one of the supervisors who voted against the San Francisco bill is threatening a legal challenge. There’s also the possibility that business interests may push for weak state legislation that would take precedence over San Francisco’s VDT law. “I think the struggle at the state level will be over to what extent the state legislation can have teeth,” said Kellogg. “So far [VDT] bills have been extremely watered down, and even then they’ve been vetoed.”

The Los Angeles City Council is considering a similar ordinance, and officials from several states have also expressed interest in the bill. Contact San Francisco Board of Supervisors’ office at 415/554-5184 for copies of ordinance number 405-90.

(Research assistance by Carolyn Bickford.)

Send nominees for sainthood to Service Heroes, Macworld, 501 Second St., San Francisco, CA 94107 or via AppleLink (Macworld) or America Online (Branscum). Conversely, drop Conspicuous Consumer a line if a company is ignoring you.
Have you ever noticed the way your colleagues use graphics? How they seem to make their reports and presentations come alive? Chances are, they're using MacDraw II software, the most popular drawing tool for the Macintosh.

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The Rival 19" Monochrome Display by MegaGraphics (see photo above)
MacWorld Magazine rated the Rival the top performing WYSIWYG big screen — outranking dual-page displays costing much more.

BONUS! When you purchase a MegaGraphics monitor you’ll receive a Coupon Book with over $4,400 savings towards a variety of Mac products!
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The MacPro Plus by Key Tronic
No matter which Mac you use, old or new, the MacPro Plus keyboard gives you the ability to get you through your work faster and easier. The 105-key layout is similar to the Apple Extended Keyboard, but with more features. Also included is a free copy of Tempo II Software ($99 value) .......... $119
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- Radios Pivot Ix/ii/iii $1199
- Imagis CT20 20" TrimLine w/8-bit card $2799
- RasterOps 8LC System $2759
- RasterOps ColorBoard 264 (Mac Ix) $539
- RasterOps ColorBoard 364 (Mac Ix) $949
- Micron 8-bit Video Card (Mac Ix/ii/iii footprint) $349

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**EtherNet Products from Dayna**
- DaynaPORT network interface cards let you connect your Mac to thick and thin cable and twisted pair Ethernet based AppleTalk networks. With the DaynaPORT cards, you can share Ethernet system resources such as printer, modems, electronic mail, file servers and file transfering with other network hosts.
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Now you can get the entire Adobe Type Library on a Macintosh formatted CD-ROM. The fonts arrive locked; you can "unlock" as many as you wish to instantly obtain your new typeface. Simply call CDA to purchase and receive the access code necessary. Initial purchase includes the CD-ROM disc, Adobe Type Manager (including the base 13 fonts), bitmaps of all of the fonts included on the disc, and access to 2 typeface packages to be selected from a list of eight. Or purchase all eight and save over $200!
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LiteShow II works with any multi-sync monitor or video/data projector. But for the most dramatic presentation team, couple LiteShow II with an In Focus PC Viewer® LCD projection panel. Its 640 x 480 resolution supports CGA, EGA, VGA, and Macintosh video standards.

When you consider presentation impact, image quality, ease-of-use, flexibility, the freedom to make last minute changes on the fly, the easy portability and the final, bottom-line cost, LiteShow II is the most persuasive and cost-effective way to make your point.

And there's nothing lightweight about that.

IN FOCUS SYSTEMS® INC.
Meta-Mail

As fast as we've accepted electronic mail for sending phone messages and notes across a network, E-mail is changing faster. Microsoft wants its open-architecture E-mail to become the backbone of network-dependent applications—a kind of operating system for groupware. And cc:Mail, a leading electronic-mail package for IBM PCs and compatibles, is evolving into a transport mechanism for compound documents.

Version 3.0 of Microsoft Mail bears a fully packed feature set, including multiple attachments, user-definable address books and aliases, and support for batch-printing messages or appending message contents to text files. (Microsoft Mail lacks two good features that its rival, CE Software's QuickMail, has: a chat screen and an unsend capability.) Mail 2.0's database stored a single copy of messages addressed to more than one person on a local server; 3.0 propagates a single copy of messages going to remote servers as well, leaving each server to determine if the route diverges and requires duplicating a message.

Outside developers are already using Mail for transport services. For example, Status Mac compiles networkwide information using Mail messages, and Magnum's TFLX voice-mail system can attach voice notes to messages. Groupware applications are emerging, such as Syzgyx, a low-end project-management package, and Microsoft is planning much more sophisticated network applications.

cc:Mail's first Macintosh product was for clients only, requiring a DOS network to run. Version 1.2 includes Mac administration tools (remote dial-in and access to gateways still require a DOS server), but the Windows version, using Digital Data Exchange, will be the first with advanced compound-document features.

On the Mac a message with attachments appears as a folder full of files, shown with their proper icons. The server can receive faxes and deliver them as image files; under Windows, you can write on a fax and forward it. Later, you will be able to superimpose and write on transparent layers over a document. cc:Mail will incorporate support for voice and video, and will let you see and edit a document's attachments without the creating applications—even across platforms. Also in the planning stages: more advanced ways to mix data types. For example, you might superimpose a data entry form in PICT format over someone else's database. Eventually, cc:Mail will have identical feature sets for the Mac, DOS, Microsoft Windows, OS/2, and UNIX environments.

Pricing for both products depends on network size. For more information, contact cc:Mail in Mountain View, California, at 415/961-8800; or Microsoft in Redmond, Washington, at 206/882-8080.—D.L.
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HIQ will be available on the Apple Macintosh II series of computers in April and soon after on the SUN workstations. However, you can reserve a copy of the HIQ Macintosh version now at a special price of $495. This is a 90-day limited time offer direct from Bimillennium Corporation, so act quickly. To reserve your Mac Version of HIQ at this special price call 1-800-488-8662. VISA/MasterCard/AmEx accepted.

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First in Power Computing Software
Visions to Go

For peripatetic users who wish to take their data with them in an ultraportable form, Colby Systems has designed the Pocket Info Pac, a battery-powered device that weighs just over a pound yet can store thousands of monochrome screen images. Not itself a computer, the Pocket Info Pac downloads the screen images from a Mac via a serial port, stores them in RAM, and shows them on the innovative Private Eye miniature display designed by Reflection Technologies.

The 2½-ounce Private Eye display, worn on a headband, positions a reflecting surface about six inches in front of one eye. A sophisticated optical system directs light onto the reflecting surface, and the perspective fools the eye into believing it sees a larger object that is farther away. The resulting image has a resolution of 720 by 280 and looks as if it measures about 12 inches diagonally. Currently that resolution shows about two-thirds of a standard Mac screen. Colby expects a higher-resolution display to ship sometime in 1991. In the meantime, users can select the desired part of a screen using the marquee, then download the selected part via a desk accessory. Colby is currently working on software that will support downloading the screens remotely via a pocket modem.

With the standard 1MB of RAM, the Pocket Info Pac stores about 150 screens, depending on the type of data the screens contain. With the maximum capacity of 16MB of RAM installed, as many as 2400 frames may be stored, again depending on the type of data. The Pocket Info Pac’s rechargeable nickel-cadmium battery has an average life of 6 to 8 hours of use. The device can also use AA alkaline batteries, which last about 12 to 14 hours.

A Macintosh version of the Pocket Info Pac with 1MB of RAM is available now at a price of $899; the price ranges up to $2999 depending on the type and amount of memory. A version for IBM PCs and compatibles should begin shipping in the first quarter of 1991. For more information, contact Colby Systems in Palo Alto, California, at 415-941-9090.—T.M.

Access to Knowledge

Say you just bought a CT scanner. Or an airliner. Or a supercomputer. What are you going to do with the 10,000—or 100,000—pages of documentation that came with it? If your documentation arrived on a CD ROM, you could find room for it on your desk. If the CD ROM came indexed with KnowledgeSet’s Knowledge Retrieval System (KRS), you could even find the information in it.

KRS is an indexing- and search-engine designed for static data sets such as technical documentation and reference works. It can search using Boolean, proximity, adjacency, wild cards, and other criteria. If the document’s SGML (Standard Generalized Markup Language) tags include hypertext tags, KRS automatically assigns hot buttons where they belong. (For use with KRS, documents must be tagged for SGML. SGML is part of a new federal requirement for contractors to deliver documentation to government agencies in a standardized format.)

KRS lets you assign bookmarks, study lists of cross-references, write yourself notes, or replace pages on the CD (new information goes on a hard drive that must accompany the CD ROM). With GraphicKRS, which recently shipped for the Mac, you can look at vector, PICT, and bitmapped images from the original documentation, zoom in on them, and arrange them in windows side by side with text. GraphicKRS incorporates KRSfax, a bitmap-compression utility that KnowledgeSet also sells separately.

KRS can share CDs across Mac, DOS, and UNIX systems. Later versions will search text in graphics, and a future product line will manage dynamic data sets. KnowledgeSet also makes HyperKRS and SuperKRS for indexing and searching HyperCard and SuperCard documents, and the new version 2.0 of HyperKRS supports almost unlimited stack size.

Prices depend on installation size. For more information, contact KnowledgeSet in Mountain View, California, at 415-968-9888.—D.L.

Sigma Boards Speed Lossless Compression

For users whose storage devices runneth over, Sigma Designs has introduced two boards designed to accelerate lossless data compression in the Mac II family. The first board, called DoubleUp, uses a specialized Saco Electronics processor (continues)
Big screens for your Mac Classic

So you've got a Mac Classic. Good. Inexpensive. That's good too. Of course you have to live with that little screen, right? No. Put a Publisher Classic™ board in your Mac and presto, little price, big screen. Or very big screen. Have a Mac Portable? Good. Goes anywhere. Of course there is no way to make that Portable Publisher. member of the Mac Your Macintosh with business of any size screen larger. Wrong. Got an LC, Ilsi or other family... get the picture? a Publisher series and a is suddenly a lot bigger.

Generation Systems 1-800-325-5811.
Sigma Designs' DoubleUp board contains a specialized Stac Electronics chip that quickly compresses image and data files to about half their original size without any loss of data.

to come out with an SE version of the board sometime in 1991. The Bullet 3040 for the IICx and Ills should begin shipping in March at a list price of $1999. The Bullet 3040 for the Mac IIsi comes with an installation kit incorporating an add-in slot that accepts boards designed for an 030 Processor Direct Slot, allowing further expansion of the system. Also, a 20MHz 68882 math coprocessor can be added for $199 list. On the Mac IICx, the Bullet 3040 occupies the cache card slot.

For more information, contact Sigma Designs in Fremont, California, at 415/770-0100.—T.M.

**Kodak Unveils Low-Cost Color Printer**

Adding to its line of low-cost printers, Eastman Kodak has introduced the Kodak Diconix Color 4, an ink-jet printer that uses a custom chip to control the position of its four print heads and to regulate the amount of ink used. The Color 4 uses thermal ink-jet cartridges developed by Hewlett-Packard for HP's ink-jet printers, but Kodak designed the rest of the printer and formulated its own cyan, magenta, yellow, and black inks. The nonsmear inks are designed to blend together well when producing intermediate colors and to work with plain paper, according to Kodak.

The Color 4's print modes include draft and near-letter-quality, in either 10 characters per inch (cps) or 12 cps. The typical print speed ranges from under 4 minutes for a full page of color graphics to about 30 to 40 seconds for a page of text in draft mode at 10 cps. A full page of color graphics takes 4 to 5 minutes to print on a transparency. The printer’s resolution is 192 by 192 dpi.

The Color 4 includes an LCD control panel, and the Macintosh version includes a Control Panel device for regulating the proportions of the inks. The printer is currently available at a suggested retail price of $1595. Cyan, magenta, and yellow ink cartridges retail for $19.95 each, and black cartridges retail for $13.95. For more information, contact Kodak at 800/344-0006.—T.M.

**The Littlest Mainframe**

A tiny piece of software called HOPS began life as a utility to accelerate mainframe computers. Now it makes a Mac into a database server that, its developers claim, races past IBM and Amdahl heavyweights.

HOPS (Heuristic Optimized Processing System) is a database kernel, a database development environment, and a metal box (with a bounding rabbit painted on it) that contains a Mac IICx and some hardware to keep prying eyes away from the kernel. HOPS executives claim HOPS typically requires a single disk access to complete a retrieval, even with enormous files, because it indexes a billion-record file in 1MB of memory.

In informal tests, HOPS's random generator filled a four-field database (continues)
SERIOUS SMALL BUSINESS ACCOUNTING.

The Highly Acclaimed Business And Financial Manager.

Accountant, Inc. has been carefully designed to handle the books for virtually any type of business: manufacturing, retail, professional or service. Its rock-solid, double-entry system includes General Ledger, Accounts Payable and Receivable, Inventory Management and Payroll – all fully integrated so information flows seamlessly through your office. And Accountant, Inc. is ready to run right out of the box, featuring easy chart of accounts setup and plenty of sample companies. All for just $595.

It Handles The Details.

You’ll breeze through the normally laborious task of writing invoices, checks, credit memos and more. And since Accountant, Inc. is a 100 percent pure Macintosh product, it fully exploits the swift, simple (yet incredibly powerful) functionality of the Apple Macintosh.

Instant Reports To Analyze Anything You Want.

But perhaps the most important feature of Accountant, Inc. is its ability to report and analyze. In fact, Accountant, Inc. will instantly create over 100 different types of reports that can tell you many things about your business, while they’re happening. Income statements and balance sheets, account agings and transaction listings, payroll reports and sales breakdowns of any kind. Sharpen the focus with Accountant, Inc.'s remarkable set of easy-to-use analysis tools.

You’ll quickly find out exactly what your customers are ordering, what inventory you’re about to run out of, who owes you money, who adds finance charges, when a certain customer placed his last order and how much credit he has left.

A More Enlightened Approach.

Accountant, Inc. does not duplicate the standard modular approach to accounting. Rather, the functions are task-oriented. For example, when you want to fill in a form (like an invoice), you’ll find it under the “Forms” menu; reports can be found under the “Reports” menu. Simply select the task and Accountant, Inc. knows where to go. Now, everyone can get their own reports, and the information they need.

The technicians and accounting professionals at Softsync/BLOC have assembled the premier accounting system for the Mac and small businesses. No painful setup, no learning curve, just a brief session with the documentation and you’re on your way to a more informed future.

If you’d like to learn more about this system, call us toll-free: 1-800) 933-2537.

For more information, or see it at your local software dealer.
with 1 million records in less than two minutes, and then ran multifield, multicriteria searches in less than half a second.

HOPS takes over the Mac, using the Mac's operating system for some functions but essentially running the Mac like a mainframe, providing such mainframe-like features as setting priority levels for users and automatically partitioning a query across multiple servers based on where data is stored. It also can manage other mainframe necessities such as fault tolerance (recovery from crashes or hardware failure) and communications.

HOPS provides tools for interface design, as well as a development language that HOPS president Harvey Goodman claims is very robust and extensible by skilled programmers. HOPS can handle any data type (for example, it can compare digitized fingerprints), but it lacks utilities for converting database structures to HOPS structures.

HOPS plans to sell its servers "at mainframe software prices," Goodman says, making the cost of the filx inside the HOPS box negligible. However, "Our policy is, Don't pay for it until you like it. We're willing to put our money where our mouth is." For more information, contact HOPS in Miami Beach, Florida, at 305/672-2561.—D.L.

PostScript on Non-PostScript Printers

With PostScript cartridges available for the HP LaserJet and other "dumb" laser printers, it was only a matter of time before someone took the next step, the creation of a stand-alone box that enables a Macintosh to print PostScript files on virtually any printer.

So, upstart Pacific Rim Data Sciences has taken that step, announcing the shipment of its PageBlaster, PageBlaster Plus, and HappyBlaster products. These devices are variations on the same theme: the use of a processor board that sits between the Mac and a "dumb" printer and performs the rasterization process that is normally done by the PostScript part of a PostScript printer. In the PageBlaster products, the board also offers a doubling of the horizontal resolution to 600 by 300 dpi. All of the PostScript rasterization products come with ImaGene's UltraScript interpreter, which enables the Mac to turn PostScript files into bitmapped images.

If you have an HP LaserJet II, there's the HappyBlaster Board (and enclosure), which takes the place of the back panel of the II that houses the parallel and serial connectors. The HappyBlaster receives its information from the Mac's SCSI port, then converts it to the parallel port on the II for decompression and printing. The $649 version contains UltraScript and the 35 LaserWriter fonts, while a cheaper version, at $498, uses JetLink Express, a QuickDraw driver, instead of UltraScript. The version with both UltraScript and JetLink Express costs $798.

The HappyBlaster does not have the dual resolution (600 by 300 dpi or 300 by 300 dpi) feature, but the PageBlaster does. PageBlaster also has the ability to translate the SCSI port's data directly into the video connector on any laser printer with a Canon engine, such as the HP LaserJet line, the Canon line, and the Fujitsu FX series. This process bypasses the printer's controller and allows data-transfer rates of up to 1.2MB per second, although the HP LaserJet Series II and III will require an optional video board priced at $195 to receive the signal. The PageBlaster Plus system, which includes UltraScript, is priced at $895.

If you have a dot matrix printer, there's a version of the PageBlaster that converts data from the Mac's SCSI port to the parallel port on the dot matrix printer. That version costs $795, including UltraScript.

Using either the HappyBlaster or the PageBlaster, a Macintosh can act as a print server for any other systems on a LocalTalk or other network. For more information, contact Pacific Rim Data Sciences in Fremont, California, at 415/651-7925.—Martin Marshall

CoStar Addresses Envelope Printing

Designed to end the hassle of printing envelopes and to save money on mailings, AddressWriter is a compact printer that prints a logo, two addresses, a short message, and a postal bar code on up to 100 envelopes at a time. Although the basic AddressWriter handles only envelopes, its developer, CoStar, will offer an optional $75 label-handling attachment. Under 1991 regulations, the U.S. Postal Service offers discounts of 10 percent or more on mail that is bar-coded by the sender.

The AddressWriter comes in two versions: a serial model for IBM PCs and compatibles, and a model with a (continues)
NO ONE HAS TO KNOW YOU DID ALL THIS MINUTES BEFORE THE MEETING.

The meeting is in an hour. And your presentation is the main event. It's in your head, but not on paper—much less on overheads. It's important to communicate professionally and persuasively, but there's not enough time to prepare. Or is there?

Persuasion: first choice for last minute.

Aldus® Persuasion® 2.0 is the fastest way to create impressive visuals for all your meetings. In fact, all the overheads above were created in just 30 minutes. That's productivity no other method or Macintosh® program can beat—and test results prove it.

Simply type text into Aldus Persuasion’s outliner, and your visuals are automatically formatted. Persuasion 2.0 is a complete solution for creating organization charts, diagrams, and a variety of graphs, with features like 36 pre-designed templates, spell-checking, and a library of clip art. So all you provide is the content—Persuasion does the rest.

And when you’re ready to print, choose from output options to suit your needs: black-and-white or color overheads, or 35mm slides from a film recorder or nationwide service bureaus.

Of Persuasion’s many accolades, MacWeek summed it up best: “...the best presentation package available.” Need more persuasion? Call 800-333-2538, Department 2D3, for free literature or a $4.95 demo disk.* Because with Aldus Persuasion 2.0, your presentations will look like you spent days, not minutes. And we’ll never tell.

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bar code, the AddressWriter takes about 20 seconds per envelope. When printing on stationery that already has one address and a logo, for instance, the printing time is considerably less. The printer accepts envelopes up to 4 1/2 inches tall, and with the label-handling option attached, it can accept pin-fed labels that measure up to 5 1/2 inches from pin to pin.

At press time, CoStar expected to begin shipping both initial models of the AddressWriter in January. The label-printing option will have a list price of $75. For more information, contact CoStar in Greenwich, Connecticut, at 203/661-9700 or 800/426-7827.—T.M.

Blank Canvas

Is plain old drawing on the Macintosh dead? Between 32-bit paint programs, the merger of sketching and CAD, and the failure of most draw programs (Draw It Again, Sam; Drawing Table), basic drawing seems almost forgotten. Fortunately, Claris has written a big upgrade to MacDraw (see Macworld News, "MacDraw Goes Pro," February 1991), and now Deneba is getting Canvas 3.0 ready.

Canvas 3.0’s new features include much stronger text-handling tools, drawing tools that look a lot like FreeHand’s or Illustrator’s, and smarter technical illustration.

Text blocks in Canvas 3.0 can have their own rulers, and support tab leaders, full justification, and leading or tracking by half-points (with only one setting per block). Text can align with independently slanted margins, bind to a curve, or wrap inside or outside an object, and Type 1-format text can be converted to editable curves.

You can add cusps (temporary points) to bezier curves, and select multiple points on a curve—or even on more than one curve—and manipulate them. Canvas now provides blends between objects just as Illustrator, FreeHand, and MacDraw Pro do. Also like the 3.0 versions of Illustrator and FreeHand, Canvas 3.0 can composite objects so that you can see through a hole in an object to the objects behind it.

For technical illustrators, Canvas has standard architecture hatching and a smart mouse. The mouse guesses what you’re trying to select, and its icon changes to indicate when you get close—for example, if you are near a tangent or a corner.

An unusual feature in Canvas is its ability to search for objects by attributes—for example, to find all the gray rectangles in layers 10 through 50 and replace their fill with concrete hatching. Version 3.0 also reads and writes DXF, IGES, and Illustrator 88 formats, and it has a plug-in structure for adding new features easily.

Canvas 3.0 will list for $395. For more information, contact Deneba in Miami, Florida, at 305/394-0965.—D.L.

CD ROM Preserves
High-School Days

Imagine nostalgically browsing your high-school yearbook. You find the photo of a friend, read about her accomplishments—then listen to her recite her poetry. Yes, multimedia yearbooks have arrived, thanks to CD ROM technology and the pioneering determination of students in Eugene, Oregon.

The South Eugene High School students’ SuperCard stack blends animation and sound with the text (continues)
If you're adding Ethernet to a Macintosh® IIci computer, there is one thing you need to know. The new low profile of the IIci requires all existing Ethernet cards to use an additional, expensive adapter.

The exceptions however, are the MacCon+™ 30i cards from Asante. They are the only Ethernet cards designed specifically for the Macintosh IIci that don't need an adapter.

Eliminating the adapter saves you money. But, if you prefer to use the math coprocessor available on some adapters, you'll be happy to know that the MacCon+ 30i cards are fully compatible with all adapters as well.

To create the MacCon+ 30i, we took the technology that MacUser said, "buried the competition in raw performance tests," and put it in a small, elegantly designed IIci package. The result is blindingly fast Ethernet performance on the fastest Mac bus.

Along with this performance comes unmatched compatibility and reliability. The MacCon+ 30i cards are register-level compatible with Apple's Ethernet card and both run A/UX. With their lower chip count, the MacCon+ 30i cards run cooler and have fewer parts. That translates to fewer problems. They're even backed by a five-year warranty.

Asante Technologies is the only company that offers a full line of Ethernet products for all Macintoshes. If you're simply adding a IIci to an existing network, or creating a complete high-performance Ethernet network from scratch, turn to Asante for all the right connections.

The MacCon+ 30i comes in thick/thin and 10BaseT versions and is available now from your Asante reseller. Call them today for full details.

Asante Technologies, Inc. • 404 Tasman Drive • Sunnyvale, California 94089 • (800) 662-9686

Resellers: Asante products are available from Ingram/MicroD, Merisel/Macamerica, and Tech Data.

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Circle 24 on reader service card

PHYSICALLY FIT
Introducing the only IIci Ethernet cards that fit without an adapter.
These students are at work on a yearbook that will include videos of school sports and recordings of school musicians.

and photographs of conventional yearbooks. The students used MacroMind Director to create animated menus, interface to introduce a friendly English-speaking guide, Digital Darkroom to touch up photos, and MacRecorder to digitize voices and music. With no precedent to follow, they agonized over trade-offs dictated by designing screen-shaped translations of traditional two-page spreads. To simplify navigating the huge hierarchy of information, they invented special icons called GRÖF—Graphical Representations of the Outline File System.

For the 1991 yearbook, the students plan more ambitious ways to exploit the medium. Electronic Eugenean editor Thor Prichard is excited about integrating sports videos and musical performances. "We're trying to make it a true representation of what it was like to be a student in 1991."

And what about students who find a CD in a pocket of their yearbook but have no access to computers? "We tell them to hang on to it," says student Aaron Ray. "In five years CD ROMs will be cheap and standard."—B. J. Novitski

**Virus Watch**

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

**MODM and zero**

- **Type:** Viruses
- **First listed in Virus Watch:** 3/91
- **Info:** Both are nVIR B clones; infect applications and system files.
- **Impact:** Nondestructive; can cause crashes.

**ZUC B**

- **Type:** Virus
- **First listed in Virus Watch:** 3/91
- **Info:** A ZUC clone.
- **Impact:** Nondestructive; infects applications and system files; renders cursor inoperable.

**MDEF C**

- **Type:** Virus
- **First listed in Virus Watch:** 2/91
- **Info:** A Garfield strain; infects applications and system files.
- **Impact:** Nondestructive; can cause crashes.

**prod**

- **Type:** Virus
- **First listed in Virus Watch:** 2/91
- **Info:** An nVIR B clone; infects applications and system files.
- **Impact:** Nondestructive; can cause crashes.

**Bigger Foxes**

FoxBase/Mac's early speed records were impressive, and later versions added a Macintosh interface without slowing down. Now Fox says its latest, FoxPro/Mac, searches large disk-based databases a hundred times faster than before. (Fox has applied for several patents on a piece of technology code-named Rushmore.) New indexing algorithms require converting old data files, but the new product is compatible with FoxPro/DOS and can use dBase IV programs and data.

Fox claims that during in-house tests on a single-user system, FoxPro/Mac retrieved several thousand street names from a single-table, 1.6-million-record, 140MB address database in one or two seconds per name. Fox gave Macworld a hint at how Rushmore works, pointing out that the bottleneck is normally in calling up records from disk to see if they match search criteria. So Rushmore probably uses FoxPro's very compact indexing method to search a RAM-resident index, and then sweeps all the finds from indexed disk locations in one or two passes, thus bypassing much slower disk-based operations.

This makes the Mac on your desktop competitive with mainframes in dealing with huge quantities of data. (Mainframes still have advantages in transaction-processing and security features, but Fox claims third-party developers are currently writing these big-database functions in the Fox language.) FoxPro also includes a SELECT command and a large subset of other SQL commands for complex searches, and a new query-by-example scheme shows users how SELECT statements are constructed. New tools speed creating custom menu bars, adding pop-ups and keyboard enhancements, and developing custom applications.

Pricing for FoxPro/Mac was not set at press time. For more information, call Fox Software in Perrysburg, Ohio, at 419/874-0162.—Charles Seiter

**Macworld's Theory about Rushmore**

A guess about FoxPro/Mac: with a highly compressed database index, queries can run entirely in memory, and FoxPro accesses the disk only when it's ready to retrieve records.
HIT THE ROAD, MAC.

In a shakedown of removable storage devices, one drive quickly rises to the top. The new 44MB Bernoulli® Transportable. A drive that delivers reliable hard-disk-like performance day in and day out. In the office or on the road.

Bernoulli’s patented design draws a flexible disk up to the read/write head. Which, unlike hard disks, makes Bernoulli virtually head-crash free. Should the drive encounter a jolt or a dust particle, the disk falls harmlessly away from the head, making Bernoulli the most reliable removable system available. Period.

The numbers tell the story. Bernoulli drives have an unbeatable MTBF of 60,000 hours. And Bernoulli’s 44MB disks can take 1,000Gs of shock force (or an 8-foot drop). We back that up with an unprecedented Gold Standard 5-year media life limited warranty.

The Transportable’s performance puts you in the fast lane, too. A high transfer rate, with an intelligent buffer and user-configurable cache, gives Bernoulli exceptional real-life performance.

If you’d rather go cordless, there’s a battery-powered version, which, like the Transportable fits neatly under a Mac SE. And now, Bernoulli takes your dollar the extra mile with dramatically reduced prices (up to 20 percent) that affect the entire Bernoulli family, including the Dual.

Which all adds up to one thing: Bernoulli’s closest competition isn’t close at all.

So call 1-800-777-6217 for free Bernoulli literature. Because no matter what road you travel, Bernoulli is the only system that can take it. Over the long haul.
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QuarkXPress 3.0
only $525

QuarkXPress® has long been the professional's choice for publishing software worldwide because of its powerful and precise type handling, page layout, and graphics production features. The new 3.0 version delivers all these, with a redesigned interface and clear, comprehensive documentation that make QuarkXPress easier than ever to use.

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QuarkXPress 3.0 provides an array of interactive palettes that make it simple for new and experienced users alike to create effective, high-quality publications. A document layout palette enables you to insert, delete, and move pages easily by dragging page icons. And the new Library palette provides an easy way to store text and graphic items for use whenever they're needed.

Text Creation Simplified
QuarkXPress offers full-featured WYSIWYG word processing and editing capabilities that give you the look and feel of your document while you're creating it. The Global Spelling Check and Find/Change features make fine-tuning easy.

A Tradition of Precise Type Handling
QuarkXPress 3.0 continues a tradition of providing the most precise, flexible type handling of any comparable program. You can adjust font, size, style, leading, location, and angle of rotation in fractions of degrees, right on the screen. Whether you're creating automatic drop caps or editing already-rotated type, QuarkXPress 3.0 delivers the power and freedom you need to create the most eye-catching text possible.

The Designer's Choice
Because of the power and responsiveness of its page layout features, QuarkXPress is now the top choice of designers around the world. The program's advanced capabilities — including the rotation and skewing of graphics, picture box reshaping, rotation of text, and the creation of bleeds — make QuarkXPress the most flexible page layout program around.

Complete Control Over Color
With QuarkXPress, you can apply process or spot colors to any EPS graphic. What's more, you can create color separations without resorting to an add-on program. Besides supporting the PANTONE MATCHING SYSTEM®*, as well as RGB, CMYK, and HSB models, version 3.0 provides precision controls for trapping and other sophisticated prepress effects.

Easy To Learn And Use
Even if you've never used QuarkXPress before, you'll find this 3.0 version simple to learn and explore. The handy on-line Help system and clearly written user manuals that come with the program—in addition to the step-by-step, self-paced tutorial—quickly put you in charge of the most powerful publishing tool of its kind.

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QuarkXPress 3.0 is available now—and you can have it tomorrow. Order before 12:00 midnight (E.S.T.) and we'll ship overnight for only $3.00. When it comes to getting the newest products at the best prices, nobody beats MacWAREHOUSE—nobody!

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MacWAREHOUSE Low Price: $525
System Requirements: The enhanced QuarkXPress 3.0 requires a Macintosh Plus, SE, or II series with a 6.0 or later operating system, 2MB of RAM (extra memory required for color or graphics-intensive applications), a hard drive, and a LaserWriter 5.2 or 6.0 printer.

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

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Never again will you have to quit your word processor just to answer a question about a spreadsheet. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

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

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs. For the Mac Plus or SE, you'll need a specially designed tool—it's available from us as part of a handy tool kit for just $9.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMS (Single Inline Memory Modules). Each one megabyte SIMMS card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products. Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 100ns SIMMs is $59. Please call for the very latest prices and availability. Our sales staff will tell you what you need and help you make your choice an easy one.

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

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MacWAREHOUSE 30-DAY MONEY BACK GUARANTEE

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

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

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The Power User Hard Drive from MacWarehouse

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MACWAREHOUSE TAKES THE HARD WORK OUT OF BUYING A HARD DRIVE.

The PowerUser Hard Drive is loaded with all the features you'd expect from a top quality drive. It's made for MacWAREHOUSE by a leading manufacturer - to our exacting specification. Its superior design fits right under the Mac Plus, Classic or SE, bringing the screen up to a convenient height.

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The PowerUser Drive is packed with quality components like the "state-of-the-art" Seagate hard disk. There's a rear panel SCSI address selector switch, two 50-pin SCSI connectors, and removable internal SCSI terminators for your convenience.

The PowerUser Hard Drive includes the popular "Disk Manager Mac" software by On Track, and is pre-formatted - ready to use right out of the box.

Each unit goes through thorough quality control and testing before it leaves the factory. The comprehensive "User Manual" includes all the necessary step-by-step instructions.

THIRTY-DAY MONEY BACK GUARANTEE.

Try the PowerUser Hard Drive for thirty days, and if you're not completely satisfied, call us for an RMA number and return it with all of its documentation for a full refund.

The PowerUser Hard Drive is covered by a one year manufacturer's warranty and, if you do ever have a problem, the MacWAREHOUSE loaner drive program guarantees you'll never be without a drive for more than a few hours.

20MB Hard Drive .... $329 60MB Hard Drive ........... $469
30MB Hard Drive .... $369 80MB Hard Drive ........... $519
45MB Hard Drive .... $419 44MB Removable HD ...... $629
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**ACCOUNTING & PERSONAL FINANCE**

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<td>$50</td>
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<tr>
<td>FSI0124</td>
<td>MacPlus/SEE Carrying Case (black)</td>
<td>$55</td>
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<td>FSI0200</td>
<td>MacPlus/SEE Extended Keyboard Carrying Case</td>
<td>$69</td>
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<td>FSI0202</td>
<td>MacPlus/SEE Extended Keyboard Carrying Case</td>
<td>$75</td>
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<td>FSI0203</td>
<td>Ultimate SE Carrying Case - Black</td>
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<tr>
<td>FSI0204</td>
<td>Ultimate SE Carrying Case - Navy</td>
<td>$99</td>
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<tr>
<td>FSI0205</td>
<td>Ultimate SEPlus/SEE Carrying Cases</td>
<td>$69</td>
</tr>
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**Smart Alarms 3.0**

Smart Alarms 3.0 & Appointments Diary 3.1 (JAM Software)

<table>
<thead>
<tr>
<th>Item Code</th>
<th>Description</th>
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<tr>
<td>FSI0050</td>
<td>Smart Alarms</td>
<td>$39</td>
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<tr>
<td>FSI0051</td>
<td>Appointments Diary</td>
<td>$139</td>
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</tbody>
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**MacPro Plus** (Key Tronic)

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<tr>
<th>Item Code</th>
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<tr>
<td>KTR0205</td>
<td>MacPro Plus</td>
<td>$149.95</td>
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<tr>
<td>KTR0206</td>
<td>MacPro Plus - Esc Keyboard Carrying Case</td>
<td>$69</td>
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**Business & Presentation**

<table>
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<tr>
<th>Item Code</th>
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<tr>
<td>BUS0066</td>
<td>Persuasion 2.0</td>
<td>$329</td>
</tr>
<tr>
<td>BUS0103</td>
<td>Sales &amp; Marketing Edition</td>
<td>$49</td>
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<td>BUS0109</td>
<td>Health Care</td>
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<td>Education</td>
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**Accessories**

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<tr>
<td>ACC0414</td>
<td>MacTrac II - 15° Color ROB</td>
<td>$75</td>
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<tr>
<td>ACC0418</td>
<td>MacTrac Plus/SE - Platinum</td>
<td>$89</td>
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<td>ACC0401</td>
<td>VIP Design, Inc.</td>
<td>$14</td>
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<tr>
<td>ACC0406</td>
<td>MacTrac Plus/SE Carrying Case</td>
<td>$64</td>
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<td>ACC0410</td>
<td>MacTrac Plus/SE Carrying Case</td>
<td>$75</td>
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<tr>
<td>ACC0414</td>
<td>Ultimate SE Carrying Case - Black</td>
<td>$99</td>
</tr>
<tr>
<td>ACC0416</td>
<td>Ultimate SE Carrying Case - Navy</td>
<td>$99</td>
</tr>
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<th>Apt.</th>
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<th>State</th>
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</tr>
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The fifth edition of Steven Bobker's Power User's Tool Kit is now available exclusively to MacWAREHOUSE customers. A hand-picked collection of four powerful programs on one handy disk, the newest Tool Kit includes To Do—a unique desk accessory for organizing and implementing your daily tasks. The newest version of StuffIt Classic, also on the disk, will create freestanding space-saving archives of files that you can expand whenever you need them without having any special decompression software.

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Microsoft
BUS0019 The Microsoft Office CD-ROM 599

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**Smartcom II 3.2**

Specially designed to work with any Hayes modem, Smartcom II automates communications with Autopilot while providing a variety of error-free file transfer options. It holds information for later use in a personal buffer and stores frequently used instructions as programmable buttons. COM0015 $84.

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MDD0060 Personal Modem 2400 w/SmartLink II $179.
Microcom
MDD0005 MacModem V.30/1500 $89.

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**Circle 240 on reader service card**
NuTek Computers founder Benjamin Chou is confident that his company's chip set, operating system, and user interface will serve as the basis for a thriving Macintosh-compatible market.
Since the introduction of the Macintosh, people have wondered if there would ever be a Macintosh-compatible computer. More recently, the question has become when will we see the first Mac-compatible?

If the late January announcement by two-year-old start-up NuTek Computers is any indication, Apple's quiet Macintosh monopoly may soon give way to a noisy host of Mac compatibles. According to NuTek president Benjamin Chou, the Cupertino, California-based company has developed three components—a chip set, an operating system, and user interface software—necessary for a fully functional Mac-compatible computer. NuTek's marketing strategy will involve licensing its products to select original equipment manufacturers (OEMs) that will build the actual computers.

Equipped with the NuTek operating system and user interface software, the new computers should run all well-behaved, 32-bit, clean Macintosh applications and work with nearly all the standard NuBus add-in boards and peripheral devices available from Apple and third-party vendors. NuTek claims the resulting machines will offer users enhanced features at lower prices than Apple's Macintosh machines. We speculate, for example, that buyers will be able to purchase a Mac-compatible with a color monitor, hard drive, and a 68030 processor for just over $600. NuTek expects OEMs to make the first Mac-compatibles available by the end of the year, (NuTek's Motif interface will be the first NuTek component available to the public, offering Mac owners an alternative desktop environment.)

Getting working products to market within a year will be a daunting task given the technical and legal problems facing NuTek. NuTek engineers have spent two years developing an operating system that is functionally equivalent to the current Macintosh Operating System and are in the process of distilling their chip set down to three chips. Testing for software and hardware compatibility is currently under way. Also, like any developer attempting to create the functional equivalent of Apple proprietary technology, NuTek must take every precaution to guarantee that the new code will be significantly different from Apple's. Although
NuTek has been scrupulous about following clean-room techniques throughout the development process, the company may still find itself involved in costly battles with Apple's legal department (see "NuTek's Legal Strategy").

It Happened to IBM
Designing a personal computer that is fully compatible with another personal computer is nothing new, as evidenced by the huge variety of IBM PC-compatible computers in the market. Barely a year after IBM introduced the original IBM PC in 1981, several vendors—including Compaq Computer—were shipping IBM PC-compatibles.

Compaq had written a legal version of the IBM ROM basic input/output system (BIOS)—the part of the operating system that allows DOS software to work with the Compaq hardware design. IBM had licensed PC-DOS from Microsoft; Microsoft subsequently licensed its version of the operating system, MS-DOS, to all comers—including Compaq.

In 1984, Phoenix Technologies developed and licensed its first IBM-compatible BIOS to Tandy Corporation. Phoenix's willingness to license its ROM BIOS to all prospective manufacturers enabled any vendor to develop PC-compatibles—without having to write its own ROM BIOS. The number of vendors and PC-compatible computers exploded. In fact, Phoenix claims that more installed PC-compatibles contain Phoenix ROM BIOS (over 14 million systems in 1989) than IBM BIOS.

Manufacturers of PC-compatibles, however, still had to design their own hardware to match that of IBM. That situation changed in 1985 when Chips and Technologies introduced a chip set that reduced the IBM PC AT logic board to five chips. Designing a PC-compatible became simple: buy the chip set and the ROM IOS, and license the operating system.

Hard Hardware Issues
The original IBM PC, XT, and PC AT were built with off-the-shelf components and chips, easily accessible to any potential manufacturer. The basic component of all Macs is Motorola's 680X0 CPU family, which anyone can buy. In contrast, Apple's strategy has been to keep the hardware design of the Mac proprietary by constantly replacing off-the-shelf components on the Mac's main logic board with custom-designed, application-specific integrated circuits (ASICs).

According to NuTek, its three chips provide virtually all of the logic required to create a Mac-compatible computer. Two of the very large scale integration (VLSI) ASIC chips provide a NuBus-compatible interface to a standard Motorola 680X0-family processor, as well as memory-management circuitry. The third handles all the I/O peripheral control.

In addition, NuTek's chip set includes all the logic necessary for controlling floppy disk drives, including SuperDrives. NuTek says that its chip set implements Apple's non-standard versions of SCSI and NuBus and that any computer built with the NuTek chip set will work with most standard peripheral devices—disk drives, printers, video boards, network adapter boards, and the like.

NuTek has also designed its chip set to support high-performance features currently not available for all Macs—burst-mode memory transfers from the microprocessor, a capability that could improve performance of memory-intensive Mac applications, and direct memory access (DMA), currently available only on the Mac IIx. All computers built with the NuTek chip set will be able to generate stereophonic sound, something the Classic, Plus, SE, and earlier Macs cannot do. All will support color. Finally, the chip set will address up to 64MB of main memory, twice that of current Macs, and will interface the CPU to the NuBus at speeds up to 33MHz.

Because the Apple Desktop Bus (ADB) technology is patented by Apple, NuTek will use a standard Intel 8742 chip to directly connect PC-compatible input devices to the I/O ports of a NuTek chip set-based computer.

Will They Buy?
By developing an operating system, user interface software, and chip set that constitute a relatively compatible Mac system, NuTek could find itself in the enviable position of being not only the Phoenix Technologies, but also the
The Macintosh Operating System and User Interface Toolbox are contained in read-only memory (ROM) chips on the Mac's main logic board. (The System file on disk is actually a resource file necessary for the Mac Operating System to function.) Basic start-up information for the computer—available hard drives, floppy drives, and so on—is also contained in ROM. Among the Mac Operating System's responsibilities are memory management, serial- and ADB-port control, and disk input/output. The Toolbox is responsible for the Mac's user interface—the way windows, pull-down menus, dialog boxes, and the like appear on the Mac screen. Applications (even the Finder is an application) use Toolbox routines to draw the screen and use the Operating System to talk to Mac hardware.

In the PC, a basic input/output system (BIOS) located in ROM is responsible for bootstrapping the system into action at start-up. After testing itself, the ROM BIOS searches for an operating system on any floppy disks or hard drives attached to the PC. The BIOS then loads the operating system—for example, MS-DOS or Windows—from disk. PC applications use the operating system and ROM BIOS to communicate with the PC hardware.

NuTek's system scheme for a Mac-compatible computer has more in common with the PC than the Mac—NuTek's operating system is disk-based like MS-DOS, not ROM-based like the Mac Operating System. A 64K start-up ROM BIOS controls power-on self-test functions and then boots the operating system from a floppy disk or hard drive. NuTek's user interface is based on a rewrite of the Open Software Foundation's Motif graphical user interface, which is a collection of software routines on disk. By keeping the majority of the operating system in software, NuTek can more easily update its operating system to keep pace with changes not only in Apple's operating system but also in future hardware technology.

Chips and Technologies of the Mac-compatible market. The rewards could be enormous.

Phoenix Technologies, for example, initially licensed its ROM BIOS to hardware manufacturers for $10 per machine; if 1000 machines using its ROM BIOS were shipped by the hardware manufacturer, the manufacturer paid Phoenix $10,000. At its peak, Chips and Technologies made $200 million per year selling chip sets. Total the figures, and NuTek's two-year stake in developing the operating system, user interface software, and chip set is more than a good investment—it's a great one. As long as there are no extraordinary legal fees, that is.

All of this depends, of course, on whether hardware OEMs are willing to license NuTek's technology. Certainly, the precedent set by sales of PC-compatibles is enticing to any prospective vendor of Mac-compatibles. IBM-compatible computers from Compaq Computer, NEC Corporation, Toshiba Corporation, and others, currently account for more than 60 percent of a worldwide market estimated at more than $20 billion in annual sales. Worldwide sales of Macs are currently estimated at $4.5 billion a year—and it's all going into Apple's coffers. Tandy Corporation, for one, has expressed interest in selling Mac-compatible computers.

But hardware OEMs shouldn't overlook other issues. Signing on with NuTek requires considerable confidence in NuTek's technology and its ability to keep pace with Apple's system developments—both hardware and software. Even more, it requires confidence in NuTek's ability to stay in business should Apple decide to litigate. According to Chou, NuTek is willing to indemnify any hardware OEM from possible lawsuits filed by Apple regarding the NuTek operating system, user interface software, and chip set.

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According to legal experts, any company that wants to build a Macintosh-compatible computer needs three things: a detailed legal blueprint for avoiding Apple's intellectual property rights, scrupulous documentation of its independent development effort, and buckets of money to defend itself in court. NuTek Computers may be the first company to meet all three requirements.

In compatibility cases, there are user interface-copyright issues, software code-copyright issues, and patent issues. Some Mac software, such as the user interface and the operating system inscribed in ROM chips, is copyrighted, while some Mac processes, such as QuickDraw's region-clipping procedure, are patented. (According to Apple, there are more than 60 patents on the Macintosh; NuTek claims the U.S. Patent Office lists fewer than 25.) A copyright protects the expression or description of an idea but not the idea itself, while a patent generally protects any useful, innovative invention, process, or machine.

NuTek sidestepped the user interface-copyright issue by licensing the Motif interface from the Open Software Foundation. (Motif is based in part on New Wave, a user interface from Hewlett-Packard that Apple claims infringes its copyright. But as a licensee, NuTek is not responsible for any resulting legal issues if Apple should win its suit against HP.) Still, significant software code-copyright and patent issues remain.

In the early 1980s, IBM PC-compatible makers employed clean-room procedures to convince courts that the makers had no access to IBM's code and that they independently developed their products. Clean-room procedures vary: one setup is described in Software, Copyright, and Competition (Quorum Books, 1989). As described by author Anthony Lawrence Clapes, a group of experienced analysts study the target program to determine its functions and then write a detailed specification explaining how the program must perform, but not indicating how the code should be written. The company then hires programmers who have not had any previous contact with the target program. The programmers work only from the list of specifications, while the company maintains an audit trail of documentation, including mistakes made along the way, as evidence that the programmers' work is original.

NuTek roughly duplicated that process under the tutelage of G. Gervaise Davis III, a respected computer-copyright specialist with Schroeder, Davis & Orliss of Monterey, California. NuTek developed its operating system software and chip set by carefully looking at the design of the Macintosh and at publicly available documentation such as the Inside Macintosh series of books. Then, NuTek claims, its team of engineers duplicated the Macintosh's function by using newer technology and different processes. The company refused to hire former employees of Apple, in an attempt to avoid trade-secret issues; did a worldwide search for Apple's existing patents; and archived its weakly sourced code development. According to Davis, a "person who should know" compared the resulting code with Apple's original and said the two are significantly different. And none of Apple's patents are infringed, according to Davis, who says NuTek's algorithm for graphic region-clipping, for example, differs significantly from that of Apple.

Even if NuTek has done all its legal homework, it may still be vulnerable if Apple sues. Since patents that have not been issued are not made public, Apple could conceivably have some pending applications that NuTek would have no way of knowing about. One attorney, however, thinks that is unlikely. "It's reasonable to assume that any hardware or any patentable aspect of the original Macintosh that isn't patented by now probably is not going to be," says Ron Laurie, who heads the Computer Law Group of Ireli & Manella in Menlo Park, California.

So the patent issue involves a calculated gamble. What about copyright? "If you're building a compatible product, you've got to look at something," according to Laurie. "You cannot independently create a compatible product—it's an oxymoron." NuTek looked at Inside Macintosh, which doesn't have any code in it. Still, Apple might argue that Inside Macintosh has a high-level description of the program and that by looking at it NuTek infringed Apple's copyright. Laurie, however, doesn't think that would be a good argument.

As a practical matter, if Apple does sue, NuTek will bear the burden of proving in court that it did not infringe Apple's copyrights, patents, trademarks, or trade secrets. "Courts, like most people on the street, think that it's not nice to exploit the fruits of somebody else's labors," says Stephen J. Davidson, a Minneapolis attorney who specializes in computer technology issues.

NuTek should be able to counter that bias by showing how much time, money, and effort went into independently developing the Mac compatible. That way, according to Davidson, "you can go to the court and say, 'Look, these people didn't rip off something Apple had done; these people invested a zillion dollars and..."
a lot of hours and a lot of blood, sweat, and tears in developing a competitive product." 

NuTek likes to compare itself to Compaq, the pioneering IBM PC-compatible maker that made a bundle off its compatible machines. Apple isn't convinced. A spokesman for the company would not comment specifically about NuTek, but notes that when it comes to the Macintosh, "there are copyrights, trademarks, and patents that do not relate to Intel-based clones."

In the absence of a business arrangement, he says, "there are no legal Macintosh clones or compatibles. We believe that you cannot clone a Macintosh without violating our intellectual property and, as you know, Apple aggressively defends its intellectual property."

NuTek hopes to avoid litigation but is prepared to go to court. "This company is funded by a group of investors who understood from the beginning that litigation might be a problem," says NuTek's attorney, Davis. An expensive problem according to attorneys, who estimate that the "burn rate" for this kind of litigation could be several million dollars per year for both Apple and NuTek.

Apple could decide not to sue NuTek but to go after any hardware company that builds Macintosh-compatible machines based on NuTek's products. "If Apple gets really litigious, they can scare a lot of the market away," according to one source, who asked not to be identified. "The key is who is going to dare to be the first one to build a Mac clone, the person willing to go out and take some arrows in the back."

NuTek hopes to protect its potential customers by indemnifying them against potential litigation by Apple. No one knows if that will be enough to reassure hardware companies and actually spur a new market, but there's plenty of speculation. "This is potentially an earthshaking development, not only in the industry but also in the Mac market," says Davidson. "If these people have done this right, I expect they'll be sitting on a gold mine."

—Deborah Branscum

If Apple does sue, NuTek's survival may lie not in its ability to prove that no infringement occurred, but in its ability to pay legal fees. NuTek investors include Chou, private sources in the United States, and one offshore investor, Lao-Yeo Hsu. Hsu is the chairman of Taiwan-based Ban Yu Paper Mill Company, a paper manufacturer that had pretax profits of over a billion dollars in 1989. According to 1990 Ban Yu Paper Mill figures, the company has approximately $100 million in available capital.

See How They Run

Even if NuTek can overcome legal hurdles and sell its chip set to computer vendors such as Dell or Tandy, software issues still present a major technical obstacle. Many software vendors are skeptical that NuTek can deliver on its promises of compatibility. The first IBM PC clones claimed complete compatibility but, more often than not, did not run major software packages correctly. The ROM in the early PCs contained only 16K of instructions; newer Macs use 512K ROM chips. "Apple's ROM and its system software are extremely complicated," says Joel West, president of Palomar, a vendor of software drivers for printers and plotters. "If they've failed to duplicate even one small quirk then there could be real compatibility problems for the user."

NuTek claims, however, that any software that follows Apple's specifications—and that doesn't address hardware directly—will run on the NuTek chip set. For the user, that means that all major applications, such as word processors, spreadsheets, and databases, should run correctly. Several games, such as Dark Castle, won't run; however—these programs frequently bypass Apple's managers in order to eke out the most performance they can. Applications that make direct calls to video hardware, such as HyperCard and Autodesk's AutoCAD, will not work either. And serial printers such as the Hewlett-Packard DeskWriter, GCC Personal LaserPrinter II, and Apple LaserWriter IIC may not work.

"When I hear 'mostly compatible' the hair on my head rises," says Dick Skeie, president of CE Software. "I know how tough it is to keep up with Apple's systems. We follow Apple's rules and regulations when we develop software and things still break on new systems." Chou admits that NuTek has not implemented all of the Mac's calls. What no one currently knows is which calls NuTek has implemented and what those calls do.

If current versions of Mac software won't run on the NuTek chip set, vendors will modify their applications to run—but only if the Mac-compatible machines are selling in volume (for vendors, that means thousands of units per month). But for most vendors, the question of whether or not they will modify software is moot. Most believe that Apple will litigate and that NuTek will not be able to withstand that legal onslaught.

At the same time, the software community is pulling for the underdog. Most hope that the appearance of viable Mac-compatibles will force Apple to be more aggressive with its technology. Adobe Systems, a company that has felt the sting of clone makers, agrees that a challenger can only be good for the industry. "I can speak from experience," says John Warnock, president of Adobe. "[Clone technology] has made us more competitive and made us raise the bar on the level of our technology to stay ahead of others. Apple won't be able to be complacent any longer."

Warnock believes that the problems inherent in porting Mac applications to run under Motif would be minor. "I would make such an investment," he says.
Who’s Got the Clones?

Unlike NuTek, most companies have no desire to confront Apple with their own version of the Mac’s ROM. Instead, they develop clever methods of working around the legal hurdles Apple has set up. Three such companies—Cork Computer, Hydra Systems, and RDI Computer Corporation—are developing Mac compatibility in very different ways for different uses.

Cork Computer’s Cork System 30 is an inexpensive ($2999) illi-equivalent system that requires a 128K ROM from a monochrome Mac. Cork says that it developed a color ROM that adds the functions of 32-bit

QuickDraw without infringing Apple’s copyright. The market for the product will be owners of monochrome Macs who want to upgrade to color systems inexpensively.

RDI’s Companion is a $1695 combination of hardware (including a ROM from a Macintosh Classic) and software that lets Mac software run on RDI’s Brite Lite, a SPARC-based laptop. Users will be Mac owners who want a powerful laptop but don’t want to leave their Mac software behind. The company plans a software-only Mac emulation that will be faster and less expensive. Because RDI’s Brite Lite has its own screen-drawing routines, it does not have to emulate QuickDraw.

Hydra Systems’ product is a $995 add-in board for IBM PC XT’s, PC AT’s, and compatibles that lets those systems run monochrome Mac software. (Hydra’s board now requires a Mac ROM chip.) Hydra licensed the Xerox Star interface to avoid legal problems with Apple. Of the three companies only Hydra says it is working on a clean-room approach to cloning the Mac’s ROM. Hydra hopes to finish that project in about a year, after which its board would not need the Mac ROM.

Changing Times for Apple

For the ten years that Del Yocam was an executive at Apple Computer, he had a stock reply to any question about what Apple would do if someone attempted to clone its machines. Essentially his answer was that the company would spend up to its last remaining penny litigating to protect Apple’s technology. Given Apple’s lawsuits in the past, no one doubts the earnestness of his statements.

Times may have changed. The attorney who led Apple’s Pyrrhic suits against Microsoft and Hewlett-Packard has left Apple. But Apple’s most common response to companies trying to clone its hardware or software has been to wield its mighty financial and legal weight against those involved.

Franklin Computer was the first notable company that Apple successfully sued. Digital Research lost the lawsuit brought against it by Apple for infringing the copyright on Apple’s interface and suffered substantial damage, although it remains in business. Cadmus, a Massachusetts-based workstation company, demonstrated Mac applications running on its workstations in 1986. Apple quietly acquired the company, which over time disappeared from sight. Outbound Systems, which like Dynamac and Colby, uses Mac ROM chips for its portable, seems to have gotten a little too good. Like Cadmus, Outbound is now entangled in a confidential and complex agreement with Apple.

Clearly, Apple’s consistent strategy has been to bring lawsuits to protect its rights as soon as products such as these are brought to market. This suggests that NuTek and others are in for legal action.

Market Share Is the Focus

During 1989 and 1990 John Sculley took a beating from the press, analysts, users, and vendors for neglecting to increase Apple’s share of the personal computer market. Sculley seems to have taken these criticisms to heart. Expanding the Mac’s installed base has become increasingly important in Apple’s strategic thinking. Sculley’s belief that the company had to produce cheaper computers for a mass market is verified by the Mac Classic’s wild success.

Market-share growth is now a guiding principle in the thinking of Apple executives, but Apple’s ability to manufacture more machines is saturated—the company is up to four shifts at its plant in Singapore. Apple cannot increase its speed without diminishing profitability on products that already have lower profit margins than any computer the company has manufactured to date.

Licensing the Mac OS

Another request has been that Apple license its operating system to third-party manufacturers. This would create a larger set of developer opportunities, expand the number of Macintoshes sold in the personal computer market, and therefore increase Apple’s market share. By late 1990 Apple executives were rec-
What Happens to Apple after Clones?

Apple will have an increasingly difficult time trying to reconcile growing research and development expenditures with declining profit margins. Competition from Mac-compatibles will dictate that Apple lead the market via technology rather than via marketing. Apple may begin to lose very profitable segments of its own market, such as peripherals.

While the company has stiff competition from peripheral vendors at present, it can be expected to become worse. Over time the Apple logo will be no more important in the mass market than the IBM logo.

As Mac-compatibles begin to proliferate, prices will tumble. The second piece of Apple's business to crumble will be the stranglehold on the market channel it has through the authorization of dealers. Suddenly Apple-authorized dealers will face competitors selling Macintosh capability at 30 percent to 50 percent less. Mail-order vendors will introduce compatibles at cutthroat rates, taking away even more Apple revenues, and constricting the amount of money Apple can dedicate toward future products.

Apple Operating System Is the Key

It is easy to predict that the Mac market might duplicate IBM's, with compatible vendors actually producing higher-performance computers for less money. The big difference, of course, is that Apple writes its own operating system while IBM licenses its operating system from Microsoft.

The question, then, is can Apple continue to lead its market, with its own operating system, after the release of Mac-compatibles? It should come as no surprise that Apple has yet another version of its operating system under way, a non-QuickDraw version. The company could introduce this new operating system in order to chill competition, but a new operating system is likely to require a major change within the Mac installed base, and such an introduction might only increase the confusion.

On the other hand, NuTek is already saying that it will not write software to emulate the Mac's 7.0 operating system until 7.0 has been shipping for some while. Yet another version of the Mac OS could be a hurdle that compatible manufacturers might not overcome.

What's It All Mean?

NuTek is gambling that it has enough engineering expertise to unravel the Macintosh's complex environment; that the company has mitigated potential legal hassles by carefully adhering to classic clean-room development techniques; and that the company has the financial clout necessary to withstand any litigation that might ensue anyway.

Manufacturers of NuTek-based machines will have to gamble that buyers are willing to trade less-than-perfect software and hardware compatibility for lower prices and a few enhancements. And these companies will have to trust that NuTek will in fact indemnify them should Apple choose to sue.

The real concern for Macintosh users and developers should be how Apple responds. As Adobe Systems' president John Warnock puts it, "There are two choices [for Apple]. Either stand and defend your turf, or be creative and stay ahead. In this day and age standing in some intractable stance—a defensive position—is doomed to failure."

Written by Jerry Barrell, Brita Meng, Tom Moran, Cheryl England Spencer, and Suzanne Stefanac.
If every book in a bookstore looked the same, browsing wouldn't have the excitement and pleasure that any bibliophile knows. It's the same with stacks. More than 400 stacks and projects arrived at Macworld in time for the 1990 SuperStacks contest. To say that none of them looked alike is the understatement of the year. At the end of the three-week judging process, developers of 30 entries—which ranged in content from an animated dancing mouse to a simulation of an acute heart attack—emerged as SuperStacks winners.

What distinguished these stacks? From their opening cards, they cried out “Read me!” So, we did. Something about each of them reached out and grabbed us, took us in, and wouldn’t let us back out until we’d explored every last nook and cranny. The winning stacks all share excellence in interface design, informational organization, graphic design, and media integration. But more than that, they’re fun to use. **Know Your Audience** SuperStacks winners designed their stacks to communicate specific information to a well-defined audience.

The Earthquake Preparedness Stack, winner for Best Educational Entry, K–12, teaches that through knowledge and planning, you can improve your chances of surviving a big earthquake. Developer Kelly O’Brien compiled scanned graphics from public domain sources and material from at least 30 different periodicals and books to create a compelling interactive stack.

To avoid overwhelming her target audience of schoolchildren, O’Brien divided the stack into six chapters. Chapters include earthquake geology, scientific measurement, and home and office preparedness; each can be used as a separate lesson. And instead of presenting card after card of text, she chose graphics to explain and amplify short text fields of information.

For instance, you can explore ways to make your own home safer by clicking on bulleted hot spots—basement, kitchen, and bedroom—in a cutaway drawing of a house. Another card lets you interactively compare the intensity and magnitude of famous earthquakes, such as the 1985 Mexico City earthquake, measuring 8.1 on the Richter scale, and the 1989 Loma Prieta earthquake, measuring 7.1.
1990 SuperStacks contest know that the rest of us don't?

Stacks

by Liza Weiman

Students at the Thunderhill Elementary School in Columbia, Maryland, demonstrate some earth-saving techniques from Kids Can Save the Earth—this year's winner for Best Entry for under $20.
Organize Your Information
Clear and simple organization of information was the hallmark of the Motion Works' Outdoor and Vacation Adventure Guide. Winner for both Best International Entry and Best Interface Design, this guide to the vacation spots of British Columbia turns a 78-page booklet created by the Wilderness Tourism Council of British Columbia into a fun interactive jaunt with Eddie, an animated character, as your tour guide (see “Eddie Goes on Vacation”).

Designed for novice HyperCard users, the Outdoor and Vacation Adventure Guide makes sure you’re never lost. There is a central, well-organized table-of-contents card. Buttons are consistently placed along the bottom left of each card. And throughout the stack, Eddie’s always there—just like a reliable guide. He arrives by helicopter at the beginning of the stack, snaps tourist pictures (never getting the one he wants), climbs mountains, and sits before a fire at the end of a long day. If you pause for long, Eddie taps his foot. Pause longer, and he tells you how to click on a button for more help.

The Eyes Have It
The Lazy Eye: A Primer on Neuro-ophthalmology uses HyperCard to simulate the movement of the eyes during an ophthalmological exam. The eyes track the cursor’s movements realistically. Turning on the right or left flashlights or administering drugs with the dropper changes the size of the pupils.

Each branch of the stack contains information about a particular kind of vacation, say scuba diving, canoeing, or trekking and mountaineering, and then shows available resorts on a map of British Columbia. Once you finish exploring a branch, you can return to the table of contents. The Outdoor and Vacation Adventure Guide leads you through a series of sequential cards in an orderly way, but still leaves some room for creative exploration and roaming. (You don’t have to read about all the fun stuff to do in British Columbia.)

Stay One Step Ahead
SuperStacks winners know there’s more to good interface design than consistent button placement and understandable icons. The winning stacks always stay one step ahead of users, guiding and anticipating user actions.

The Lazy Eye: A Primer of Neuro-ophthalmology, winner for Best Educational Entry, Higher Education, lets medical students perform simulated eye exams on patients by moving the cursor in front of an on-screen patient’s eyes and watching the resulting eye movement. (That’s exactly what doctors are checking when they wave their fingers in front of your face.) The stack details both normal and abnormal ocular motions and pupillary reflexes in patients with clinically rare, but medically important, conditions. By using the stack, students gain valuable experience for their future practices.

At the bottom of each card in the stack, a control bar offers flashlights for examining the right and left eye, and a dropper for administering drugs (which cause the pupils to dilate or contract). Other buttons jump to drawings illustrating the underlying anatomy of the simulated conditions. As you move the cursor across all buttons, text appears explaining the function and use of each. It’s an elegant way to guide the user, and one that makes the stack easy to use (see “The Eyes Have It”).
The Microsoft Excel Tutorial, winner for Best Training Entry, takes an entirely different approach to user guidance. Created to teach a beginner how to use Microsoft Excel, the stack guides you through a series of three structured lessons. Each lesson begins with defining a concept to be studied, and proceeds with a guided tutorial where you actually create a worksheet, chart, or database by following step-by-step instructions.

As you work, the stack analyzes your actions and provides hints and suggestions when you give incorrect answers, insisting on a sequential solution to the tutorial problems. It really feels as though there’s someone helpful at your elbow, gently guiding you through complex concepts and procedures. The stack so skillfully imitates Excel’s worksheet format and environment that when you open Excel for the first time, it looks like an old friend.

**Looks Count**

Just as with books and magazines, the graphic design of hypermedia is a powerful factor in its ability to communicate. The look of a stack or project defines its personality, helps state its purpose, and directs the user to important information.

The Mackerel Stack, winner in the Best Interface Design category and of the Leslie Liedtka Memorial Award (for the truly excellent stack that doesn’t quite fit in any other subject category), is a playful and wacky combination of promotional information about Mackerel Design’s Macintosh work; the biology, history, and enjoyment of the firm’s namesake fish; and baseball (don’t ask). The stack’s striking graphic design captures your interest immediately and keeps your attention all the way through.

The playful content of the stack—there are even six recipes for mackerel you can print out and try—is matched by its unconventional interface, which takes you through all the information in this multi-dimensional stack (see “What They Do”). Click on the picture of a dog’s ears, for instance, and the text message “Macintosh Graphics Systems Consulting” flashes; then the stack jumps to a card explaining how the folks at Mackerel Design have always got their ears perked for interesting new developments in the Mac world. Click on a row of application icons at the left of a screen, and a text field pops up, explaining how the designers use those applications in their work. And the sounds of snare drums, water drops, and digitized voices saying things like “Holy Mackerel!” keep the stack engaging and exciting to explore.

**Mix Your Media**

Skillfully integrating text, graphics, sound, and animation isn’t easy, but the SuperStacks winners know how to do it.

Ludwig van Beethoven Symphony No. 9, winner for Best Commercial Entry, takes media integration the furthest. It combines a CD-audio recording of Beethoven’s Ninth Symphony with an informative, interactive HyperCard program that offers insight on the music, the symphony’s structure, and Beethoven himself. By offering CD-quality audio recording, expert commentary, and immediate access to any part of the symphony, Symphony No. 9 represents a won-

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**The 1990 Winners**

**Best Commercial Entry**

Winner: Ludwig van Beethoven Symphony No. 9: The Voyager Company

**Honorable Mention:** interFACE; Bright Star Technology

**Honorable Mention:** TypeChart 1.0b; Octavo Productions

**Best Vertical Market Entry**

Winner: DisplayNet; Eric Alderman, The HyperMedia Group, Electronic Catalog Corporation

**Best Training Entry**

Winner: Microsoft Excel Tutorial 2.2; Curtis Marsden

**Honorable Mention:** LessonCard; Mel Ristau and Tony Ceca, Visual Interface Architects

**Honorable Mention:** The Book of MIDI; Steven Rappaport and Opcode Systems

**Best Educational Entry, K-12**

Winner: Earthquake Preparedness Stack; Kelly O’Brien, Gaia Systems

**Honorable Mention:** Ballet Tutor; Rosendo Gonzalez and Joyce Wong, Shun-Yee Poon Ballet School

**Honorable Mention:** Mac Frog 1.0; Bob Dolter

**Best Educational Entry, Higher Education**

Winner: The Lazy Eye: A Primer of Neuro-ophthalmology; Howard Bregman, M.D., and Phong T. Ly, University of Pennsylvania School of Medicine

**Honorable Mention:** SuperImage; Joseph Klingler, M.D., Image Analysis Research Center, Medical College of Ohio

**Honorable Mention:** Bayshore Blast; Paul Baerman, Duke University Press

**Best Entry for Under $20**

Winner: Kids Can Save the Earth; compiled by Karen Rall and Amanda Goodenough

**Honorable Mention:** Hyper-Abledata; Gregg Vanderhelden, Trace R&D Center and Newington Children’s Hospital

**Best Multimedia Entry**

Winner: A Simulation of Acute Myocardial Infarction; Lee Andrews, M.D., Joseph Klingler, M.D., Michael Begeman, and Brad Behrendt, Image Analysis Research Center, Medical College of Ohio

**Honorable Mention:** Women Artists of Color: A Multimedia Research Tool; Dana Bass

(continues)
The 1990 Winners

Honorable Mention: Macroscope; Michael Hamilton, James San Jacinto Mountain Reserve, Regents of the University of California

Honorable Mention: Bird Anatomy II; Patrick Lynch and Noble S. Proctor, Biomedical Communications, Yale School of Medicine

Best Entry by Kids
Winner: El Verbo Simple; Jason Sluzevich
Honorable Mention: HyperMailbox 3.3; E. Kenji Takeuchi

Honorable Mention: The Dancing Mouse and Metamorphosis; Donnie Madsen and Marinier Janes, Wonder-tree Education Society

Best International Entry
Winner: Outdoor and Vacation Adventure Guide; Lloyd Bernhardt, Motion Works, Vancouver, B.C., Canada
Honorable Mention: Revolución; Hugo Rosatti, Pontificia Universidad Católica de Chile, Santiago, Chile

Honorable Mention: Terremoto; Ian Bertie, Pontificia Universidad Católica de Chile, Santiago, Chile

Best Interface Design
Winner: The Mackerel Stack; Gordon Gower, Patrick Rodrigues, and Kevin Steele, Mackerel Design

Winner: Outdoor and Vacation Adventure Guide; Lloyd Bernhardt, Motion Works, Vancouver, B.C., Canada
Honorable Mention: Bird Anatomy II; Patrick Lynch and Noble S. Proctor, Biomedical Communications, Yale School of Medicine

Best Development Tool
Winner: Dialoger Professional 1.5; theResult Software
Honorable Mention: HyperRegister 1.2; George Pytlik
Honorable Mention: Bubble Help for HyperCard; Randal Jones

Leslie Liedtka Memorial Award
Winner: The Mackerel Stack 1.5; Gordon Gower, Patrick Rodrigues, and Kevin Steele, Mackerel Design
Honorable Mention: The Andean World; Charles Brod, Latin American Studies Program, Cornell University

Honorable Mention: Cosmic Osmo; Activision

The Mackerel Stack design team—(clockwise from upper right): Gordon Gower, Patrick Rodrigues, and Kevin Steele—somehow managed to convey their wacky sense of humor in 2-bit black-and-white.

The striking interface of The Mackerel Stack relies almost exclusively on pictures. If you click on the coffee cup, the stack goes to another card that allows you to see samples of Mackerel Design's illustration work.
color fidelity in the comparison screen, color being an important part of a purchasing decision. To keep colors accurate, the developers first prepared a set of smaller versions of each image using only 80 optimized colors. When you select these items to compare, a series of XCMDs mixes the resulting 240 colors to define the system palette for the set. The three images are then displayed using that system palette, bypassing SuperCard altogether.

Any student of Spanish will appreciate El Verbo Simple, winner of the Best Entry by Kids category. Designed by 16-year-old Jason Sluzevich during his summer vacation, the stack is based around an XCMD that Sluzevich wrote in Think C. The stack conjugates 250 Spanish verbs in 17 tenses and includes the many mystifying and frustrating irregular verb forms. El Verbo Simple has background information and examples for all 17 tenses, so you can read up on that pesky preterite subjunctive. It also lets you search through all the verbs in either English or Spanish, and add your own verbs—the stack conjugates them automatically.

Dialoger Professional 1.5, winner for Best Development Tool, allows scripters to easily add custom dialog boxes to any HyperCard stack, extending HyperCard's functionality while using familiar HyperCard objects (buttons and fields). Dialoger Professional is filled with useful examples, enabling beginners to get started right away; experts, meanwhile, get a head start with the development of custom stacks. It also provides a tutorial and a cross-indexed reference stack for the serious dialog developer.

Secrets Revealed

From places as far away as Santiago, Chile, and from children as young as seven, the 1990 entries were uniformly good, yet incredibly diverse. It is especially exciting that the two categories with the most entries were Best Entry by Kids and Best Educational Entry, K-12. One frustrated judge, knee-deep in entries, said that any of the 1990 entries could have been semifinalists in 1989—and many of them would have been winners.

As SuperStacks repeat winners Lloyd Bernhardt, Amanda Good- enough, Patrick Lynch, and The Voyager Company can attest, practice helps. The continual refinement of interface design, informational organization, graphic design, and media integration makes hypermedia projects better with every iteration.

The 1990 SuperStacks winners represent a cross section of excellence in stack design, and we are proud to present them to you. And this year, many of the winning stacks are available in the Macworld Resource Center area on America Online. Just look for the SuperStacks folder, download the files, and discover their secrets for yourself.

See Where to Buy for contact information.

Special Thanks

The 1990 SuperStacks contest couldn't have happened without the discerning opinions of the judges: Mary Bushnell, HyperCard product specialist, Claris Corporation; Eric Carlson, HyperCard engineer, Apple Computer; Steve Costa, founder, BMUG; Doug Doyle, multimedia solutions manager—higher education marketing, Apple Computer; Bob Eddings, HyperCard testing team leader, Apple Computer; Stuart Heningson, strategic marketing manager, Silicon Beach Software; Mike Holm, HyperCard product-line manager, Claris Corporation; Roger Knight, multimedia marketing specialist K-12, Apple Computer; Kevin La Rue, SuperCard product manager, Silicon Beach Software; Linda Neumann, manager of program development, Apple Computer; Robin Shank, HyperCard stack engineer, Apple Computer; and Robertson Reed Smith, HyperCard engineer, Apple Computer.

A special acknowledgment of thanks goes to the following organizations for their support and sponsorship of the 1990 SuperStacks contest: Apple Computer, Claris Corporation, Digidesign, Farallon Computing, Iomega Corporation, National Semiconductor Corporation, Silicon Beach Software, Spinnaker Software, and Storage Dimensions.
GOING THE
Ethernet
ROUTE

No doubt about it, Ethernet offers Macintosh users a variety of enticing network alternatives. The primary reason so many users are tempted to get onto Ethernet, of course, is speed. Because Ethernet cable can transmit data at faster rates than LocalTalk cable can—10 megabits per second versus 230.4 kilobits per second—using Ethernet instead of LocalTalk to connect an AppleTalk network can mean speed increases of five to six times in network throughput.

If you have two or more separate Mac networks in a building, Ethernet also offers a convenient way to link them. If you create an Ethernet backbone, a Mac in one network, or zone, can print to a LaserWriter or access a file server in another zone. Finally, Ethernet is an established network standard commonly used by large computers and powerful workstations. Should your Macs suffer from a lack of communication with a Digital Equipment Corporation VAX or a Sun Microsystems UNIX workstation, you can take advantage of Ethernet to bridge that gap.

Luckily, numerous options exist to put the Mac on the Ethernet highway. Add-in boards for the Macintosh SE, SE/30, LC, and II series provide the cable interface necessary to hook up directly to Ethernet. External SCSI devices enable a Mac Plus, Classic, or Portable to access Ethernet directly (see “Ethernet Direct Connect”). And routers—either hardware or software—enable a Mac to access Ethernet via a LocalTalk network rather than through a direct Ethernet connection. Because a router is a shared device, it provides an Ethernet connection to all Macs on the LocalTalk network.

Last year, Macworld Lab reviewed most of the available Ethernet add-in boards and SCSI boxes (see “Ethernet Highway,” Macworld, March 1990). This year, we tested the performance of several LocalTalk-to-Ethernet routers. As we discovered with add-in boards, not all Ethernet routers are created equal.

Planning for Ethernet
Before you make any kind of Ethernet connection, you must first decide what type of Ethernet cable to use. You have three primary choices: thick-wire coaxial, thin-wire coaxial, and unshielded twisted-pair cables.

Unwieldy thick-wire coaxial cable is best reserved for Ethernet backbones. Although a thick-wire coax interface is built into almost all Ethernet hardware devices (boards, SCSI boxes, and routers), connecting to it still requires a separate transceiver and another interface device, called a tap.

Thin-wire coaxial cable—currently the most popular way to create an Ethernet network—is much easier to install than thick-wire coax. Thin-wire

BY DAVE KOSIUR

MACWORLD • APRIL 1991
Ethernet routers connect Macs on LocalTalk to PCs and minicomputers on Ethernet.

At Lucasfilm's games division, Ethernet routers connect Macs on LocalTalk to PCs and minicomputers on Ethernet.

cable coax is about the same thickness as television cable. You can connect thin-wire coaxial cable directly to any Ethernet hardware device; the necessary transceiver is built into all such devices.

The newest Ethernet medium is unshielded twisted-pair cable, called UTP or 10BaseT (see "Another Twist to Ethernet"). UTP has proven to be a quick, economical, and more flexible way to connect LocalTalk (PhoneNet-type) networks, and it offers the same capabilities for Ethernet networks. Although not all Mac Ethernet devices offer 10BaseT interfaces, the number that do is increasing rapidly.

**Connection Options**

Once you've picked the type of Ethernet cable you want to use, you must decide how to attach Macs to the network. Direct Ethernet connections—such as those offered by add-in boards and SCSI devices—are a good idea if you're looking to get the most out of the network's speed. There's now a fierce battle shaping up for a piece of the Ethernet pie, evidenced by dropping costs for such devices. That's one clear reason Ethernet has become a viable alternative to LocalTalk.

Keep in mind, however, that many Macs with a direct connection can't keep up with Ethernet's 10Mbit-per-second speed. Macworld Lab tests of direct-connect devices last year showed that the combination of the SCSI Manager and a hard drive was a considerable bottleneck to Ethernet data transfer. As a result, the real-world performance of add-in boards and external SCSI devices—though two to six times faster than LocalTalk—does not come near Ethernet's maximum transfer rate.

A router, on the other hand, provides a more cost-efficient way to connect a Mac to Ethernet. Although more expensive than a single interface board, a router is shared by all the Macs on a LocalTalk network. As a result, a router lets you hook up a group of Macs for less than it would cost to put a board in, or a SCSI device on, each machine. A router also offers network-management services—zone security and configuration, for example—that add-in boards and SCSI devices can't.

For all routers, LocalTalk is the limiting factor in performance; some traffic must either enter or leave the router at LocalTalk speeds. That's a far cry from being directly on Ethernet. Thus, a router is most appropriate when you have a group of Macs that don't need constant access to Ethernet. For example, users may need the Ethernet connection only to send an occasional piece of data that needs quick, efficient transmission.
## Routers Compared

<table>
<thead>
<tr>
<th>Router</th>
<th>Company</th>
<th>Price</th>
<th>Maximum Number of Ports (LocalTalk/Ethernet)</th>
<th>Centralized Configuration</th>
<th>Diagnostics, Statistics</th>
<th>Automatic Restart</th>
<th>Security Zone/Password</th>
<th>Phase Support 1/2/Mixed</th>
<th>Other Protocols Supported</th>
<th>Remote Access</th>
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<td>ComTalk 2.0</td>
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</tbody>
</table>

- = yes; 0 = no  
1 Not tested  
2 Phase 2 support planned for first quarter 1991 release  
3 Liaison supports a maximum of 5 network interfaces at one time

Electronic mail to a VAX, to download a file from another zone's file server, or to access a shared database file elsewhere on the network.

### Comparing Routers

A router's primary job is passing network data, or packets, between LocalTalk and Ethernet networks. However, the formats of LocalTalk and Ethernet network packets differ, particularly in the way they specify destination. The router, then, must ensure that LocalTalk packets are provided with the correct destination address for Ethernet nodes, and that Ethernet packets are correctly formatted for LocalTalk destinations.

There are two types of routers: hardware routers and software routers. Hardware routers range from simple devices that handle one or two LocalTalk networks and one Ethernet network to high-end devices that support from 4 to 16 separate LocalTalk networks and 2 Ethernet networks. Multiport routers, those with more than one LocalTalk port, can be a distinct advantage if you need to connect multiple LocalTalk networks to an Ethernet network.

Low-end hardware routers typically employ a 68000 microprocessor to process all the network traffic that passes between the LocalTalk network and the Ethernet network. But to handle the greater number of attached networks, high-end hardware routers must have more processing horsepower—the primary reason for their higher cost. For example, Tri-Data's MaxWay 500 uses a Scalable Processor Architecture (SPARC) chip from Sun Microsystems. Ungermann-Bass's Net One MaxTalk takes a different tack: instead of using one more-powerful processor to control all the network ports, it uses multiple processors to handle network ports.

Software routers are programs that enable you to turn any Mac—including an AppleShare file server or electronic mail server—into a router. As a result, software routers are especially appealing to a network manager who either has a spare Mac to devote to routing tasks or wishes to install the router software on a server. Keep in mind, however, that although software routers can be cost-effective alternatives to hardware devices, the performance of both the router and the server can degrade considerably if traffic on the network is heavy.

### Speed Tests

Even though some network traffic must travel at LocalTalk rates, any router that connects a LocalTalk user to Ethernet at a speed significantly slower than that of LocalTalk isn't of much use. In fact, the router itself becomes a network bottleneck if it can't forward packets fast enough. Macworld Lab tested 13 routers to see how quickly they transfer data between LocalTalk and Ethernet (see "Router Speed Tests").

In the first set of tests, a single router linked a single LocalTalk network and a single EtherTalk (AppleTalk protocols on Ethernet cable) network. The results have some interesting implications for users on traffic-heavy networks. When only one user transfers a file through the router, every router performs at about the same pace. But as traffic through the router increases—as more users access the router simultaneously—some routers suffer performance lapses. Shiva's EtherGate fared the worst by far; it took almost six times longer to transfer a file with four users than with one user. (Shiva says a new version of EtherGate software, currently under development, will improve the EtherGate's routing speed.)

The second set of tests used two identical routers to connect two LocalTalk networks to an Ethernet backbone. Compared to the results of
Router Speed Tests

All times in seconds

<table>
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<tr>
<th>Single-Router Test</th>
<th>One Pair</th>
<th>Two Pairs</th>
<th>Three Pairs</th>
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* Tested only with Phase 1.

Macworld Lab tested 13 routers in two different network configurations. The first setup employed one router to connect a LocalTalk network and an EtherTalk network (AppleTalk protocols running on Ethernet cable). In the second configuration, two identical routers provided two LocalTalk networks access to an Ethernet backbone.

On the LocalTalk network were four 8MB Mac llcx computers set up as AppleShare servers; four other 8MB Mac llcx’s, configured as AppleShare clients, resided either on the EtherTalk network (the first configuration), or on another LocalTalk network (the second configuration). Each server was paired with one client to ensure that any measured bottlenecks were the result of shared the honors for fastest router. All the software routers functioned well—in some cases, outperforming some hardware routers. To achieve maximum performance, however, a software router must run on a dedicated Mac. When we configured Farallon’s PhoneNet Liaison to run in the background with a lower priority, Liaison’s routing performance slowed by 34 percent. Neither Apple’s AppleTalk Internet Router nor Network Resources Corporation’s (NRC) MultiGate Mac allows you to prioritize routing when run on a nondedicated Macintosh.

Macworld Lab also performed a separate set of tests on multiport routers. Judging by our results, each LocalTalk port really does behave as a separate router. At the same time, each port still quickly routes traffic to Ethernet. For example, four 1MB file transfers performed simultaneously through four separate ports took only 50 seconds each to complete. That compares favorably to the time it took to transfer a single file over one port, as well as to the time it took to transfer four files over one port.

More Than Speed

When choosing a router, however, you should also consider factors other than speed. Almost all of the 13 routers tested have some options—ranging from foreign protocol (non-AppleTalk) support to additional hardware features—that make them unique (see “Routers Compared”).

Configuration and Management

It probably comes as no surprise that
different routers have different configuration and management schemes. With two exceptions—the Wollongong Group's MacGateWay AT and Ungermann-Bass's Net One MaxTalk—you can configure and manage all hardware routers from a central Macintosh on the network. Because of the fact that the MacGateWay AT can be configured only with a Macintosh attached to its LocalTalk port, managing more than one MacGateWay AT on a network is quite difficult. The Net One MaxTalk, meanwhile, requires an IBM PC for configuration management.

As for software routers, they can be configured only at the Macintosh they are installed on, making central management of multiple software routers impossible. Apple's AppleTalk Internet Router's configuration is handled via a desk accessory; Farallon's Liaison uses the Chooser, while NRC's MultiGate Mac employs a HyperCard stack.

If you have multiple routers on a network, configuring and managing them is easier if they all support seeding. Seeding allows one router, which is called the seed router, to store all the appropriate network numbers and zone information for other routers on the network. When you attach other routers to the network, they acquire network configuration information from the seed router. Not all routers can act as seed routers, nor do all routers accept data from seed routers.

**Automatic Restarts** Another router capability that should be near and dear to managers' hearts is automatic restarting. Not all routers can remember their configuration upon restarting after a power loss. Shiva's FastPath 4 and EtherGate and Compatible Systems' EtherRoute store their configuration information either in battery-backed-up memory or nonvolatile programmable read-only memory (PROM).

On the other hand, the Cayman Systems GatorBox remembers only basic routing information after a power outage occurs. The GatorBox can be instructed, however, to automatically download more detailed information from either a Macintosh on LocalTalk—which I consider to be a definite disadvantage—or a UNIX computer on the network. Similarly, the NRC MultiGate 2000 can be set...
to download more detailed information from a Macintosh running the MultiGate Manager software.

AppleTalk Phase Support  Not all routers provide support for AppleTalk Phase 1 and AppleTalk Phase 2 protocols. At testing time, three routers—the Net One MaxTalk, Webster’s MultiPort Gateway, and the MacGateWay A—supported only Phase 1 protocols.

Although Phase 1 protocols can suffice for smaller networks, Phase 2 protocols improve the behavior of routers on large networks. In addition, Phase 2 permits up to 16 million AppleTalk nodes on Ethernet, while Phase 1 restricts the number of AppleTalk nodes to 254. Finally, keep in mind that some products—such as Farallon Computing’s PhoneNet—require Phase 2 protocols when running on Ethernet.

Routers that do support both Phase 1 and Phase 2 protocols can often be used as transitional routers. With them, you can upgrade a network to Phase 2 protocols gradually, rather than all at once.

TCP/IP Support  LocalTalk-Ethernet routers are often used as Transmission Control Protocol/Internet Protocol (TCP/IP) gateways, linking an AppleTalk network of Macs to an existing IP network. With a router that supports TCP/IP protocols, Macs can exchange information with other computers such as IBM mainframes, DEC VAXs, Cray supercomputers, and Sun workstations. In addition, an IP Ethernet backbone can connect geographically separated AppleTalk networks.

The FastPath and the GatorBox offer perhaps the most extensive range of TCP/IP services. (The FastPath also supports DECnet protocols.) Additional software from Cayman allows Macintosh users to access files on Network File System (NFS) file servers or UNIX users to print to LaserWriters.

Serial Support  Another router feature that may appeal to users is dial-in support. Some routers, such as Liaison, do permit remote access. A user can then call the router via a modem to use network resources such as file servers, E-mail, and printers. The EtherGate provides an interesting twist

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- = yes; 0 = no

* Some boards or devices may not support all available transceivers simultaneously.

† Has 2 SCI ports.

‡ Requires Macintosh Ilsi Q30 Direct Slot Adapter Card.
to this scheme. Not only can it act as a router, but it also has a serial port that allows Ethernet and LocalTalk users to share a modem or printer.

### The Final Word

Because of their LocalTalk connections, routers do not provide the performance that Ethernet add-in boards or SCSI devices do. However, Ethernet-to-LocalTalk routers offer advantages that those direct-connect methods don't.

First, a router can be shared by an existing LocalTalk network. If you have a number of occasional users of Ethernet-based services, a router is definitely a reasonable alternative to buying an Ethernet board for each user, even in spite of the fact that prices are dropping for add-in boards.

Second, a router provides more services to LocalTalk users. For example, by using a TCP/IP gateway, you can access UNIX (or other) computers.

Third, routers can be used to help control traffic on Ethernet networks. Just as LocalTalk-only routers keep traffic from affecting all users on a network, LocalTalk-to-Ethernet routers restrict traffic to the networks on which the source and destination computers sit.

If you're starting from scratch, I recommend the EtherRoute as a single-port router. At $1495, it's a bargain, and for $400 more, EtherRoute includes TCP/IP services. The single-port version of APT Communications' ComTalk is my second choice: it performs better than the EtherRoute, but also costs more at $3250.

For those situations where you can tie four LocalTalk networks into one location, the MaxWay 500 is a definite price-performance winner. Four EtherRoutes would cost $5980, while the MaxWay 500 is $5495. That's only a small price savings, but the MaxWay 500 is faster.

See Where to Buy under Ethernet Products for contact information.

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Dave Kasius, a Macworld contributing editor, is the editor and publisher of Connections, a newsletter concerned with networking.
ask

the maker of a macro program, "What's so great about macros?"
The response will surely include the mandatory phrases "automate your Mac," "enhance productivity," and "increase efficiency."

But want to know the real reason macros are great? Because they let you be lazy. By performing tedious, repetitive, boring tasks you usually have to do yourself, a macro program lets you kick back and relax while it types the date, sorts a database, or backs up that hard drive. This puts some of the work load back where it belongs: on the sturdy shoulders of an expensive computer. All you have to do is tell it, with a keystroke, which tedious task to begin—and get used to the privileges of desk potatoism.

And goodness, no—there's absolutely nothing wrong with being a desk potato. Indeed, it's something to be proud of! Desk potatoes represent people over machines, brains over brawn; desk potatoes live to max their Macs while expending as little energy as possible themselves. They thrill to programs like Nisus, MicroPhone, and Excel, which have built-in macro capabilities; and they absolutely slaver at the prospect of general-purpose macro programs, which let them reduce their net muscular activity in any application.

If you're not already using macros, you'll be amazed at how much effort they can save. And if you're considering getting into them, there are a few options: there's Tempo II Plus, QuicKeys, Apple's MacroMaker (free with System 6.05 or later), AutoMac III (free with Microsoft Word), and MasterStrokes (free with Datadesk 101 keyboards). In any case, let your fingers do the walking through this guide to the software servants.
The Tasks

A macro program lives in the System Folder (they're INITs or edews—programs that run automatically at startup). To signal a macro program that you want to teach it something new, choose Start Recording from a menu (or press a keyboard equivalent). Then, at whatever lazy pace you want, you go through one fragment of your daily routine: choose Set Startup; open your address-book DA; type your return address—whatever. The macro program watches, lurking, learning, until you finish. It pops a dialog box up on the screen, asking what trigger key you want to teach it.

This, of course, is precisely why you've got all those weird-looking keys on your extended keyboard: Home, PgUp, F1, F2, Control, and so on. Teach the Home and End keys to go to the beginning or end of a file. Use F1 to type your modern-service password. Assign Control-C to open the Calculator. The sky's the limit.

The only hitch: teaching a job to a macro is similar to teaching it to someone new at the office. Like sorcerer's apprentices, they have the potential to wreak minor havoc if you're not careful and explicit when explaining the task. And sometimes they're too dumb to get the concept even when you're the quintessence of clarity. So let's throw some typical tasks at each of the five programs in the Mac macro cosmos. Let's find out not only how well they perform, but also how well they learn. For each challenge, you'll rate each program according to the International Committee on Personal Inertia's laziest scale, the Système des Points d'Utilisation Déminition (otherwise known as SPUD points). The higher the SPUD point rating, the better a macro program's capacity for decreasing your grunt-work quotient.

Menu Manipulation: Taking Out the Trash

In the Finder, you can press 36-N to create a new folder, 36-O to open something, and so on. But to empty the Trash, you have to grab the mouse, roll up to the Special menu, and choose Empty Trash—by the desk potato's standards, an unforgivable expenditure of calories. With a good macro program, you can empty the Trash (or select any other menu command) without taking your hands off the keyboard.

All five programs pass this test with flying colors. You start recording, choose Empty Trash, stop recording, and give the new macro a keystroke (36-T has a nice ring). Immediately afterward—and forevermore—you can empty the Trash by pressing 36-T. All but Tempo II Plus empty the Trash so fast it's unbelievable. (Tempo II Plus, whose macros are stored on disk instead of in memory, waits about one second before performing its feat.) At first, you may feel a little out of control. But once you realize that your software slave is only doing what you've asked, you'll start to feel the desk potato's warm glow of lethargy.

QuickKeys2 and Tempo II Plus even offer an important additional menu feature: the ability to select a menu command either by its position on the menu (as the other three programs do) or by its name. You might want a by-name menu macro for Word's Italic command, for example, because its position in the menu changes depending on whether Full Menus or Short Menus is in effect.

Mouse Maneuvers: Dragging Disks

Choosing a menu command is one thing; what about something that requires a little more brains, like dragging a floppy-disk icon to the Trash? Four out of the five macro programs perfectly record and play back this one-drag macro (MasterStrokes can't drag). But suppose you're creating a presentation for the Idaho Tubers Growers Association, and want a macro to magically draw a many-eyed potato logo before the assembled throngs? You need a macro to move the mouse in more complex ways than just straight lines.

With MasterStrokes or Macromaker, you're out of luck. They define mouse movements solely by the starting and ending points. AutoMac III, QuickKeys2, and Tempo II Plus offer a Real Time playback mode, where mouse movements are replayed precisely as they were recorded—zigs, zags, hesitations, and all. Using a real-time macro, you can create anything from an animated Mac training "video" to a complete MacPaint cartoon . . . with one keystroke.

Window- and Box-Brains: Doing Windows

In the desk potato's never-ending quest to minimize mouse activity, cutting down window-clicking and dialog box-clicking is high on the list. Wouldn't it be simpler to press Control-C to close, Control-B for Best Quality, and so on?

QuickKeys2 has an awesome advantage in the window-handling event, because it has a number of predefined window macros: Close Window, Select Rear Window, and so on. They work regardless of the window's position: the Close Window macro closes the front window even if its close box is off-screen. Thus QuickKeys2's Zoom Window macro is especially useful when a window is completely off the screen (because it was saved on a bigger monitor); QuickKeys2 neatly centers and resizes the window.

While there are no canned window macros for Tempo II Plus and MacroMaker, those programs also have the brains to apply macros to the active window, even off-screen. AutoMac III, though, only does windows if their close or zoom boxes are on-screen. And if the window has moved since you recorded the macro, your MasterStrokes window-zoom macro just clicks futilely on the desktop.

Having a Dialog

Another task the effort-conserver often delegates to a macro is selecting...
items in dialog boxes. Suppose, for instance, that you want your subhead macro, Control-S, to select Bold and Small Caps in Word's Character dialog box. Any macro program could learn to click on check boxes. Trouble is, if you apply the same macro to a passage that's already bold, it clicks the Bold check box a second time, turning Bold off. That's why QuicKeys and Tempo II Plus have a click-only-if button-is-off option, so they click only if the check boxes aren't already checked.

You might think Control would be the perfect macro key, since it's almost never used in applications. Yet AutoMac and MasterStrokes don't recognize the Control key. And while we're at it: a macro program should let you create unmodified letter-key macros, too, so that pressing the P key in MacPaint selects the Pencil tool, for example. But Tempo II Plus and MasterStrokes require at least one modifier key (except for F-keys). AutoMac doesn't even let you use the function keys.

Keyboard Skills: Taking a Letter
All right. You've reduced your mouse usage to the absolute minimum. The desk potato's next priority is to cut down on that other major energy-waster: typing. Why on earth should you consult your calendar and type the date at the top of every letter? You've got a computer, for goodness' sake!

QuicKeys and Tempo II Plus are ready and waiting; each has an assortment of ready-made date-stamping macros in all different formats. Slap that macro onto the F5 key and forget about looking up the date. The other programs have no such built-in features. The best you can hope to create is a macro that opens the Alarm Clock desk accessory, copies the date, and pastes it. Even that method's not ideal, unless you want "5:17:52 PM 3/9/91" at the top of your letter.

Boiling Over
Of course, a macro can learn to type more than just the date. Your return address is a typical candidate. So are frequently used lengthy or hard-to-type phrases (the MacroMaker manual gives Zbigniew Brzezinski as an example). Lawyers and others who draw up contracts have plenty of standard paragraphs; they're called boilerplate text, and they're a cinch with macro programs.

MacroMaker and AutoMac III have basic boilerplate skills: start recording, then type the passage. QuicKeys is slightly better at boilerplate text, because it lets you copy the text from an existing document (instead of typing it again for the macro's benefit).

Tempo II Plus takes boilerplate text so seriously that it has a special feature called Autopaste. You don't even have to copy the text into Tempo II Plus—just select text in a word processor and choose Autopaste from the Tempo menu. This even works with graphics like your signature. When the time comes to sign your letter, hit Control-S (or whatever's been assigned); after Tempo II Plus's characteristic one-second hesitation, your signature pops into your letter.

If there's an approach that's better yet, it's MasterStrokes'. You trigger the automatic typing not with a # or function-key combination, but with an abbreviation. That is, type normally; when it's time to insert the vegetable du jour, just type FRIES (with a space on each side); MasterStrokes instantly backspaces over the word and types "A tenderly fragrant serving of fresh potato product, lovingly fried in Kansas beef fat, and served with a tasty dash of granulated sodium chloride."

Multistep Macros and Looping: Work Processing
No desk potato would stop at macros that only relieve them of a key-stroke or two. Power macro users learn to create multistep macros, or sequences, that perform a whole series of actions in a row.

Suppose you've completed a 70-page paper on warships—so much sheer labor it'd turn the average desk potato's hair white. Imagine your horror when you discover that ships' names should be italicized. Using Word's Find command, you could create a macro that searches for the ship prefix (US), highlights the following word (such as Constitution), and chooses Italic. But there are 250 ship references in the paper. You need

### THIRTY GREAT JOBS FOR MACROS

Get your hands off that mouse! Here are 30 great uses for macro programs that are already saving people thousands of cumulative hours. And think: each merely requires one keystroke.

Most of these macros have already been made up for you. They're available at no charge from America Online, in the Macworld Resource Center (keyword: Macworld), in MacroMaker, Tempo II, and QuicKeys formats. Start downloading and get lazy.

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<td>Change tools (PageMaker, MacPaint, Canvas, and so on)</td>
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<td>Check Inbox for new mail; save it</td>
<td>T</td>
</tr>
<tr>
<td>Choose common font size combination</td>
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<tr>
<td>Convert all straight quotes to curly quotes (existing file)</td>
<td>T</td>
</tr>
<tr>
<td>Convert all straight quotes to curly quotes (while typing)</td>
<td>Q</td>
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<td>Drag top MultiFinder window to bottom of screen</td>
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<td>Eliminate extra spaces between sentences</td>
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<td>Find/delete Word Temp files (using DiskTop)</td>
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<td>Initialize blank floppy disk</td>
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<tr>
<td>Jump to a specified folder when you Open or Save</td>
<td>T, Q</td>
</tr>
<tr>
<td>Launch Excel (or any program)</td>
<td>A, Q, T</td>
</tr>
<tr>
<td>Log on to online service (America Online, CompuServe, Delphi...)</td>
<td>A, Q, T</td>
</tr>
<tr>
<td>Mount AppleShare volume</td>
<td>Q</td>
</tr>
<tr>
<td>Open address-book desk accessory</td>
<td>A, MM, MS, Q, T</td>
</tr>
<tr>
<td>Print only page 1</td>
<td>A, MM, MS, Q, T</td>
</tr>
<tr>
<td>Reconfigure numeric keypad (put 1, 2, 3 on top row)</td>
<td>Q, MM</td>
</tr>
<tr>
<td>Replay all steps up to a crash (while programming)</td>
<td>Q</td>
</tr>
<tr>
<td>Restart or shut down the Mac (within any program)</td>
<td>Q</td>
</tr>
<tr>
<td>Save your work every ten minutes</td>
<td>A, Q, T</td>
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<tr>
<td>Select next window</td>
<td>Q, T</td>
</tr>
<tr>
<td>Select Text Offset for a graphic (PageMaker)</td>
<td>A, MM, MS, Q, T</td>
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<tr>
<td>Set clock to Daylight Savings Time</td>
<td>A, MM, MS, Q, T</td>
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<tr>
<td>Strip linefeeds from telecom text</td>
<td>T</td>
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<td>Switch color monitor to BW or back</td>
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<tr>
<td>Type &quot;SUMO!&quot; in Excel, put cursor between (l's</td>
<td>A, MM, MS, Q, T</td>
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<tr>
<td>Unstuff a Stufflt Deluxe archive</td>
<td>Q</td>
</tr>
<tr>
<td>Zoom all PageMaker pages to same % view</td>
<td>T</td>
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</tbody>
</table>

A = AutoMac III, MM = MacroMaker, MS = MasterStrokes, Q = QuicKeys², T = Tempo II Plus.
Tempo and QuicKeys2 get an extra SPUD point apiece for their intelligence in choosing commands by name.

Mouse Maneuvers
Tempo and AutoMac get extra SPUD points because they're the best at mouse maneuvering, and they let you incorporate real-time segments into regular (step-time) macros; a QuicKeys2 macro must be recorded in either all real-time or all step-time. MacroMaker drags the mouse only in a straight line; MasterStrokes can't even do that properly.

Window- and Box-Brains
QuicKeys2 excels at doing windows, with its pre-made, sure-fire, and trustworthy window macros. Tempo and MacroMaker do equally well, although their window macros aren't canned. AutoMac works only if the window is fully on screen, and MasterStrokes isn't smart enough to click the Zoom box if it's not where it was when you recorded. Extra points to QuicKeys and Tempo for having common sense in checkbox- and button-clicking operations.

MacroMaker
MasterStrokes
QuicKeys2
Tempo II

Multistep Macros and Loopping
All five programs handle multistep macros gracefully; MacroMaker and MasterStrokes, however, don't let you edit those macros once you've created them. Tempo II's built-in brains handle looping with aplomb. MacroMaker and AutoMac can loop a few times; QuicKeys2's Timer feature can do a pseudo-loop; and MasterStrokes—well, you don't want to try looping with MasterStrokes.

AutoMac III
MacroMaker
MasterStrokes
QuicKeys2
Tempo II

Keyboard Skills
MasterStrokes makes it easy to call up boilerplate text, because remembering your own abbreviation is easier than remembering a key combination. Tempo even has boilerplate graphics, and you don't have to type the text again to create the macro. QuicKeys limits text length to 256 characters (although you can string several together), but it has terrific built-in date-stamping; the remaining programs have to watch you type the full text.

AutoMac III
MacroMaker
MasterStrokes
QuicKeys2
Tempo II

The other programs aren't designed to loop. You have to create two macros, each of which ends by invoking the other. That is, the Control-1 macro finds and italicizes the first ship name, then presses Control-2. The Control-2 macro handles the next case, then presses Control-1 . . . and so on.

This works splendidly with MasterStrokes. Trouble is, there's no way to stop the infinite loop. Ultimately, you have to shut off the Mac (in the desk potato's book, a disgraceful waste of effort). MacroMaker automatically stops after about 10 loops, and AutoMac III after about 20—not a bad compromise.

The twin-macros method doesn't work in QuicKeys2—not even once. Fortunately, QuicKeys2 has another feature that works almost as well: a Timer option, which can set any macro to run at regular time intervals. If you set your italicizing macro to run once per second, it works almost as fast as Tempo II Plus's self-looping macro. Once again, though, there's no way to stop the mad macro once it's begun. Even if you click to cancel, the looping begins again immediately. You can interrupt the cycle only by opening the QuicKeys2 control panel and turning off the Timer feature—workable, perhaps, but inefficient.

Macrobatics Summary
It's tough to criticize AutoMac III and MasterStrokes; after all, they're provided as free helpful bonuses by the makers of nonmacro products. But the desk potato would blanch at AutoMac III's dialog box-intensive interface.
And remember that AutoMac III won't let you assign macros to the row of function keys or the Control key; that takes away half the fun of macro making. MasterStrokes has one or two terrific features—for example, that boilerplate text feature is glorious. But too many tasks fall into MasterStrokes' can't-do-its category—everything from mouse drags to file launching.

The other three programs are terrific, but are aimed at different kinds of users. MacroMaker is amazingly under-rated. Its present-menue means that you never have to memorize your macros (or even give them keystroke assignments). Unlike any other program, MacroMaker has an info box for each macro for entering in short descriptions. And MacroMaker's is the only interface you could conceivably navigate without a manual. It isn't meant to perform tasks that involve more than menus, clicks, and typing, but it does these with speed, brains, and reliability.

QuickKeys5 is a powerful middlelevel program. It classifies every Macintosh action as one of about a dozen types: Text, Click, Date/Time, Menu, and so on. On one hand, the controls for all these types clutter QuickKeys5's interface somewhat. On the other hand, because each step of a macro is identified this way, it is easy to access and edit individual steps of a multistep macro—a crucial capability that MasterStrokes and MacroMaker don't give you. You won't get far without the QuickKeys5 manual, but the program is much more flexible and programmable than the simpler programs are.

And finally there's Tempo II Plus. Glancing at the "Macrophone Features" table, you'd think Tempo II Plus could do almost anything. Indeed, it's by far the most powerful, intelligent, and limitless macro program. Because it's so programmable, you can, with patience, create complex macros that perform lengthy overnight tasks; one might, for example, automatically log on to a mainframe at midnight, download data, format it in Word, print it out, and shut down the Mac. No, Tempo II Plus is not for beginners. Its dialog-boxy interface won't win any design awards, and editing macros is more cumbersome than it is in, say, QuickKeys5. But more than one lucky soul's database-conversion project or massive document-formatting task has been saved by Tempo II Plus's programmable smarts.

Lifting a Finger

The Golden Rule of Desk Potatoes: If you catch yourself performing a task for the second time today, hand it over to a macro. (Let the list of "Thirty Great Jobs for Macros" give you some ideas.) If you're already using macros, please sit down and observe a moment of laziness in honor of all the cumulative energy you've conserved. And if you're not yet using macros, go get that Utilities disk that came with your Mac, and try out MacroMaker as a first step. That's the one bit of effort you'll be very glad you made.

David Pogue, a Macworld contributing editor, lives in New York City, where he's writing a high-tech Macintosh thriller. He's still trying to make Control-D run the dishwasher.
With the advent of 32-bit QuickDraw, virtual memory, pressure sensitivity, and enhanced image processing features, color paint applications have been transformed from diverting toys into extraordinarily capable tools. Full-color image-editing and image-creation software packages now offer a wide spectrum of traditional and innovative tools and techniques for electronic painting. After seeing the range of possibilities open to you, you might be moved to say the sky's the limit. But you'd be wrong. With a color paint program, you can edit the sky too.

Serious Painting, Serious Storage
If you're serious about color painting, there's no substitute for a true-color, 24-bit system and its 16.8 million colors—provided, of course, you can afford it. The software itself is not necessarily expensive. Delta Tao Software's Color MacCheese, for example, a limited but adequate 24-bit paint program, can be had for under $100. But be prepared to hock your inheritance on the hardware.

The first pieces of equipment you'll need are a bigger hard drive and a backup system. True-color paintings are disk hogs. At the typical 72-dots-per-inch screen resolution, an 8%-by-11-inch RGB image can take up as much as 1.5MB of space on a hard drive. Increase the resolution to 300 dpi, and the image soars to nearly 25MB.

Lots of memory is also a necessity. Of the 11 color paint programs reviewed here, only Electronic Arts' Studio/32 uses disk-based virtual memory to edit images that are larger in size than the available RAM (for a comparison of Adobe Photoshop and ColorStudio, see "Want My Real Opinion?"). Less expensive programs require that you load an entire painting into RAM before working on it, which severely limits the kinds of paintings you can produce. A 4MB system allows you to create low-resolution, letter-size paintings; an 8MB system, not running MultiFinder, gives you the most flexible working environment.

Together, a 24-bit video card and a compatible monitor can cost about $2000 more than their 8-bit counterparts. However, three paint programs—Color MacCheese, Zedcor's DeskPaint, and Studio/32—allow you to access 24-bit color using an 8-bit system. With 32-bit QuickDraw installed in the System folder, pixels are automatically dithered to simulate colors that cannot be displayed on screen. The display isn't perfect, since you can't see exactly what you're painting, but images can be saved to disk and printed as 24-bit paintings.

The Perfect Toolbox
Most color paint programs are remarkably similar in terms of general features and interface, unlike, for example, desktop publishing applications, which vary widely. The best color paint programs are those based on the now-familiar set of tools and functions introduced in MacPaint, so you can get up and running with them in a relatively short period of time.

Microlusions' Photon Paint is a notable exception. The program lacks such hallmark tools as the pencil, eraser, and grabber hand. Its toolbox, which consumes an enormous portion of the screen, contains a collection of squiggles, line graphs, and peacocks (really, that is what the icon looks like) that are seemingly designed to send the hardiest user scrambling for the manual. But because the manual lacks even a single illustration, hours into using the software you may be left wondering which icon does what.

Oddball tools—tools that appear familiar but don't perform as expected—can also be frustrating. Olduvai's VideoPaint (offspring of the bizarre GraphistPaint) and SuperMac's PixelPaint Professional, for instance, have pencil tools that don't erase in a normal fashion.

Another tool that varies widely from program to program is the airbrush. MacPaint's airbrush (known
as the spray can) sprays a fixed pattern of dots, and only when you drag the cursor. Other programs offer a well-implemented airbrush tool that sprays a continuous random pattern of dots. If you pause while still pressing the mouse button, paint continues to be applied, much as if you’re using an actual airbrush. Of the programs reviewed here, only Creative Software’s Easy Color Paint, Preferred Publishers’ MasterColor (previously CA-Cricket Color Paint), and Olduvai Corporation’s VideoPaint lack such well-implemented airbrushes. Easy Color Paint’s airbrush is even worse than MacPaint’s. Though MacPaint’s sprays a constant pattern, it skips every other pixel regardless of how slowly you drag, leaving your airbrushed patterns a random appearance. Easy Color Paint doesn’t skip every other pixel, so dragging its airbrush tool slowly produces an unbroken line that bears little resemblance to shading. MasterColor’s airbrush is identical to MacPaint’s. But the program also provides a fully customizable texture tool that paints both randomly and continuously with a variety of multicolor splatters. VideoPaint’s airbrush tool allows you to control the shape and size of individual dots and lines in the airbrush pattern, but it does not operate continuously; it applies color only when the tool is dragged.

Taken as a whole, the best toolboxes are those available in Studio/8 and Studio/32 and the PixelPaints (both 2.1 and Professional). Rather than presenting huge and sometimes confusing collections of tools—as MasterColor and Deneba Software’s UltraPaint do—the Studios and PixelPaints offer medium-size toolboxes with extensive modification options. In special-effects mode in PixelPaint Professional and PixelPaint 2.1, selecting a tool brings up a custom menu complete with options for applying cycling colors and gradation. In the Studios, you select modification options from special pop-up menus below the toolbox, each of which may be toggled from the keyboard even as you’re using a tool. For example, while you are using the paintbrush tool, pressing 2 on the numeric keypad changes the brushstroke from opaque to tinted (semi-transparent); if you’re painting with a pattern, pressing 2 a second time makes the white portions of the pattern transparent. You can make all these changes without breaking your stroke or concentration.

**Colorful Demands**

Color increases the range and quality of a painting more than any other single element does. However, color also complicates your work by introducing additional tool requirements. For example, you need to be able to select colors quickly both from a palette and directly from the page. All 11 color paint applications reviewed here solve this problem by offering a dropper tool. Clicking on a color in a painting makes that color the foreground color (the color currently applied by most painting tools). Most programs also allow you to temporarily access the dropper from the keyboard, so you don’t have to move the mouse back and forth between the drawing window and the toolbox to change colors. Only DeskPaint and Photon Paint fail to provide temporary keyboard access to the dropper tool.

Even though paint programs create only bitmapped documents, color paint offers a way to avoid the jagged edges normally associated with bitmapped artwork. By blending pixels along the borders between contrasting colors, you can blur jagged edges, making the transitions appear softer and more natural. The most common means for accomplishing this is anti-aliasing, which blends the edges of a line or character of type as it is applied to the page. Some programs, like UltraPaint, DeskPaint, and DeskDraw, provide charcoal tools that let you draw free-form lines with blurred edges. Studio/32, VideoPaint, and MasterColor also have special antialias brush tools. Better yet, Studio/32, Color MacCheese, and PixelPaint Professional offer antialias modifiers that affect the creation of geometric lines and shapes as well as type (see “Smoothing the Jagged Beast”).

With the exceptions of Studio/32 and UltraPaint, which provide special layers for creating and modifying object-oriented text, color paint programs print only bitmapped text, so what you see on screen is exactly what you get on paper.

However, if you use Adobe Type Manager in combination with one of the three color paint programs that offer antialias type—Studio/32, Color MacCheese, and PixelPaint Pro—large type may appear quite smooth and readable when printed. ATM optimizes the appearance of on-screen type based on printer-font information; antialiasing blends the remaining jagged edges of the letters more smoothly into the background of an image.

After using the standard painting tools to apply colors, you may want to blend colors on screen using a smudge tool, offered by all the programs reviewed here except Photon Paint, PixelPaint 2.1, Color MacCheese, and Easy Color Paint. Unlike real paint, which sets as it
dries, electronic paint may forever be manipulated. It is “dry” or “wet” depending on the whim of the user and the prowess of the programmer. The smudge tool picks up color from one portion of the painting and smears it onto neighboring pixels, much as if the colors were finger paints. Indeed, the process is so much like the finger painting of yesteryear that the smudge tool commonly appears as a finger pointed toward the page.

For users with a keen interest in more advanced image processing features, VideoPaint, UltraPaint, and the two PixelPaints provide Blur and Sharpen commands for filtering the appearance of a large selected area. For experienced users who require a higher degree of control and accuracy, Studio/32 offers both a blur tool and a sharpen tool, for precise work on small areas of a painting. The blur tool, represented by a water drop, acts like an anti-aliasing tool that you use after creating a painting, to smooth existing images and soften contrasting pixels. The sharpen tool increases the contrast between pixels and is especially useful for bringing fine details into sharper focus.

Selecting is another operation that takes on new meaning in a color paint program. Suppose that you want to select the image of a daisy that appears against a grassy background. Somehow you have to isolate the whites and yellows of the flower from the greens and browns of its surroundings. If you have a steady hand, you can simply lasso the flower by carefully tracing its outline. But if you’ve ever tried to clip an image from a photograph, you know how unsuccessful and damaging such free-form selection can be. For this reason, many high-end painting applications offer several ways to select areas in a painting.

Studio/32 and UltraPaint have magic wand tools, which select a contiguous area of pixels whose colors fall within a specified range. As an example, consider a scanned image of Alan Bates’s face. While the pixels that make up his hair are not colored uniformly, they are colored similarly—certainly they are similar enough to be easily distinguished from his face. To select only the hair, click on a series

**WANT MY REAL OPINION?**

If you’re serious about color painting take my advice and part with a few extra bucks to buy a full-fledged color photo-editing package. ColorStudio and Adobe Photoshop, the most powerful examples, sell for about $300 more than either PixelPaint Pro or Studio/32. Although they lack tools for creating geometric shapes like rectangles and ovals, both are far superior products for many high-end color paint projects. Both Photoshop and ColorStudio provide 24-bit color using an 8-bit monitor; virtual memory; a slew of useful image-editing filters; full contrast, brightness, and color balance control; anti-aliasing; and pressure sensitivity. In addition, both offer exacting control when creating four-color separations, and they provide direct support for scanners (see “Real to Realizer”).

Deciding between the two, however, is difficult proposition for the discerning artist. ColorStudio offers an extremely versatile collection of drawing tools and brush shapes. The program also allows you to customize brush shapes, which can be saved and transferred to other versions of ColorStudio as annex files—special resources that can include separation modules and image-editing filters. From an electronic painter’s perspective, ColorStudio’s greatest strength over Photoshop may be the Shapes annex, a collection of object-oriented tools and commands that rival those of dedicated drawing programs such as Adobe Illustrator and Aldus FreeHand. Like Illustrator 3.0, ColorStudio’s Shapes allows you to reshape PostScript type outlines to create logos and other specialized letterforms.

Unfortunately, while it’s a dramatic improvement over its predecessor in many ways, ColorStudio 1.11 has inherited two frustrating ancestral traits. First, it demands 5MB of RAM to run—more than twice as much memory as Photoshop requires—preventing many users from operating ColorStudio under MultiFinder. And second, the program has a cumbersome user interface, cluttered with complicated dialog boxes.

 Photoshop, on the other hand, delivers high-powered painting prowess in a substantially simplified format. A highlight among Photoshop’s points of painting interest is the magic eraser tool, which selectively reverts portions of a painting to their previously saved appearance. ColorStudio lacks even a standard eraser. What’s more, Photoshop offers versatile transformation commands and straightforward masking control in which selections act as editing stencils. These features are present but less intuitive in ColorStudio.

But regardless of which program you choose—ColorStudio or, my favorite, Photoshop—there’s no getting around the fact that these two image-editing applications double as the best color paint programs on the market.
## COLOR PAINT PROGRAMS

<table>
<thead>
<tr>
<th>Company</th>
<th>Color Paint Contrasts</th>
<th>DeskPaint &amp; DeskDraw 3.03</th>
<th>Easy Color Paint 2.0</th>
<th>MasterColor 1.0</th>
<th>Photon Paint 1.1.1</th>
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<td>Delta Tao Software</td>
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<td>SuperMac Technology</td>
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</tbody>
</table>

### GENERAL FEATURES
- Opens multiple paintings
- Supports PICT/TIFF
- Supports MacPaint/EPS
- Maximum painting size (in pixels)
- Direct scanner support
- Prints color separations
- Halftone screen frequency control

### COLOR
- 24-bit color
- Key colors per gradient
- Pantone color support
- Color editing modes
- NTSC gamma correction
- 32-bit alpha channel control

### PAINTING TOOLS
- Bezier curves
- Antialias line control
- Editable multicolor patterns
- Adjustable paint opacity
- Paint on lighter or darker colors only
- Antialias brush control/charcoal tool
- Adjustable airbrush size/flow
- Airbrush splatter control
- Image-editing tools
- Pressure sensitivity
- Object-oriented drawing tools

### TEXT HANDLING
- Antialias type control
- Supports multiple fonts and sizes in text block
- Maximum type size (in pixels)
- Object-oriented text capabilities

### SELECTION CAPABILITIES
- Magic wand selection
- Select shape from inside
- Autoskip lasso control
- Select noncontiguous areas
- Select/reshape most recent object
- Add or subtract to selected area

### IMAGE-EDITING FEATURES
- Mask objects/colors
- Nudge selection one pixel
- Resize selection by percent
- Warp selection onto shape
- Project light source on selection
- Image-editing filters

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- • = yes
- ○ = no, none
- * Saves in monochrome TIFF only
- † Saves in gray-scale TIFF only
- ‡ Opens only
- ‡ Saves only
- ‡ Limited only by available memory
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<th>Feature</th>
<th>PixelPaint Professional 1.0</th>
<th>Studio/S 2.0</th>
<th>Studio/32 1.0</th>
<th>UltraPaint 1.0</th>
<th>VideoPaint 1.0</th>
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*  Gadients may fill selected area only.  "Unrestricted."  *In drawing layer only.  *Applicable to entire image only.
of representative pixels with the magic wand tool. A range of similarly colored contiguous pixels becomes selected. If portions of the face become selected, specify a smaller range. If the selection misses some follicular pixels, increase the range.

Another selection method, autoslip lasso control, is offered by DeskPaint (the program calls it masking), PixelPaint Professional, and the two Studios. In contrast to a magic wand, this feature allows you to define the colors that should be exempt from a selection. If you drag across the green and brown areas around the daisy, for example, the program ignores all green and brown pixels and selects only the whites and yellows inside the lassoed area—the daisy itself.

Some Very Special Effects
If you're looking for razzle-dazzle, you'll find much to admire in the new crop of color paint software. VideoPaint and Photon Paint are perhaps the most powerful applications in the special-effects arena, although they have their share of special difficulties too. Both programs enable you to wrap selected images onto spheres, cones, cubes, and other three-dimensional objects. You may also define a light source, the angle of light, and diffusion rate with these two programs. The problem is that the results are long in the making and extremely difficult to predict. On a Mac II, a standard surface-mapping command can take as long as five minutes to complete. If you're unhappy with the results (which I found to be a common experience), you have to choose Undo and start all over again.

If you're too impatient to withstand the slings and arrows of the special-effects programs, you might prefer to settle for the less dramatic Studio/32. Studio/32 allows you to wrap a selection onto a sphere, though you cannot define a light source. You can also create a 3-D montage of repeating perspective tiles (see "The Ideal Linoleum"). The effect is time-consuming, but more predictable than the surface mapping offered by other programs.

Printing Your Painting
All right, color paintings look great, but what good are they? What can you do with the final image? Unfortunately, this is the biggest failing of the majority of color paint applications. If you're on a budget, you can print monochrome halftones or color composites on PostScript-compatible output devices, and use photocopies to create multiple copies for fliers or other informal documents.

But only VideoPaint and the two PixelPaint packages provide the color-separation capabilities and the halftone screen frequency control required for professional offset printing. PixelPaint 2.1 and PixelPaint Professional display comprehensive print dialog boxes that allow you to choose both process-color and spot-color separations. In VideoPaint, you have to save your painting as four PostScript-language separation files—one each for the cyan, the magenta, the yellow, and the black components. You then download each of these to a PostScript-compatible printer. It's time-consuming, but at least it works.

While lacking direct color-separation capabilities, UltraPaint, Studio/8, Studio/32, and DeskPaint do allow you to save images as color TIFF documents, which you can then separate with other programs, such as Aldus PrePrint, Adobe Photoshop, or Letraset ColorStudio.

If you're more interested in video than in print output, you can save your artwork as a PICT file—the only format supported by all 11 color paint programs—and import it to a presentation program such as Aldus Persuasion or use it as a background in a full-blown animation application such as MacroMind Director.

The Final Touches
So when all is said and done, what's the best color painting program? It really depends on how much money you want to spend. If you can't justify spending more than $100, I recommend Color MacCheese over its slightly less expensive rival, Easy Color Paint. Color MacCheese offers 24-bit color, all the expected tools, an adequate collection of anti-aliasing features, and limited image-editing features, certainly enough for the casual user. The manual is next to worthless, but the program comes with a hand-painted box and some Taoist philosophy thrown in.

If it weren't for the existence of the very inexpensive Color MacCheese and Easy Color Paint, PixelPaint 2.1 and Studio/8 would be reasonable deals for under $300. But as it is, I can't recommend any program in the $100-to-$500 range except for the $159 UltraPaint—and that only because UltraPaint provides a drawing layer complete with a set of object-oriented tools.

If your idea of painting includes photo editing, painterly drawing control, and an occasional color separation, you should consider shelling out $700 for a top-of-the-line program. Insofar as a pure drawing experience is concerned, Studio/32 is my personal favorite. It provides pressure sensitivity (see "As If That Weren't Enough") and a host of fine drawing-modification controls that make on-screen painting a real pleasure. Studio/32 also offers access to Apple's alpha channel. But Studio/32...
Having seen the future of color bitmap software, I can tell you that it begins with pressure sensitivity and ends (at least for now) with Time Arts’ new paint package Oasis.

The Wacom tablet, with its two pressure-sensitive styluses, does everything a mouse does and more. Used with some paint programs, it responds to variations in the pressure you apply, letting you create realistic images that look for all the world like watercolors or oils.

Presently, a handful of paint programs support the Wacom pressure-sensitive tablet. The best of these—Studio/32, UltraPaint, ColorStudio, and Adobe Photoshop—allow you to vary line thickness by pressing harder or softer as you move the stylus. As you gradually release the stylus, the line tapers to a soft, delicate tip.

Several new programs, not yet shipping at press time, will also support the Wacom tablet. These include VideoPaint Pro, scheduled to ship in mid-1991; PixelPaint Professional 2.0, the new heavyweight contender from SuperMac; StrataVision Paint, the first program to address 54-bit color; and Oasis, the Mac version of the much-respected Lumena for IBM PCs and compatibles.

Of these, only Oasis will allow the user to specify how the pressure-sensitive data is to be interpreted. You will be able to direct the pressure to affect the size of the cursor, as is common in most programs; the density of the ink; the color of the ink, as selected from the current gradation; or all three at once. Using the antialias brush tool, you will even be able to use pressure to determine the “wetness” of the brush. As you release the stylus, the ink will “dry” slightly to produce a coarser line.

Oasis will also offer several image-editing filters. After you select the portion of the painting to be affected and choose a filter command from the Area menu, a preview dialog box will appear, enabling you to preview the consequences of your changes before you apply the filter (see “A Pressing Future”).

Oasis will also include a stand-alone video module designed to assist the transfer of RGB images to videotape and overlay computer-created type and graphics onto live video images. Real-time antialiasing will also be available. Oasis will be priced under $800, less than either Photoshop or ColorStudio.

The comparably priced PixelPaint Professional 2.0 promises to give Oasis a run for its money. In addition to pressure sensitivity, PixelPaint Pro 2.0 will offer virtual memory, semi-transparent masking, and a special dialog box for defining multicolor gradients. The new WetPaint feature will allow you to select and modify an image before integrating it into a painting (much like the FreshPaint feature pioneered by Cricket Paint and now found in MasterColor). Most alluring of all will be the integration of PixelPaper, a feature that will let you determine the texture of the surface on which you paint.

You say 16.8 million colors just doesn’t hack it? It may sound ridiculous, but StrataVision Paint will provide access to 282 trillion colors, well beyond the capabilities of existing hardware. But never fear; users with 8- and 24-bit systems will be able to use StrataVision Paint to create full-color paintings while they wait for the technology to catch up with the program. Specifically designed to be compatible with the upcoming System 7.0, StrataVision Paint will ship in January for $695 retail, slightly less than either PixelPaint Pro 2.0 or Oasis.

Deke McClelland is a writer in Boulder, Colorado. His recent books include Painting on the Macintosh (1989), Drawing on the Macintosh (1990), and Mastering Adobe Illustrator, Macintosh version 3.0 (1991) (Business One Irwin) as well as the Encyclopedia Macintosh.
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Professional Paint Program

STUDIO/32 1.0

Pros: 24-bit color capabilities; support for virtual memory, Pantone Matching System, and pressure-sensitive tablets; antialiasing; superb selection control; special text layer for creating fully editable, high-resolution type; modifiable, intuitive interface. Cons: Can't generate color separations; can't alter size of existing document; overpriced.


Since most painting programs are based on the common MacPaint model, they are essentially easy to use. A typical user can sit down and start painting right away, without having to spend hours sifting through a manual. But when you get ready to tackle the intermediate and advanced features—masking, transformation effects, color control—many high-end paint programs lurch wildly into a meandering bog of bizarre menu commands and unfathomable dialog boxes. Studio/32 is a wonderful exception. Happily, the program starts out easy to use and becomes even more predictable as you become increasingly familiar with it. Every feature has been implemented logically and with careful attention to convenience and versatility.

Tools and Modifiers

Cut and dried, Studio/32 is a 24-bit upgrade to Studio/8, the two-year-old 256-color paint program also from Electronic Arts. If you've used Studio/8, you're already familiar with the basic interface. The toolbox features a collection of standard painting and image-editing tools followed by a handful of pop-up icons that modify the tools' actions. All tools can be accessed from the keyboard. Pressing 1 through 9 on the keypad toggles the modifier settings.

The ability to access and modify Studio/32's incredible tools from the keyboard is a convenience, and it augments your capacity to control colors and objects. Almost any tool's function can be modified from the keyboard while you are using the tool, or even after you've completed an operation. For example, suppose you want to select and manipulate a complex object independently of its complex background. Studio/32 offers two selection modifiers: the slip colors modifier, used to determine which colors are selected inside a lassoed or marqueeed area, and the shrink/expand modifier, which controls whether the selection shrinks to the exact boundary of the selected object, tightens to a rectangular marquee, or expands to include boundaries surrounding the lassoed or marqueeed area. Both modifiers can retroactively adjust the confines of the current selection. Together, the slip colors and shrink/expand modifiers offer up to 15 different selection alternatives for each execution of the lasso or marquee tool, making it possible to change your mind several times without so much as touching the mouse.

Beyond the 8th Bit

Because they offer an exponentially wider array of colors, true-color paintings are predictably more intricate than their 8-bit counterparts. Studio/32 has several new capabilities to help rein in the color overload. Foremost among these capabilities are features that offset hardware inadequacies. If you can't quite justify the additional expense of a 24-bit video board, Studio/32 enables you to open and edit 16- and 24-bit images even while you're using a standard 8-bit monitor. Also, Studio/32 is one of the new
tremendous amount of work to perform such a common and normally simple operation.

**Printing Companion**

Printing is an area in which Studio/32 at first impresses but ultimately disappoints. For enthusiasts of high-resolution type, Studio/32 offers a special text layer for creating and editing object-oriented text. Type on the text layer is forever editable and will print from Studio/32 to PostScript and TrueType printers at full resolution, relying on the printer font definition just as drawing and page-layout programs do. However, type on the text layer can only be black and cannot be saved in a format that any other program will recognize. Unless you require small type for labeling an image, it's more fun to apply text to the paint layer, where you can color, antialias, and manipulate it using standard paint tools.

Studio/32 offers full on-screen support for the 747-color Pantone Matching System. The interface for selecting and using Pantone colors is truly exceptional, allowing you to locate colors by number or by color qualities (see "Pantone Paradise"). But here's the clincher: What good is Pantone color support, no matter how cleverly organized, if the program doesn't provide color-separation capabilities? This is Studio/32's great failing—its only major failing, really. It has to rely on other programs to produce color separations. Studio/32 paintings can be separated using Adobe Photoshop or Letraset's ColorStudio, or they can even be saved as TIFF files and separated using Aldus PrePrint. But all these options involve the added cost of purchasing separation software or visiting a service bureau. And none of these options let you print high-resolution type saved to the text layer or create spot-color separations, which are necessary for printing true Pantone colors.

**Interface Lift**

Electronic Arts plans to release Studio/8 2.0, an upgrade to the original 8-bit program, at a price halved to $295. If Studio/32 were priced as competitively, I would heartily recommend it as a companion program for any Macintosh owner interested in creating full-color, bitmapped graphics. But sadly, Studio/32 is not worth $400 more than Studio/8, as the retail price tag might lead you to expect. Make no mistake, Studio/32 is a tremendously enjoyable and reliable painting program that in many ways equals Adobe Photoshop and surpasses PixelPaint Professional. But without support for color separations, direct scanner input, or video output, Studio/32 users have to purchase an additional program to provide input and output and separations. No program is an island, but when I think of parting with $700, I anticipate a painting application that at least pretends to be self-sufficient.

—Deke McClelland

See Where to Buy or circle 705 on reader service card.
Digital Recording and Playback Software

DECK 1.03

Pros: Tape deck–like interface; compact disc-quality sound; versatile signal-processing options; automated mix-down settings; allows control from external MIDI faders; allows integration of MIDI sequences and audio. Cons: Can’t adjust input level during recording; requires fast, high-capacity hard drive; finicky about system configuration; jerky fader movement during playback; copy protected.

Company: Digidesign. Requires: Mac II; 2MB of RAM, hard drive with 28ms access time; Digidesign Audiomedia or Sound Tools hardware; appropriate audio amplifier and sound source. Recommended: 4MB of RAM. List price: $349.

One of the hottest trends in today’s music world is the personal recording studio. The Mac and other personal computers have fanned the flames, thanks to the Musical Instrument Digital Interface (MIDI) and music software that lets you record, play back, and edit the data that MIDI instruments transmit (see “Getting Started with MIDI,” August 1990). As a result, pros and amateurs alike have turned basements and bedrooms into studios whose capabilities would have cost tens of thousands of dollars not long ago.

One cornerstone of most personal studios is a multitrack tape deck, which can record and play back multiple tracks of music. By successively recording a different instrument on each track, a single musician can build up complex arrangements. Multitrack decks start at under $500 and use standard audio cassettes to record and play back up to four tracks. They are terrific for fleshing out arrangements and creating demo tapes, but their sound quality is not up to professional audio standards.

Digidesign’s Deck uses a Mac’s hard drive to record digital sound with the fidelity of a compact disc. Deck also lets you combine digital audio and MIDI information in ways no conventional tape deck can.

Deck costs about as much as the least expensive four-track audio recorder, but you’ll also need Digidesign’s $995 Audiomedia expansion board, which contains the circuitry needed to translate between audio signals and bits and bytes (see Reviews, Macworld, May 1990). You can also use Digidesign’s more sophisticated and costlier Sound Tools hardware.

And because a Deck recording inhales disk space at a rate of 20MB per minute, you also need a copious hard drive and backup medium. Throw in a Mac II, and you’ve spent several thousand dollars—a lot for an amateur to spend, but peanuts for pros and school music labs.

In the Studio

Deck’s sole screen display is faithful to the multitrack recording metaphor, with volume meters that dance during recording; sliding faders that adjust recording and playback volumes; and transport controls that let you record, play back, fast forward, and rewind (see “Now on Deck”). If you’ve used conventional multitrack decks, you’ll feel at home with most of what you see. And you’ll be delighted with some of the differences, such as instantaneous rewinding.

Recording a track with Deck involves selecting the desired track, adjusting the input volume to avoid clipping (which causes distorted sound), and then clicking on the Record button. After you record one track, you can record additional tracks. If you fill all four tracks and still need more, you can merge two or more tracks into one, freeing the others for reuse. This technique, called bouncing, is often used with conventional multitrack decks, too. But bouncing tracks in the analog world degrades a recording’s quality; that doesn’t happen with Deck.

Deck also exploits the digital signal processing (DSP) features of the Audiomedia board to enable you to alter the sound of a track during playback. Several digital effects are supported by Deck, ranging from a digital equalizer, which lets you accentuate or attenuate certain frequencies, to a stereolizer, which processes a monophonic recording to simulate stereo.

The MIDI Connection

Deck can import and play back a MIDI composition created using sequencer software such as Opcode Systems’ Vision and Mark of the Unicorn’s Performer. To include a MIDI sequence in a Deck recording, you save the sequence as a standard MIDI file and then import it into Deck. Thereafter, when you play back your audio recording, Deck also plays the sequence, thereby controlling any MIDI instruments attached to your Mac.

Deck reaches out to the MIDI world in another way: it lets you assign, or map, one or more of Deck’s on-screen faders to the physical sliders on a MIDI fader box such as J. L. Cooper Electronics’ FaderMaster. (A fader box contains slider knobs that transmit MIDI data when you move them.) With this feature, you can control the playback volume of one or more tracks by moving the sliders on the fader box instead of using Deck’s on-screen sliders.

Deck provides some features that enable it to synchronize its playback to industry-standard time-code signals, but these sync features are limited compared to the ones in Digidesign’s Sound Designer II software.

(continues)
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Circle 6 on reader service card
The Final Mix

The final step in any recording session is the mix-down, which involves adjusting the playback volume of each track while recording in standard two-track stereo on a second deck. As the multitrack recording plays back, a recording engineer often adjusts the volume of certain tracks, changes their multitrack recording plays back, are the mLx-down, which involves adding the exact same way each time is all but impossible. For these reasons, professional recording equipment often provides automated mix-down features that “remember” the adjustments the engineer makes so the final mix can be re-created if needed.

Deck brings automated mix-down to the desktop. You can save and restore up to 200 different combinations of fader and effects settings. During playback, Deck’s faders and other on-screen knobs move to the appropriate positions by themselves. Automation files are stored separately from the recording itself, letting you apply different automation files to a single recording to see which you prefer.

You can move recording files between Deck and Digidesign’s AudioMedia and Sound Designer II software. Deck can also import files saved in the Audio Interchange File Format (AIFF), used by sound-editing programs such as Passport Designs’ Alchemy.

On the downside, Deck is a bit finicky. It doesn’t coexist well with start-up documents (INITs), especially network and electronic-mail software, which eat into the Mac’s processor time. It also requires a fast hard drive (28ms or faster) without a lot of fragmented free space. And because Deck gives priority to playing back at an accurate speed rather than to updating the screen and responding to the mouse, its on-screen faders operate sluggishly, making real-time volume adjustments difficult and frustrating. (An external fader box eliminates this problem.)

In all, Deck is a superb program. No comparably priced analog multitrack tape deck offers Deck’s sound quality and automation features, and no tape deck of any price boasts Deck’s ability to import and play MIDI sequences. Don’t buy any analog multitrack deck until you’ve seen Deck and the Audiomedia board in action.

—Jim Reid

See Where to Buy or circle 618 on reader service card.

EARTHQUEST 1.0


HyperCard and other hypertext let students explore personal paths through information, rather than being tied to the beginning-to-end approach dictated by most books and videos.

Earthquest is one of the best examples yet of how HyperCard can be used to give students from ten years old to adult a global, rather than parochial, perspective. Instead of presenting the earth from a discipline-specific point of view, Earthquest allows students to simultaneously study natural and human history, ecology, sociology, and geopolitics, exploring the interconnections between these different viewpoints in the process.

Earth to Mac

The main menu screen of Earthquest, the Explore card, looks like a planetary version of the HyperCard Home card (see “Global Sampler”). It’s filled with colorful icons grouped into four broad categories: Earth, Journey, Environment, and World Tour. (Although most of Earthquest is presented in HyperCard’s traditional monochrome, several cards are decorated with splashes of color.)

Clicking on the Planet icon reveals a drawing of the Solar System, showing Earth in relation to the planets. In one corner of the Solar System, a spreadsheet-like button hides a pop-up chart full of Solar System data. Clicking on any planet brings up a scrolling text window with a brief description of that planet.

Continue scrolling in that window for descriptions of the other planets. The text window’s mini menu includes commands for instantly jumping to the text for any planet, and utilities for finding particular words and printing the text.

The Planet screen is far more than a click-to-read-about-it picture display, however. Like other Earthquest screens, it has all sorts of buttons that cause interesting things to happen. A click on the flying saucer launches an Earthquest “movie”—a short animated sequence created with MacroMind Director. The saucer sequence, like the other Earthquest movies, is likely to disappoint multimedia aficionados expecting a Spielberg epic, but it’s the kind of thing that motivates kids to explore every nook and cranny of the program.

It’s a Big World

And there’s more. A tiny triangle below the title of the Planet card leads to a pop-up menu that links to different global map projections and to screens showing how Earth, the Sun, and the Moon interact to produce tides, seasons, and day and night.

Seven more pop-up menus line the bottom of the Planet card (and most other Earthquest cards). Some of these serve as alternative navigation tools if you don’t want to search the screen for hidden buttons; others provide access to different Earthquest treasures. The Quotes menu, for example, is like a small Bartlett’s that gives you an eclectic collection of quotations.

(continues)
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With all of the links between cards in Earthquest, it's easy to lose your way. The upper-right-hand corner of almost every screen contains a navigation control center for returning to the previous card or to the main menu. There's enough variety to keep kids (or adults) busy for hours—watching animated simulations of the ecological consequences of overpopulation; clicking on dynamic maps that show the geological phenomena and geographical boundaries of the planet; hearing snippets of other languages while reading about cultural diversity; learning about concrete actions we can all take to preserve the planet; and playing test-your-knowledge multiple-choice games. (As a bonus, the package includes a copy of the outstanding Global Warming stack created by Apple employees and given to Soviet President Gorbachev last year.)

It's a Small World
In the sense that Earthquest promises the world, it sets itself up for failure. Packing all of human knowledge onto a handful of floppy disks is bound to result in some agonizing compromises. Musical morsels are unforgivably short; movies are simplistic; “simulations” are little more than animated snippets; explanations are often missing or superficial; places that look as if they should be buttons don’t do anything. (Why on earth is the Bermuda Triangle the only button on the continental United States map?)

Earthquest is too big for many Macs. I had trouble installing it on a Mac Plus, and even after it was installed, I found that some of the features didn’t operate properly. The company strongly recommends 2MB of RAM; I’d say it’s a necessity. In short, Earthquest should be on a CD ROM where it wouldn’t be subject to disk space limitations.

I found that, even on a beefed up Mac IICi, Earthquest occasionally froze the system, forcing me to restart.

Down to Earth
Earthquest is available in lab packs for classrooms at substantial savings ($550 for a 10-station site license and teacher-support materials). The program has tremendous potential as an enrichment tool for middle- and high-school science and social studies classes. Students can use it for independent exploration and study; teachers can use it as a basis for class projects. Students and teachers can export maps and pictures to a Workshop, modify the artwork with HyperCard’s paint tools, and print it. (Unfortunately, there’s no option for exporting text via the Clipboard.)

Many educational tools are designed to help students understand the details of a discipline: few help them to see the big picture. It’s hard to imagine how anyone could spend time exploring this stack and not come away with a deeper understanding of the home planet.—George Beekman

See Where to Buy or circle 624 on reader service card.

WEALTHBUILDER BY MONEY MAGAZINE 1.0

Pros: Suggests investments based on your investment philosophy; attractive reports; videotape introduces financial planning concepts; excellent context-sensitive help system and online financial tutorial; handy financial calculators.

Cons: Stock, bond, and mutual fund databases contain only 500 entries each; confusing interface.

Company: Reality Technologies.

Requirements: Mac Plus; hard drive with 6MB free disk space; System 6.0.

List price: $249.95.

The essence of my financial plan has always been to make as much money as possible, save whatever I can without changing my life-style, and live and retire comfortably. My investment strategy follows similar lines. Pick a few stocks or mutual funds at random, and see what happens. Then I watch the stocks drop to 50 percent of their purchase value, hold them for 5 to 15 years in the hope that they’ll come back, and sell them all the day before the start of the next great bull market. By comparison, Las Vegas is starting to look good. (At least I know the odds.)

The purpose of WealthBuilder by Money Magazine is to help you formalize the financial planning process and come up with real, measurable objectives. The program forces you to set goals for budgeting, saving, and investing. It includes a database of stocks, bonds, and mutual funds that you can sort, filter, and compare in order to select your ideal investments.

Over time, the program tracks your progress and suggests steps you can take to help achieve your goals.

Setting Up
Before you can plan for the future, WealthBuilder needs to know how you’re doing today. You enter basic information about yourself and your dependents, set up a monthly budget with typical expenses and income, and provide figures necessary to calculate your net worth. You must also specify an investment philosophy—somewhere between Very Conservative and Very Aggressive. WealthBuilder uses all this information to suggest an appropriate mix of investments.

Most people won’t stop with calculating their net worth. That’s not where WealthBuilder’s power lies. The next step is to formulate some goals (Objectives), such as retirement or financing a child’s college education. To set an objective, you fill out a simple worksheet. In the case of retirement, indicate how much money you’ll need per year of retirement (in today’s dollars) and which of your current assets should be earmarked for that purpose. There are several key assumptions that affect the program’s projections, such as your age at retirement and life expectancy, the inflation rate, and whether you want to preserve or deplete your principal during retirement. Once you complete the worksheet, you can instantly see the likelihood of meeting your goal. The program’s Timeline window shows what should happen if nothing in your financial situation changes (see “Timeline Window”). Objectives directly supported by the program are college education, buying a house, and retirement. There’s also an option to set special goals, such as buying a new car.

Building a Portfolio
Clicking on the Allocate icon lets you compare the makeup of your current (continues)
Portfolio with one suggested by the program. Based on your Investment Philosophy setting, the program tells you what percentage of equities, bonds, metals, and cash your portfolio should contain. You can also request a detailed suggested allocation and get a further breakdown of the types and dollar amounts of bonds, stocks, and mutual funds you should buy.

Assuming you're ready to make some investments, you can check WealthBuilder's Product list—detailed information on 500 stocks, 500 bonds, and 500 mutual funds. You can filter the list by showing only the ones judged most likely to produce maximum capital gains or long-term growth, and then select only the industries and sectors you're interested in. You can sort the information by a number of criteria, such as current price, beta, S&P ranking, or P/E ratio. As you identify investment vehicles of interest, you can perform additional analyses, producing comparative graphs of annualized, cumulative, or start-adjusted returns. You can also see how each of your picks has performed historically compared to key indicators such as the New York Stock Exchange, T-bills, and gold. Although WealthBuilder won't suggest specific stocks, bonds, or funds, it provides you with most of the information you need to make your own choices.

Problems
For the most part, WealthBuilder looks and acts like a HyperCard stack. The Timeline window serves as the main menu, enabling you to get to most of the components by clicking on icons. The HyperCard analogy isn't carried far enough, though. The icons won't take you everywhere. Some actions can be initiated from the Timeline window, some only from menus, and some from both places. Some items on the different WealthBuilder "cards" respond to clicks, and others are only highlighted by this action. Several dialog boxes have no Cancel option. If, for example, you click on the Special Objective icon just to see what it does, you have to choose the Delete Objective menu item to get rid of it. As with most programs, you adjust with experience, but the interface needs work.

WealthBuilder's database of mutual funds, bonds, and stocks might make you feel like you're missing something. Of the four mutual funds I hold shares in, only one is listed. For a larger set, you have to subscribe to one of the database update programs. In fact, if you're serious about investing, you should consider the updates a must buy.

Updates to the mutual fund and stock/bond databases are available on a subscription basis for $99.95 each (plus shipping and handling) or $174.95 for both. The updates expand the databases to include information on 1200 mutual funds, 4600 stocks, and 6100 bonds. A $9.95 demo of WealthBuilder is also available and includes a copy of Money Magazine's Guide to Financial Planning and a $10 rebate coupon for WealthBuilder.

Finally, although WealthBuilder produces a variety of beautifully-formatted reports, you'll find that report printing doesn't work if Radius's Math INIT is present. If you generate a report with background printing switched on, the spool file continues to build in size until your entire hard drive is filled.

Most people I know are unsophisticated investors. Not only will WealthBuilder educate you in investment basics, it'll also suggest an appropriate mix of investments and track the progress made toward your financial goals. Of the product's shortcomings, all except the interface design can easily be remedied—just pull the INIT and buy the updates. If you've been looking for a financial program that can do more than just record investment transactions, WealthBuilder fits the bill. It's the financial program I've been waiting for.—Steven Schwartz

See Where to Buy or circle 215 on reader service card.

ELITE PROFESSIONAL FLIGHT SIMULATOR 1.0
Pros: Realistic flight-instrument depiction; real-life navigation database; keyboardless user interface; accurate aircraft flight dynamics. Cons: Can't save state of simulation; can't print flight-path display.


Flight Simulators in the past were primarily entertainment. AzureSoft's ELITE (Electronic IFR Training Environment) is the first Macintosh flight simulator developed exclusively for flight training. A licensed instrument-rated pilot can use ELITE to satisfy most of the Federal Aviation Administration's (FAA) six-month recurrency training requirements, and a private pilot looking to obtain an instrument rating may soon be able to satisfy half of the required flight hours with ELITE-based simulator training.

Not a Toy
AzureSoft—a subsidiary of Azure Technology, maker of aircraft navigation equipment—expects only serious pilots to use ELITE. The basic package simulates a simple IFR-equipped (Instrument Flight Rules) single-engine airplane, and includes software, a thin manual, and a Universal Controls Interface box that connects the Mac to separately purchased flight controls. The minimum Mac configuration requires a 128-kilobyte CPU with a math coprocessor, 2MB of RAM, and an 8-bit color display. It runs best on a Mac IIci or faster machine.

The flight controls—a yoke and optional rudder pedals—are needed to really fly the simulator. Without them (and the attendant interface box) ELITE lapse into a three-minute demo mode during which you can experiment with the controls and do some limited flying. You can use either the Maxx Yoke control wheel ($99.95) or the more sensitive (and easier to use) FlightStick from CH Products ($79.95).
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The optional Maxx Rudders give you rudder pedals, which might be useful for initial instrument training but which aren’t really necessary if you’re already an instrument-rated pilot.

Also available is a $99 ELITE/SEL high-performance aircraft add-on, which simulates a “complex” single-engine aircraft with retractable landing gear and more sophisticated navigation equipment. Azuresoft also offers a $699 ELITE/Jet add-on, which simulates a DC-9 model MD-80 airliner, complete with radar altimeter, machmeter, turbine-engine instruments, and a fully programmable navigation system.

The basic package includes a navigation database for the San Francisco Bay Area, covering about 30 airports. You can purchase additional databases for any metropolitan area in the United States for $50 each.

If you already know how to fly airplanes and understand IFR navigation, the skimpy manual is perfectly adequate. The manual briefly describes the ELITE setup, some basic operating procedures, the instrument panel, and the moving map display. It doesn’t explain how to take off, navigate, find the destination airport, or land.

Virtual Reality
ELITE is easy to operate, however, even if you’re completely unfamiliar with the Mac. This is in part due to ELITE’s stunning color instrumentation panel presentation (see “The Captain’s View”), but it’s mostly the result of Azuresoft’s decision to exclude any keyboard controls. You operate ELITE’s cockpit the way you operate controls in a real aircraft: by reaching out and touching them (with a pointing-finger cursor). The instrument panel depicts all equipment with the same layout found in real aircraft, and with astonishing visual detail. Controls are three-dimensional and tactile. Buttons push, sliders slide, knurled wheels wheel. Annunciator and warning lamps illuminate with the same colors found in a genuine cockpit, and instrument faces show the same markings as the real instruments. Even the navigation radios provide audio Morse-code identification on demand.

These are not Macintosh controls but real-life controls. For example, if you slide off a button after pushing it and holding the pointing finger on it, the button activates, just as in real life. Similarly, pulling the landing-gear handle partway down leaves the handle in the partial position—the switch isn’t snapped to a fully on or off position like Mac toggle switches.

This attention to detail makes ELITE immediately flyable by any pilot. With the control stick in your left hand and the mouse in your right, operating ELITE is natural and comfortable. You quickly forget you’re flying a simulator and begin concentrating on the instrument panel and the view out the window.

The objective of IFR flying is to control the aircraft and navigate without reference to outside visual cues such as the horizon. With ELITE—just as in real instrument flying—you see two things outside: the runway when you take off and the runway again when you land. Shortly after takeoff you fly into the cloud ceiling and the windshield view goes gray, then hazy, then milky white. On final approach, you slowly descend out of the soup (at the preset cloud-ceiling altitude) with a realistically foggy, mist-shrouded view of the runway that gradually clears as you get closer. ELITE lets you practice your approach-transition technique, including an option to set a variable cloud ceiling that could force you to execute a “missed approach” procedure—an other critical IFR training regimen.

The runway in the windshield on final approach is an authentic depiction of the actual destination airport’s runway—right down to the runway length and type of approach-lighting system. Even the Visual Approach Slope Indicator (VASI) lights—red and white lights on the side of the runway that indicate your approach angle—indicate the FAA-published approach angle. ELITE uses actual FAA navigation data for the airport latitude and longitude, runway configurations, navigation beacon frequencies, geography, airways, and intersections. This means you can navigate in ELITE airspace using standard-issue government maps and approach charts.

No Airplane Does This
ELITE provides a moving map display that shows your current position, ground track, and (optionally) vertical flight profile. This display provides valuable feedback on your piloting technique, letting you see how closely your flying complies with FAA position and altitude rules. In addition, you can drag the aircraft’s icon on the map display to any geographic location in the database and preset your altitude, heading, and airspeed—a feature that simplifies the repetitive practice of a troublesome approach procedure.

ELITE supplies an Environment control panel, from which you can set the turbulence level (from none to severe), wind speed and direction, cloud ceiling, visibility, and barometric pressure—all parameters that directly affect instrument flying. Azuresoft’s attention to detail shows here, too: turbulence causes gauges to juggle; wind direction and speed gradually change from the surface to your flight altitude; the cloud-ceiling altitude varies randomly; barometric pressure affects the accuracy of the altimeter if you forget to make a compensating setting on the altimeter itself. The Environment panel also lets you tag instruments for imminent failure—at some random future time. When an instrument fails, it behaves just as it would in a genuine failure—giving somewhat inaccurate readings before going dead as a doornail.

Kudos and Caveats
ELITE’s best features are its excellent navigation database, high-quality cockpit imagery, and keyboardless direct-action interface. If anything, ELITE (continues)
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is harder to fly than the aircraft it simulates, thus ensuring a good workout for any pilot. During my extensive testing—including actual recurrent training logged as legal flight time—I encountered only one bug (a mountain where it shouldn't have been); AzureSoft says the bug will be fixed by the time you read this.

However, ELITE’s minimalist manual may be its weak point. And the moving map display—perfect for training—lacks a provision for making a permanent printed record. A printout would be invaluable for student/instructor review, and although I did get a printable screen snapshot using the shareware utility Flash-it (version 1.3, by Nobukazu Toge), that’s hardly a convenient procedure.

I also found myself wanting to save the state of the simulation. ELITE has a pause button that lets you temporarily suspend flight, but you can’t quit the simulation and then resume where you left off. Neither can you call up a preset position—say, the final approach into San Jose International runway 12R. If you want to repeatedly practice an approach, you must set it up manually each time. Finally, while ELITE runs under MultiFinder, you can’t leave ELITE without quitting the application because ELITE takes over the entire Mac interface, including menu bars and the keyboard. This isn’t a serious problem, but AzureSoft should document the limitation.

As an instrument-rated pilot constantly struggling to keep up with the FAA’s six-month recurrent training requirements, I found ELITE competed favorably with the $30,000 analog simulators typically used for IFR training today. Such simulators rent for $20 to $50 per hour. If you train in a real aircraft (at a cost of $70 or more per hour) you’d recover your $749 investment in ELITE in less than two years.

According to AzureSoft, ELITE may soon qualify as the first personal computer-based primary/instrument flight trainer, making it eligible for initial instrument training as well as recurrent training. ELITE, which also runs on 886-based IBM PCs and compatibles, truly opens the door to low-cost, PC-based instrument flight training.—Mel Beckman

See Where to Buy or circle 626 on reader service card.

### Portable Hard Drives

<table>
<thead>
<tr>
<th>LIBERTY 80</th>
<th>LA CIE TSUNAMI 80-Q</th>
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<tr>
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</tr>
<tr>
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<tr>
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</tr>
<tr>
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<td><strong>Requires:</strong> Mac Plus. <strong>List price:</strong> $899.</td>
</tr>
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</table>

**LIBERTY 80**

**Pros:** Small; portable; no fan needed.  
**Cons:** Uses larger connector than SCSI; troublesome daisy-chaining; very limited manual.  
**Company:** Liberty Systems.  
**Requires:** Mac Plus. **List price:** $899.

**LA CIE TSUNAMI 80-Q**  
**Pros:** Small; portable; value-added software included.  
**Cons:** Limited manual; SCSI screws come loose.  
**Company:** La Cie, a Plus Development company.  
**Requires:** Mac Plus. **List price:** $799.

**BENCHMARKS**

| **Seek Time** | 22 ms | 22 ms |
| **Read Average** | 5229 | 5096 |
| **Write Average** | 4379 | 4155 |

*Seek time is the time taken to move the head of a hard drive from one track to another (averaged over 10,000 seeks). The average includes the time it takes to move the head after receiving the seek command from the CPU and the time it takes for the head to settle on the data on the destination track.

Read and write averages (represented here in kilobits per second) are the average rates of transferring different-sized blocks of data from the hard drive to the CPU (read) and from the CPU to the hard drive (write).**

*All benchmarks were performed using SCSI Evaluator, a shareware utility by Digital Microwave.*
We know advertisements don't sell MacDraft®...our customers do. 70% of the people who purchased MacDraft bought it because it was recommended by a friend or coworker. That says a lot about a product.

So what do you think they recommend it for? Well, with a name like MacDraft you'd expect it to be ideally suited for drafting.

But, did you know that over a quarter of our customers use MacDraft for technical illustration? And almost a third use it to create graphics for desktop publishing and presentations.

Of course our customers recommend MacDraft. They helped to design it. They told us they wanted a complete set of powerful drawing tools to create and edit objects. Features like Bezier and spline curves and the ability to apply their own custom line styles to each of these shapes. (Well, we took care of that.)

Our customers also felt it was important to have control over their drawing environment. They wanted to create scaled drawings and organize them using layers, zoom in to create fine detail or zoom out to see their entire drawing. Then they wanted to store their commonly used graphic elements in symbol libraries for use in other drawings. (We took care of that, too.)

MacDraft customers are creative people. They want to present meaningful information in an exciting way. So we've given them control over the font, size and style of each character in a text block and rotation in less than one degree. We've even given them the ability to read, crop, and resize TIFF files and 24-bit color images. All this, plus the full 16.8 million colors of the Macintosh® and PostScript® printing to add pizzazz to their presentations!

Our customers wanted to share their enthusiasm for MacDraft with their friends. So now MacDraft 2.1 can open MacDraw® II files directly.

Sure our customers wanted all these powerful features, but they said we must keep simple and easy to use. (And that's always been our philosophy.)

Over the years MacDraft has become the program of choice for thousands of casual and professional users alike. See for yourself why so many people recommend MacDraft: visit your local dealer or better yet...talk to one of our customers.

Demos Disks available for $9.95 shipping and handling. Call IDD for more information or to order a demo disk: (415) 650-6818. MacDraft is a registered trademark of Innovative Data Design, Inc. MacDraw, Macintosh, and PostScript are registered trademarks of their respective holders.

Circle 380 on reader service card
tightens the SCSI cable, but it was a surprise. I screwed it back in as tightly as I could, but it kept coming loose.

Some people complain about technical support from La Cie, but I had no difficulty—once I actually got to talk to someone. I called the company and was told all the tech support people were busy and that someone would get back to me. Several hours later, a very helpful tech support person called.

Liberty's technical support is somewhat faster than La Cie's. When I called, I was instantly in touch with a tech support person, who worked with me to solve my problem.

Overall, the Liberty 80 and the Tsunami 80-Q drives are excellent investments. Their small size makes them very portable—you can carry them over your shoulder like a Walkman or slip them easily into luggage—and their speeds won't make you wait for data. With their small size and big volume, it would be hard to gauge—and their speeds won't make them investments. Their small size makes you wait for data. With their small size surprise. I screwed it back in as tightly as I could, but it kept coming loose.

I screwed it back in as tightly as I could, but it kept coming loose.

son called.

Software Bridge Installer, which you must copy into the Apple File Exchange folder, is a utility used to install translators for use in AFE. To do this you first select a source format and then select destination formats. Your choices are added to a scrolling list labeled Translators (see "Instant Installation"). The only wrinkle in this simple process is that you must Shift-click to select or deselect multiple items, rather than Shift-click.

With the appropriate translators installed, all that remains is to launch AFE and begin translating. This is no more complicated than navigating a few scrolling lists. Instructions for using AFE are included with the documentation accompanying the Mac's system software, as well as in the Software Bridge manual.

When a PC is the source or destination, the easiest way to transfer files is through the SuperDrive. Apple's high-density floppy disk drive. When used with AFE, instructions in the Mac's ROM let this drive read DOS files on DOS-formatted 3 1/2-inch disks.

Working on a 386SX clone, I created a PC Word 5.0 file that contained codes for centering, bolding, italics, underline, strikethrough, justification, margins, indents, tabs, superscript, subscript, plus a footnote and various point sizes. I transferred the file via the SuperDrive, then translated the document into the three Macintosh word processors supported by Software Bridge Macintosh, and opened each file in turn. In each case, all of the formatting was retained. A Mac Microsoft Word-to-PC WordPerfect translation was equally successful, except for the font, which wasn't available to the PC. Graphics can only be transferred with a Mac-to-Mac file transfer, but I succeeded in making both a WordPerfect-
Microsoft Mail version 3.0 brings you everything you need in an electronic mail system.

For openers, now you can easily build your own personal address book and distribution lists. Afterwards, Mail automatically updates them for you.

You can also send mail with as many files attached as you want. You efficient types can even attach an entire folder of stuff. Just point and click and you're done.

There's even click and drag foldering. Which gives you a better, more intuitive way to store and retrieve messages. As well as making it a lot simpler to keep all of your mail organized.

Best of all, Mail lets you send and receive files when you're right in the middle of something else. Like Aldus' PageMaker or Microsoft Excel or Word. This means you don't have to save-and-quit-and-stop-and-start anymore.

To unleash Microsoft Mail 3.0 in your own office, call (800) 541-1261, Department P20. We'll fetch you a working model for only $9.95.
Scientific and Business Graphing

MACGRAPHX 1.0

Pros: Fast, flexible graphing program; superior interface and data-import extensions. Cons: No exotic chart types.

Company: Bravo Technologies.

Requires: Mac Plus, System 6.0.3.

List price: $199.

A new graphing/charting program for the Mac world better have a pretty good excuse for existing. Not only have the charting capabilities built into spreadsheets improved since the first releases, but there’s no shortage of competent graphing packages for both business and science. Into this crowded market Bravo Technologies, developer of the spreadsheet MacCalc, has now introduced MacGraphX. Amazingly enough, Bravo has found a way to distinguish itself, chiefly by offering speed and interface advantages over its competitors.

Seven Easy Pieces

At first the MacGraphX package seems Spartan. It gives you seven standard chart types: scatter, line, area, bar, stacked bar, and pie charts, as well as a "table" chart. It does, however, let you play a few tricks to expand this humble list. A transpose function sets the bar charts sideways (giving the type of chart other programs call column), and simply holding down Shift when selecting a new graph from the Graph menu lets you overlay any of the graph types. Since overlaying lets you mix line and bar charts, for example, you can generate more chart types, and using transformations of variables (logarithms and most arithmetic functions, as well as financial functions, are available) you can produce more types yet. There’s no obvious way to make the equivalent of polar charts, but with a little labor you can produce most of the charts listed as separate types in other programs.

The workarounds for chart-type proliferation are evidence that Bravo thinks it’s more important to do a good job on the basics than to provide a huge fixed menu of charts, and convenience in charting basics is MacGraphX’s real strength. All the chart elements are independent objects; all the objects can be manipulated directly through menu commands rather than dialog boxes; and the graphic aspects of all the objects can be manipulated even more quickly using the Palette tool kit in the charting window (see “Little Helpers”).

To create a chart, you enter data or import tabbed-text, WKS, SYLK, Excel, or MacCalc files into MacGraphX’s spreadsheet-style format. You then select an x-axis data set (the cursor becomes a little horizontal bar) and a y-axis data set (the cursor changes to a vertical bar), drag to select the data you want to graph, and choose a chart type; the program pops open a window with your graph. For creating basic chart types, the program is two to six times faster than Excel, DeltaGraph, or CA-Cricket Graph. To modify a graph, simply click on any chart element to move it around, or double-click and a dialog box appears where you enter and change Data. Redraw speed is more than just a convenience: as you step through the process of axis scaling, major- and minor-grid tinkering, and text adjusting needed to transform an on-screen plot into publication-ready hard copy, you find that MacGraphX saves you serious amounts of time. Furthermore, the interface is “expectation-friendly”—the features are self-explanatory and work exactly the way you expect. It’s simple to get final output looking exactly right.

Down to Business

For tailoring black-and-white laser-printed graphics for publication, MacGraphX is a clear leader, and you can edit its output easily with the Palette tool kit to take advantage of color printers. MacGraphX also produces a superior version of the graduated color fills popular in business presentation graphics, and it offers letterhead and layout features for producing standard graph templates and for publishing groups of charts. Business users who have grown to love exploded pie charts, 3-D bar charts, and scalable elements, however, will be disappointed to find these favorites missing. The reason for their absence is revealing. Most authorities on the graphical display of data maintain that these tools lend themselves readily to misrepresentation of relative quantities. Bravo, in a display of purity of intent that will win applause from Edward Tufte and graphing authorities everywhere, if not from this month’s sales manager at G-Whizz Products, specifically declined to include them (shadowed bar charts are the only concession to 3-D glitz).

This otherworldly approach to marketing is apparent in other MacGraphX features as well: file format specifications are included in case you have a special format you need to import, and C language files are provided to assist you in developing extensions to MacGraphX’s basic curve-fitting and statistical capabilities. This open data architecture is likely to appeal to graduate students who want to automate parts of their thesis production, but it might not be immediately valuable to the user who needs a market-projection chart by 9:00 tomorrow morning.

If you find yourself occasionally spending hours tuning up sets of graphs, you are going to like MacGraphX. It is not only faster than competing products, but many refinements in its interface make it a pleasure to use. It doesn’t have a large range of built-in graph types, but the graphs themselves are remarkably easy to modify. Designed in close adherence to the most enlightened current thinking about data display, it’s worth a close look if you’re serious about graphing.—Charles Seiter

See Where to Buy or circle 664 on reader service card.
The Question Isn’t Why Ehman Monitors Cost So Little...
It’s Why Apple And Radius Charge So Much.

We make no apologies for the pricing of our monochrome monitors. Like all Ehman peripherals they’re excellent products and superb values. But it’s hard to explain the gap between Ehman monitors and the two leading brands. It’s even harder to justify it.

You could buy three Ehman two page monitors for the suggested retail price of one Apple two page monitor. Or you could buy three Ehman full page monitors for the price of one Radius full page monitor.

If you think we’ve taken short cuts in quality, think again. Ehman monitors feature exceptional resolution, front mounted controls, and our two page monitor has true WYSIWYG resolution and a flicker-free refresh rate higher than Apple or Radius. Prices on the Ehman monochrome monitors include card, a tilt/swivel base, a full one year warranty, and our standard 30 day money-back guarantee. Also, our two page monitors include Stepping Out II software for the Mac II and the SE/30 models. For those who are in the market for monitors there are a couple of choices. If you don’t mind spending money on expensive labels, buy your next monitor from Apple or Radius. But, if you prefer saving money, call Ehman.
This month I look at tutorials, floppy disk catalogers, and list managers.

**Algebra I Homework Tutor 1.9.4**
Algebra I Homework Tutor ($99.95 from Missing Link Software) is the best algebra tutorial program I have seen. First, it works with algebra problems that the student types in from his or her own textbook. Second, it can generate an unlimited number of random algebraic problems.

The software includes an editor for entering algebraic notations. After a student enters an algebra problem and begins typing the steps leading to a solution, the program automatically evaluates each step. The tutor enters a single check if the step is correct; an x if the step is incorrect; a check and a question mark if the step could eventually lead to the correct solution; and a double check for the correct solution. The student can request a series of hints to help find the solution at any time.

To create random problems (for use without a textbook), the student first selects the type of problem (Laws of Exponents, Monomial Operations, Multiplying Binomials, and so on), then chooses from a number of options (With Integers, With Decimals, Inequalities), and finally clicks on a difficulty level (Easy, Medium, or Hard).

The ability to generate an unlimited number of problems puts Algebra I Homework Tutor in a class by itself.

**Alge-Blaster Plus 1.0**
Alge-Blaster Plus ($59.95 from Davidson & Associates) doesn't work along with a student's textbook—in effect, it is the textbook.

Alge-Blaster Plus presents a series of lessons that teach basic to intermediate concepts of algebra. It includes examples, a graphing module, and an algebra game.

Alge-Blaster Plus lets students work at their own pace and needs little teacher involvement. Some instructors might prefer this approach over a traditional textbook whose problems must be graded by the teacher.

**Your Personal Trainer for the SAT 1.0**
Scholastic Aptitude Test (SAT) scores can be improved when students are taught strategies for finding solutions to different types of test problems and are given a chance to practice on sample questions. Your Personal Trainer for the SAT ($59.95 from Davidson & Associates) includes dozens of hints for obtaining a higher score, provides plenty of example questions, and has charts for tracking progress.

There are five sections to this package. The Assessment section lets the student take a practice verbal or math SAT test under timed conditions. Unfortunately, the student has to read the test questions in the book that comes in the package and mark the answers on the screen. The program, however, gives an immediate score and recommends areas to practice.

The Vocabulary, Reading, and Math sections display sample questions, one at a time, along with general hints on how to find the answers.

The final section is a game in which you try to capture blocks before they disappear by answering questions about test-taking strategies.

Your Personal Trainer for the SAT provides 40 hours of instruction, which is about equal to an SAT course. While nothing can substitute for a teacher, Your Personal Trainer for the SAT is the next best thing.

**Professor Mac 1.7**
Spend a couple of days with Professor Mac ($49.95 from Individual Software) and you'll be familiar with Mac hardware and software. Professor Mac vocalizes many instructions and is virtually idiot-proof; it lets you practice with real menu items such as Cut and Paste but doesn't allow you to make a mistake (see "Mac Practice"). Professor Mac covers all basic Mac operations, such as creating folders, as well as intermediate topics, such as Font/DA Mover and the basics of HyperCard.

Like most tutorials, Professor Mac doesn't allow you to skip around. But (continues)
if you like the disciplined approach, the program can help you learn how to use a Mac.

**MusCard Maker 1.0**

MusCard Maker ($49.95 from Intel-limation) helps you produce handsome musical notation on cards in a HyperCard stack. The program provides a tool for virtually every musical symbol: notes, bowing symbols, clefs, rest signs (see “Point-and-Click Musical Notation”). You select the appropriate tool from a palette, and a simple mouse-click places the symbol where you want it. Standard HyperCard tools such as the lasso, eraser, and text tools are included.

The program plays any note or melody you enter on the screen, but each screen holds only a few notes. MusiCard Maker, like most HyperCard applications, is excruciatingly slow. After you click on the location where you want a symbol, you have to wait five seconds for it to appear.

If you need to display a short, difficult musical passage, create flash cards for memorizing bars, or design displays for a music class, MusiCard Maker is excellent, but it can’t replace paper and pencil or a MIDI system for composing or notating long passages.

**MacPhoneBook 3.0**

MacPhoneBook ($49.95 from Synex) allows you to create center-stapled hard-copy phone books with printing on both sides of a page. Three black covers are included with the program.

The program includes both a DA and an application. The DA allows you to find and add names as well as dial a number using a modem or automatic dialer. Using the application, you can sort a list according to any field or category, print labels, or export a text file.

There are some disadvantages: you must enter each piece of data (first name, second name, and so on) in a separate field—a needless tedium if you never expect to sort by field. And if you need sophisticated Boolean searches, automatic elimination of duplicates, or other high-end database features, you won’t find them here.

**MacList 1.5**

MacList ($79 from JAM Software) can, like MacPhoneBook, be used as an address book. But it’s better to think of MacList as a database application. MacList allows you to find names using a Search facility and dial a telephone number using a modem or automatic dialer.

This DA is set up in rows and columns. As in Excel, you can change the size of columns, delete or add rows or columns, sort by up to three column headings in ascending or descending order, and calculate the sum of any column or row. MacList, however, lacks many of the spreadsheet features that make list manipulation easy. You cannot delete by category, eliminate duplicates, use mathematical operators such as the greater than symbol (>), in searches, or use data entry shortcuts such as Fill Down. But MacList is excellent if you need a cost-and memory-effective means of list manipulation.

Possibly the best use of MacList is to store data that you later export to a spreadsheet for manipulation. The program automatically uses the data in the top row as headings when you import. With MacPhoneBook, you have to enter headings manually.

**Offline 1.01**

Offline ($79.95 from SNA) allows you to catalog floppy disks so that you can view their contents without inserting them into the drive. You can search for files by name, type, or creator. The program also automatically generates labels for all cataloged disks.

Offline is similar to Cataloger (reviewed here in February). Cataloger, however, represents disks by disk icons, and it has a View menu with exactly the same options as the Finder’s View menu has. Cataloger also has a few more searching options than Offline, including the ability to search for files that were modified before or after a particular date.

But the main difference between the two products is price—Cataloger is about half the price of Offline.

**Disk Accessory Plus 1.0**

If you only want to print labels for floppies instead of creating an on-screen catalog, Disk Accessory Plus ($10 from Vertical Solutions) is a cost-effective option. In what is probably one of the best values in commercial Mac software, this $10 program automatically creates floppy disk labels with all the file and folder names on the disk.

Despite its price, Disk Accessory Plus has all the features you need: you can print the names of all files, all folders, both, or just the title of the disk; you can add or delete text on the label; you can insert an icon or PICT graphic; and you can print the disk name upside down on the spine (the area that folds over the edge of the disk).

The program even lets you perform some housekeeping duties such as duplicating, erasing, and formatting disks without using the Finder.

Vertical Solutions plans to release a new $10 software package every quarter (if you return the plastic case, included with your original disk, you will receive 50 percent off your next purchase). Disk Accessory Plus is a welcome first entry in what I hope will be a series of good low-cost utilities for the Mac.

See Where to Buy or circle 605 (Algo-Blaster), 676 (MacList), 677 (MacPhoneBook), 685 (MusCard Maker), 693 (Professor Mac), 716 (Your Personal Trainer for the SAT) on reader service card.
If a picture is worth a thousand words, then why not use a word processor that processes pictures too?

Nisus® lets you communicate the way the Macintosh works—with words and graphics.

Most people aren't really interested in whether a program is a word processor, a graphics program, or a page layout program. All they really want to do is communicate.

Sometimes, something as simple as a note with an arrow attached is all you need to make your point.

Other times, a little grey background behind some text seems more appropriate. The tools you need to communicate come built into Nisus, or you can place a PICT graphic like the features list on the right.

You can "Place" any page of a Nisus file containing text and graphics into another Nisus file where it becomes a picture called a "Placed Page Graphic." Double clicking this "Placed Page Graphic" will open the original file for editing. Graphics can be drawn or pasted to three different layers: the text layer, behind the text, and in front of the text, giving you total control.

Nisus lets you rotate text, which is very important if you are designating a self-mailer that folds into three panels. Nisus also enables you to print two pages on a single 8 ½ by 11-inch sheet of paper turned sideways. You can do this with Nisus by a simple selection. Perhaps more important, however, is that this same command will collate your pages—in an 8 page document, for example, page 1 and page 8 will lie next to each other!

If you're new to the Macintosh word processing market, you probably want a word processor that is easy to use. If you've been around for a while, you undoubtedly want a powerful word processor. Chances are you have tried either MacWrite or Microsoft Word 4.0. One is easy to use, the other offers power. Both, however, have severe limitations which is why we developed Nisus in the first place.

Nisus has a built-in word processing language which does for word processing what built-in languages do for databases. For example, the language allows you to develop routines to index all proper names, a method to find and correct all double words, periods, and extra spaces, or index every word in a document except those you specifically want to exclude. You choose the features.


This two column format above is actually a separate Nisus file placed into the master file. This gives you total control over how you layout a Nisus document.

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Circle 253 on reader service card
The New Macintosh® Computers Designed to Deliver Leading Edge Technology in the Most Cost Effective Packages. With them, Apple has taken a giant step into the world of value. Frankly, it's a world in which we at Storage Dimensions have been doing business for some time now.

Our new slimline ZFP (zero footprint) models, for instance, reflect giant steps of their own—and leave no footprints. Tucked smartly under the Mac Classic™ or just as smartly between the Mac "chassis and monitor, they’re available in 50, 100, and 205 MB capacities. And they’re among the fastest in the industry. What’s more, they include comprehensive disk management software, with advanced features like disk mirroring and volume spanning.

In fact, features like these have always been included across the entire MacinStor product family. Whether it’s a 650 MB internal or a 4 GB external. Whether it’s an erasable optical solution or a hard disk standalone solution, every MacinStor delivers more for your money. Because Macintosh users expect more.

Take a giant step in performance, reliability, features, support and value. Ask for more than just storage. Ask for Storage Dimensions. Call (408) 879-0300. Storage Dimensions, 2145 Hamilton Avenue, San Jose, CA 95125.
NEW PRODUCTS

Edited by
Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

The Air Mouse
Remote Mac input device that combines the use of a patented sensor with digital infrared technology. Enables the user to select all of the display system's functions from on-screen menus. Works with an AirMouse base station that sits on top of or beside the video screen and connects to the mouse or digitizer port on the equipment. $450 to $500. Selectech, 617/383-0128.

ATTO Cache ci
64K static-RAM-cache board that is designed to increase the speed of the Mac IIci by 40 to 70 percent. Takes advantage of the fact that programs access some small portions of code and data more frequently than others; stores the frequently used data in 25-nanosecond static RAM until needed by the 68030 processor. Plugs directly into the 120-pin cache connector on the Mac IIci. Includes optional cache-control. $279. Atto Technology, 716/688-4259.

CS-1 Control Station
Hardware control interface for disk-based recording systems, sequencers, and multimedia software. Acts as an input device when used with Digidesign's Sound Tools and Audiomedia and with Opcode's Vision and Mark of the Unicorn's Performer sequencers. Keys are programmable, and unit is built with a scrub wheel that enables precise positioning within a recording for scrub editing. $599.95. JL Cooper Electronics, 213/306-4131.

SampleCell
Stereo, 16-bit, 16-voice, 8-channel output, sample-playback board for the Mac II series. Enables musicians to play digitally recorded or sampled instruments from a computer for use in MIDI, recording, and audio post-production applications. Supports up to 8MB of Mac II RAM. Works with all MIDI Manager-compatible programs. $1995; with 8MB of RAM $2005. Digidesign, 415/688-0600.

Scan 300/Color
24-bit color and grayscale scanner that produces grayscale, halftone, and line-art images. Includes scanning software with features for scaling and zooming, controls for brightness and contrast, and a gray map for manipulating scanned images. Requires Mac interface kit that comes with Adobe Photoshop. $1995; Mac interface kit $495. Abaton, 415/683-2226.

SRM-3/Mac Modem
Portable modem that does not require AC power but is powered directly from the Macintosh. Weighs 1.1 ounces and is less than 2½ inches long. May be ordered with a variety of connectors such as terminal block, RJ-11, or RJ-45. $70. RAD Data Communications, 201/587-8822.
XCeed NB12-108 Video Card
Multiple-resolution video board for the Mac II series. Has dual-page image capabilities; works in 1-, 2-, 4-, or 8-bit mode; provides 256 simultaneous colors; functions in multiple-monitor environments. Designed to take advantage of the high refresh rates of 19-inch screens. $719. Micron, 208/385-4000.

SOFTWARE

3 in Three
Puzzle with more than 80 configurations ranging from word puzzles to graphical puzzles in which the player rearranges pieces to produce an image. Includes logic puzzles, word jumbles, and elevator puzzles. All games center around the odyssey of a character based on the number 3. This character falls out of a fictitious spreadsheet during a power surge and spends all of her time trying to find a way back. If the player masters all 80 of the puzzles, 3 gets back home. Comes with a hint book. 1MB min. memory. $49.95. Cinemaware, 805/495-6515.

4D Calc
Spreadsheet module for integration into a 4th Dimension database. Allows spreadsheets to be actively associated with a specific record in a database. Includes a business graphics package called 2D Graph. 512K min. memory. $295. ACHUS, 408/252-4444.

DBMS/Copy Mac with PC-Access
Data-translation software designed for two-way conversion between files created in various Mac and PC applications. Works with 12 major Mac applications including Excel, Works, FoxBase+/Mac, and Oracle, and is compatible with 65 similar PC applications. Supports any form of ASCII file. DBMS/Copy Mac Lite performs PC-to-Mac file conversion using the 12 Mac applications in DBMS/Copy Mac with PC-Access, but supports only 26 of the PC applications. DBMS/Copy Mac supports only the Mac software packages. Retains variable names and formatting during file conversion. 512K min. memory. $290. DBMS/Copy Mac $95; DBMS/Copy Mac Lite $185. Conceptual Software, 713/667-4222, 800/782-8969.

DitchBuilder and ReproLog
Sets of Microsoft Excel templates designed by a landscape architect. DitchBuilder is a set of templates for design and documentation of trapezoidal, triangular, and parabolic section ditches, channels, and swales. ReproLog is a set of templates for organizing and tabulating billable reprographic expenses such as photocopying, blue-
Expert Backgammon
Backgammon game that has multiple skill levels from novice to expert, has the ability to store and recall games and positions, can be played in tournament or single-game mode, and evaluates your chances of winning from any position. Program can print a list of the moves in a game, in standard notation, and can randomly generate dice rolls. 512K min. memory. $65. Komodo Software, 415-941-7784.

Fractal Attraction
Program for designing fractals usingiterated function systems. User manipulates transformations by printing, clicking, and dragging in a draw/paint-like window. The resulting fractal is generated in another window. Tool renders color using IFS transformation. User can base fractal design on imported images. Intended for education or graphic design. 1MB min. memory. $49.95. Sandpiper Software, 612/644-7395.

GraceLAN
AppleTalk network-management tool that enables network administrator to view all nodes on a network. Can be used to view machine type, RAM size, hard drive volume size and available space, System file and printer versions, active applications, available applications and their versions, INTIs and cdevs, DAs and fonts, NuBus boards, and SCSI devices. Data can be exported into spreadsheets and can produce management reports. 1MB min. memory. 50-user set $395; 50 additional users $195 each; corporate version for 200 or more Macs $995. Technology Works, 512/794-8533, 800/688-7476.

Home Fitness Consultant
Application designed to help set up a fitness program at home. Accommodates up to six users, with optional password protection for each. Contains modules for body-composition analysis, fitness training, nutritional analysis, activities planner, status and goals, graphs, and a note pad. Food portion of program developed by a registered dietician. 1MB min. (continued)

The HP DeskWriter printer puts laser-quality printing right at your fingertips.

With a small size and a $995* price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

The DeskWriter is also designed for easy use with your Macintosh, and has both serial and AppleTalk interfaces. It even includes scalable and outline fonts. Combine that with the DeskWriter’s whisper-quiet operation, and keeping it to yourself will be that much easier.

So call 1-800-752-0900, Ext. 1004 for your authorized HP dealer.

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NEW PRODUCTS

The Instant Decorator
How-to program that gives advice and tips on room design. Applies the rules of the Two-Seasons Design method to help users coordinate furnishings and accessories with the architectural features of a room to produce rooms with a finished decor. 512K min. memory. $129.13. 408/293-7593.

MarblePatterns
Patterns that can be used as backgrounds or as stand-alone graphics and are available in a variety of packages. Compatible with software that supports grayscale TIFF format produced by programs such as Aldus PageMaker, Ventura Publisher, QuarkXPress, and Digital Darkroom. 1MB min. memory. Sample professional package containing three patterns $99.95. Progressive Desktop Publishing. 301/948-3047.

Metazoa: Vanishing Kingdom
Multimedia study of invertebrate animals, authored by Kerry B. Clark, professor of biological sciences at Florida Institute of Technology. Displays colorful graphic images and detailed solid-model animations; plays digital sounds. Program is designed to present in-depth technical description of the animal kingdom, including natural history, structure, classification, and diagnostic features, and is presented at the level of a college course. Requires System 6.0.3 or later version, 24-bit QuickDraw, Spinnaker Software's Plus 2.0 or its run-time module, and Mac II with 100MB hard drive. Includes a MacroMind Player module. 8MB min. memory. Single-computer educational license: $495; each additional computer license: $250. Ocellus Productions, 407/768-8000 ext. 8195.

Note Wizard and Scale Master
Two-part series of self-teach tools for music teachers, hobbyists, and musicians. Part I: Note Wizard has

With the HP ScanJet Plus, you've

The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.

That means 256 shades of gray for the hottest-looking output from your Mac. And it's so easy, too. At the click of a mouse, you can get negative or mirror images, as well as scaling in 1% increments from 4-200%. All for $2,190, about what you would expect to pay for a 4-bit scanner.

So if you want the richest, most detailed images from your Mac, you've got it made with Hewlett-Packard. Call 1-800-752-0900, Ext. 1005 for your authorized HP dealer.

There is a better way.
drills, exercises, and tutorials to teach keyboard skills, music theory, and ear training. Part II: Scale Master teaches musical scale construction. 512K min. memory. $79.95 each. Digital Horizons, 503/622-4034.

Note Wizard and Scale Master

Oasis

Graphics software that enables artists to produce images on screen with tools that simulate brushes and ink pens. Lets user apply color to backgrounds and retouch existing color images using solid brush, tint, colorize, saturate, smear, and other options. Brushes come with size, shape, and density attributes; lines, shapes, fill patterns, and gradations can be varied. Images can be rotated, reflected, and cropped. 5MB min. memory. $795. Time Arts, 707/576-7722.

Pink SQL

Relational database-management system that is based on ANSI SQL standards. Functions as a client/server system and contains links with a variety of frontend applications, such as HyperCard and 4th Dimension. 2MB min. memory for server; 1MB min. memory for clients. Server with five clients $2275; each additional client $375; developer package $1590. MacVonk, 215/667-9781.

ResumeMaker


Tesserae

Puzzle game in which users eliminate tiles from a board by positioning them according to their color and texture. Has beginner through advanced levels of difficulty and a variety of board configurations. 1MB min. memory. $49.95. Inline Design, 203/364-0063.

VTXpress

Mac interface to VAX VTX, Digital Equipment Corporation's videotext product for electronic information distribution. Application directly accesses the VTX server to reduce overhead on the host system and eliminate the need for an individual account for each VTX user. Supports a range of graphic formats and enables users to simultaneously view multiple VTX (continues)

got it made in the shades.
Infobase. 2MB min. memory $399. White Pine Software, 603-886-9050.

Wizardry II: Knight of Diamonds
Player pilots characters introduced in Wizardry I: Proving Grounds of the Mad Overlord through a 3-D, graphic maze in search of the five fabled pieces of the Knight of Diamonds’ armor and ultimately the Staff of Gnilda. 512KE min. memory. $49.95. Sir-Tech, 315/393-6633.

Xdata
Data-publishing extension for QuarkXPress 3.0. Enables user to flow data through exactly positioned text boxes for precise alignment to forms or labels. Can conditionally include or exclude one or more fields or other static text based on the value of a field or subfield in the current or previous record. Imports more than 1000 standard address records per minute on a Mac II and is MultiFinder compatible. 1MB min. memory. $199. Em Software, 203/399-8472.

ACCESSORIES

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Squeezable, nontoxic toy computer for children.

The Big Difference
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Cartridge Brief
Portable briefcase for carrying Ehman, Cutting Edge, PowerDrive, PLL, and other major manufacturers’ disk drives, plus power and data cables. Contains a compartment that can store four removable-media 44MB disk cartridges. Case is made of ballistic-type material with foam padding; closes with a zipper. $79.95. Thinker Toys, 805/496-3246, 800/368-4777.

Komfort Wrist Rest
Device designed to help protect keyboard users from carpal tunnel syndrome and repetitive strain injury. Consists of polyurethane foam, covering molded plastic. Unit can be

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For a limited time only, you’ll get a $200 rebate when you buy a fully Macintosh-compatible HP PaintWriter color printer. Imagine that.

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For shared use, check out the PaintWriter XL. It offers AppleTalk, faster speed, and auto-sheet feed.

But whatever you do, do it soon. This rebate offer expires May 31, 1991. So call us at 1-800-752-0900, Ext. 2113. We’ll quickly send you the name of your authorized HP dealer and a piece of sample output.

You’ll see that anything else is unimaginable.
adjusted to three positions. $35. JMJ Enterprises, 714/472-4409.

**LC-1200 Line Conditioner**
Voltage regulator and powerline conditioning unit for computers and electronic equipment. Provides 1200 watts from four isobar spike-protected AC-output receptacles. Filter banks protect equipment. Comes in a compact cabinet and has a 12-amp circuit breaker, an AC power cord, and a two-year warranty. $249. Tripp Lite, 312/329-1777.

**Porta\-l Inventory System**
Hand-held portable inventory system designed for off-line data entry that can be downloaded to the Mac. Program ships with two-field data-collection software, but works with software that records from one to four data fields. Data is input either by scanning bar codes or pressing keys on the unit's keypad. System can store up to 2000 records before being downloaded to the Mac. $995. Percon, 503/844-1189, 800/873-7266.

**Wrist Saver**
Wrist support designed to provide a comfortable typing environment and help reduce the risk of carpal tunnel syndrome. Lightweight 18-inch-by-3-inch foam-covered device lifts the wrists approximately 1 inch above the desk surface. $15. LB Innovators, 619/423-6644.

### BOOKS

**Build Your Own Mac Book**
Guide to assembling a Macintosh from catalog parts. Includes tips section and more than 80 photographs and illustrations. Written by Bob Brant. $17.95 plus $3 s/h. Brant Associates, 503/659-3670.

**Learn BASIC for the Apple Macintosh Now**
Book designed to teach BASIC programming concepts and how to write programs in BASIC. Includes sample programs, a section with questions and exercises, and the Quick-Basic Interpreter companion disk. Written by Michael Halvorson and David Ryg.


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 (and two copies of software) to New Products Editor, Macworld, 501 Second St., San Francisco, CA 94107.
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Top: Macintosh II, Black & White Version
Bottom: Macintosh, Color Version

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Quick Tips
SCANNING SLIDES CHEAPLY, IMPROVING LASER-PRINTED GRAYS, ELIMINATING VIRAL PLAGUE, AND MORE

BY LON POOLE

The version of HyperCard that comes with every Macintosh has always been set initially to use level 2 (Typing). Accessing the higher levels of Painting, Authoring, and Scripting used to be a simple matter of changing a setting on the User Preferences card of the Home stack, but no longer. Now you must type the word magic (and press Return) in HyperCard’s message box before you can select a higher user level on the User Preferences card. To use the message box, choose Message from HyperCard’s Go menu.

The minimal HyperCard documentation included with a Mac doesn’t explain how to use the higher levels. However, an assortment of books is available on the subject. Also, Claris sells two HyperCard products that include manuals and 19 example and reference stacks not bundled with the Mac. One of these products, the HyperCard 2.0 Upgrade ($49 directly from Claris at 800/628-2100), includes a script-language guide. The other product, HyperCard 2.0 Development Kit ($199 from Claris dealers), includes the script-language guide and four other manuals—over 1400 pages in all. The version of HyperCard that comes with these two Claris products doesn’t require a magic word to access higher user levels.

Answers from Apple
Apple still doesn’t want to answer your questions about Apple products directly. You’re supposed to ask an Apple dealer, a school support center, a user group, or a consultant. If those sources can’t help you (as has all too often been the case in the past), you can now call Apple’s toll-free customer support phone line at 800/776-2333 from 6 a.m. to 5 p.m. Pacific time. Before calling, though, prepare a description of the problem and a list of the software and hardware you’re using. Be prepared to cite the support sources you’ve already stumped and what their responses were. If you call the support line and are unable to provide this information, all you’ll get is Apple’s toll-free number (800/538-9696) for locating dealers and user groups.

Clearing the Desktop
The discussion in last December’s Quick Tips about desktop icons being obscured when you’re using MultiFinder struck a responsive chord with Mike Berger of Salem, Massachusetts. When he first started using MultiFinder, he was distressed by the system’s inability to provide clean wipes when switching programs. Then he discovered that AlSoft’s MasterJuggler utility can hide an application’s windows when you switch to another program. If you always switch programs using MasterJuggler, you will get an unobstructed view of the desktop when you switch to the Finder. You switch programs using MasterJuggler’s Application List or Application pop-up menu, as described in the MasterJuggler manual (see “Hide and Switch”).

Works to FileMaker
I have a database of my cassette collection, created in Microsoft Works. I would like to transfer the information from the Works database to FileMaker. Is this possible?

Dave Bruno
Philadelphia, Pennsylvania

Yes. Export the information using Works’ Save As command (File menu). In the Save As dialog box, select the Export option, type a file name, and click the Save button. If you wish to export only certain records from your Works database, use the Match Records or the Record Selection command (both in the Organize menu) to select the records you want to export. Then, in the Save As dialog box, select the Save Selected Records Only option before clicking Save.

In either FileMaker II or FileMaker Pro, create a new database to hold the information; its structure does not have to be the same as the Works file’s. Then use the Import command (File menu) as described in the FileMaker manual to import the information, (continues)
QUICK TIPS

HOW TO

HIDE AND SWITCH To hide windows of inactive programs and see all desktop icons with MultiFinder active, switch programs using MasterJuggler's Application List (top) or its Application pop-up (bottom). Disable Window hiding by pressing `:e-T in the Application List.

ser tá tu re fr or making a database, tell FileMaker the relationship you want between the imported fields and the fields in the new database.

Plague Although I frequently scan my hard drive and floppies with SAM Intercept and Virex 2.0, I keep getting a recurring warning that a strain of the WDEF virus has been found on the desktop of my hard drive. I have tried both deleting and repairing this file, as well as scanning my hard drive when starting up with another disk, but every few days the strain reappears.

Andrei Martinez Diamond Bar, California

The WDEF virus has been around well over a year but still causes lots of trouble because it spreads so easily from disk to disk. Sometimes merely inserting an infected floppy will infect your hard drive. WDEF infects only the invisible Desktop file, in which the Finder stores icons and other desktop information. It does not infect programs, documents, or system files.

To eradicate WDEF, you must scan and repair all disks that you or anyone else uses with your Mac. The two products you mention, along with several others, can detect and eliminate the WDEF virus and all other known viruses. Disinfectant, by John Norstad of Northwestern University, is my favorite antivirus program because it's fast, thorough, and free. It's available from most user groups and online information services.

You can also remove WDEF (but not other viruses) from a disk simply by rebuilding the Desktop file. To rebuild a hard drive's Desktop file, hold down the `:e and Option keys at start-up time. When inserting a floppy disk (or a removable hard disk cartridge), press `:e-Option until the Mac asks whether you want to rebuild the desktop, and then click OK. If you have multiple drives, keep pressing `:e-Option until you've instructed the Mac to rebuild each one.

After making repairs, you should install protective software on all your start-up disks to prevent their reinfecion by known viruses. Some protectors, such as SAM Intercept, also detect suspicious activity that may be caused by an unknown virus. Most of these reports turn out to be false alarms, so I prefer simple protective software like that included with Disinfectant.

Show Info Report TIP: Microsoft Excel's Show Info command (Windows menu) displays useful auditing and debugging information in the Info window, but only for one cell at a time. To see the information for multiple cells, select them, choose Show Info, and then choose Print. Whereas the Info window displays only one cell at a time, the printed info covers all selected cells. You can display and print any type of information—cell reference, formula, value, format, protection, names, precedents, dependents—by choosing those items from the Info menu, which appears only when the Info window is active.

Neil Ticktin Santa Monica, California

Economy Slide Scanning TIP: You don't always have prints of slides and negatives lying around ready for scanning on a desktop scanner. Yet only a few flatbed scanners have transparency attachments available. Constantly making prints...
You can get decent scans of slides and negatives using ordinary flatbed scanners made for scanning prints. This image was scanned from a medium format (2 1/4-inch) transparency with an Apple Scanner. A small Letraset light box turned upside down illuminated the slide.

from negatives and shooting halftones from slides can become frustrating. But you can adapt a flatbed gray-scale or color scanner to get good quality scans from slides and negatives. You need an inexpensive mini-light box ($15 to $25 at art supply stores) made for viewing transparencies. Use a better light box for higher-quality scans.

Place the slide or negative on the scanner, and put the light box upside down on top of that. Turn on the light box and scan away. You can invert the scan of a negative to a positive with an image-editing program such as ImageStudio or Photoshop. I have had excellent results using these scans for placement only (not for final film), saving a lot of time and money. Scan Lite shows what you can expect.

Howard A. Wright
Grand Rapids, Michigan

When Good Disks Go Bad
TIP: Bad disks make good coasters, but you should try to have them replaced. After I returned four bad disks to Sony (three used, one new), I received a box of 10 disks and a written apology.

Bill Achuff
Philadelphia, Pennsylvania

Secret Bookmark
TIP: Microsoft Word always displays the first page of an existing document when you open it. However, choosing Go Back from the Utilities menu (or pressing ⌘-Option-Z or pressing 0 on the numeric keypad) scrolls to the place where you were working when you last saved the document. If you had text selected (highlighted) when you saved the document, that text will be reselected automatically.

John B. Andreas
Lafayette, California

This trick often fails if you're using two monitors with your Mac and you have moved the document window to the monitor without the menu bar any time before saving the document.—L.P.

File-Recovery Gotchas
TIP: Users of file-recovey programs such as Symantec's SUM II and The Norton Utilities for the Macintosh, and Central Point Software's MacTools Deluxe may be in for a surprise when trying to recover deleted files. You might not be as protected as you think if you use any software that routinely creates and deletes temporary files, such as FileMaker, Microsoft Word, MacWrite II, and many others. In addition, printing on a LaserWriter with the Chooser's Background Printing option causes temporary spool files to be created and deleted. So does using other print spoolers, such as SuperLaserSpool. File-recovery programs track these automatic file deletions as well, leaving less space for storing the files you knowingly delete. Therefore, your list of recoverable files may be filled with "Spool file 1," "FileMaker Temp 4," "Word Temp 13," and the like. To maximize your protection, allocate the largest amount of space your file-recovery program allows for keeping track of deleted files.

Chris Catalano
Farmingville, New York

Larry McHenry, a technical support representative for Central Point Software, points out that tempo (continues)
Can Do It!

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Circle 9 on reader service card
Mountains appear more lofty the nearer they are approached, but great men resemble them not in this particular.

Lady Marguerite Blessington

Mountains appear more lofty the nearer they are approached, but great men resemble them not in this particular.

Lady Marguerite Blessington

LASER GRAYS Shaded text, boxes, and other graphics appear coarse when printed on a 300-dpi laser printer with a standard halftone screen of 60 lpi (top). At 133 lpi, they look smoother and crisper (bottom). You can change the halftone screen in QuarkXPress 2.12 or 3.0 using the Page Setup command.

Simplified Disk Naming TIP: I conscientiously make archival copies of all original software disks. (It took only one crashed master disk to teach me that lesson!) For two years I have gone through all kinds of contortions to reproduce the weird characters in the names of the original disks for the copies. Then I found that you can copy and paste a whole icon name. You click the icon whose name you want to copy, press $-C (for Copy), click the icon you want to name, and press $-V (for Paste). Voila!

Michael J. Hull
APO New York

We pay from $25 to $100 for tips published here. Send tips or questions (include your address and phone number) to Quick Tips, Macworld, 501 Second St., San Francisco, CA 94107. Send electronic mail to CompuServe (70370,702) or MCI Mail (204-8078). We regret that, due to the high volume of mail we receive, we're unable to respond personally to each letter. All published submissions become the property of Macworld.

Lon Poole answers readers' questions and selects their tips for this monthly column. You'll find all the best tips from six years of this column in his latest book, Amazing Mac Facts (Microsoft Press, 1991).
...that you might be able to save work that was open when your system crashed? That you don't have to hold down Command-Option-Plus to add an item to the Microsoft Word "Work" Menu? That you can print double-sided pages from any application? That you can add frequently used filenames to the Word menu bar? Lon Poole has selected the best from his Quick Tips column in Macworld magazine and combined them with nifty ideas from software publishers, equipment manufacturers, and user groups in a book that's both useful and fun. Lon Poole's BIG BOOK OF AMAZING MAC FACTS is available wherever better computer books are sold, or you can order directly from Microsoft Press. Now you know! $24.95

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Getting Started with Hardware Upgrades

FINDING THE BEST WAY TO KEEP YOUR MAC UP TO SPEED

BY JIM HEID

Buying into the Mac world is like boarding a moving train. You stand alongside the tracks, waiting until the right model comes along, then you time your leap and hold on as money flutters from your pockets. Whew—you made it.

But where are you heading? Is a new model going to pass as you settle into your seat? And if this train can’t take you to your destination, will you be able to transfer to one that can?

Every Mac owner has faced worries like these at one time or another—most likely last year, when Apple released four new Macs while discontinuing another four. And Apple’s System 7.0 software further complicates matters. Will your upgrade be compatible with all of System 7.0’s features? Should you get a new Mac instead?

There are no easy answers, but one thing is certain: an old Mac may not be the fanciest train on the tracks, but it can still take many people where they want to go. More to the point, you can upgrade an old Mac to give it most, if not all, of the features in Apple’s current offerings. And if you have one of the newest Macs, hardware upgrades can make a good thing even better. This month, I examine the most common upgrade options available for old and new Macs, to help you map out an upgrade path that makes the most of your Mac and your money.

Upgrade Options

Before devising an upgrade strategy, it helps to know what your options are. Hardware upgrades fall into two broad categories (which often overlap): ones that make your Mac faster and ones that add new features. The most common include the following:

• Memory

More memory helps programs run faster and enables MultiFinder to run more of them at once. More memory also lets you create larger documents with programs that keep entire documents in memory instead of swapping between memory and disk. Memory prices have plummeted in recent years; at this writing, several mail-order retailers offer 4-megabyte upgrades for a few hundred dollars, and some include an installation video and technical support. A 4MB upgrade consists of four 1MB Single In-line Memory Modules, or SIMMs—small, plug-in boards, each containing eight memory chips (see “Memory Details” for a list of memory upgrade options and configurations for each Mac).

• Hard drives

With its vast storage capacity and swiftness, a hard drive is the most important upgrade you can buy. With one, your Mac will start programs and open documents far (continues)
more quickly, and you'll be able to keep all your files in one place instead of swapping and waiting for slow floppy disks. External hard drives start at under $300.

- Accelerator boards and CPU upgrades: These silicon brain transplant implants replace the Mac's central processing unit (CPU) with a faster, flashier one. Accelerators for the Mac Plus, SE, and Classic usually replace those machines' 68000 CPU with a 68020 or 68030—the CPUs that drive Apple's Mac LC and II series, respectively. (The original Mac II used a 68020 CPU.) Accelerators for the Mac II family replace the CPU with one that runs at a faster clock rate, enabling the Mac to do more in less time. What's the difference between an accelerator and a CPU upgrade? Accelerator boards often include sockets for memory; memory installed there runs faster than memory installed on the Mac's logic board. CPU upgrades simply replace the CPU and thus don't provide the same degree of performance enhancement as accelerators. Costs range from several hundred dollars for an SE or Plus CPU upgrade to several thousand for a II-family accelerator.

- Logic board upgrades: Having an Apple dealer replace your machine's logic board can only step you up to a model that comes in the same basic case—you can upgrade a 128K and a 512K Mac to a Plus; an SE to an SE/30; a IIfx to an IIGS; and a II and a IIfx to an IIx. Logic board upgrades generally cost more than accelerators but have a significant advantage: a ROM upgrade. All logic board upgrades either include or require the purchase of new read-only memory (ROM) chips, which contain some of the Mac's fundamental system software. When the ROM upgrade is sold separately from the logic board upgrade, the ROM upgrade sometimes also includes a SuperDrive floppy disk drive. A SuperDrive, also called an FDHD (short for floppy disk, high density) can use high-capacity 1.4MB floppy disks in addition to the 800K disks used by most earlier Macs. Thus your Mac not only gets faster, it gets new features as well. The SE-to-SE/30 upgrade, for example, gives you Color QuickDraw, which opens the doors to color video boards. The logic board upgrade will serve you well when System 7.0 is released, too (see "System 7.0 and Upgrades").

- Video boards: A video board's circuitry works with a display monitor to create the Mac's screen image. Most Macs include video circuitry on the logic board but can also accept plug-in video boards that control color or large-screen monitors or add other display talents, such as the ability to attach the Mac to a videocassette recorder (see "Getting Started with Desktop Video" and "Prima-Time Video," Macworld, September 1990, and "Mac Video, Take II," February 1991).

- Coprocessors: These specialized microprocessors work along with the Mac's CPU, lightening its load. Math coprocessors speed up calculations in spreadsheets and other number-crunching programs. Math chips are often built in to or offered for accelerator boards, and are available on plug-in expansion boards for the Mac LC and II. (Other Mac IIs and the SE/30 include math chips; the LC can accept one via its expansion slot—several boards bearing math chips have been announced but none have shipped at this writing.) Graphics coprocessors, also called graphics accelerators, are generally used with or included on true-color, or 24-bit, video boards. True-color boards enable Macs to display images with photographic realism but must move megabytes of data to do it (see "Fast Color," Macworld, January 1991). Without a graphics accelerator, true color can require true patience. Graphics accelerators, currently available for the Mac II series only, aren't cheap, with Apple's Macintosh Display Card 8*24 GC costing $1999.

- Sound-recording hardware: The Mac LC and IIfx contain sound-recording circuitry that, with appropriate software, lets you "attach" recorded comments to documents and send voice-mail messages to other Macs on a network (see "Getting Started with Networks" and "Mac IIs," Macworld, December 1990). You can add sound-recording features to other Macs using external hardware such as Farallon's MacRecorder ($149 to $249, depending on the model) or Articulate (continues)
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Circle 342 on reader service card
SYSTEM 7.0 AND UPGRADES

When hardware upgrades and System 7.0 are concerned, you should pay special attention to one area: virtual memory, a feature that lets the Mac treat part of a hard drive as memory. In the past, it was believed that all you would need to use System 7.0's virtual-memory feature would be a Mac containing a 68030 processor or a 68020 combined with a 68851 PMMU (Paged Memory-Management Unit) chip, available from Apple as well as third-party vendors. Not so. System 7.0's virtual-memory software relies on certain ROM routines that aren't present in Pluses or SEs. Thus, the virtual-memory feature works only with Macs designed around the 68030 processor, or with original Mac IIs equipped with the optional PMMU chip.

To work around this, many accelerator boards will (or already do) include Connectix Corporation's Virtual utility software, which implements virtual memory with today's system software and which will be updated to be compatible with System 7.0. What does this mean for accelerator shoppers? If you want virtual memory in your 68030-accelerated Plus or SE, be sure a 68030 accelerator includes or is compatible with Virtual before you buy. And if you want virtual memory without having to use a third-party utility, buy an Apple 68030 logic board upgrade or a new machine instead of an accelerator.

What Works for Your Mac?

Some Macs are less receptive to upgrades than others. The Classic, Plus, and earlier machines are especially resistant—with no expansion slots for plug-in boards such as video, accelerator, and high-speed networking boards. To work around this, upgrade developers generally use the Killy Clip, which straddles the processor and thus taps into the signals that would otherwise be provided by an expansion slot.

This clip-on technique works, but it's not without potential problems. One risk is electrical: the Plus and earlier machines lack fans, and their power supplies can be stressed by having to provide juice for extra hardware. The other risk is mechanical: accelerator clips can be jostled loose or develop unreliable connections, especially if you move your machine around. The Classic may be especially prone to this problem: according to several upgrade vendors, the way its processor is soldered to the logic board makes it difficult to develop a clip that stays put. The Ilcx, Iici, Iisi, and LC also contain soldered rather than socketed CPU chips. This has hampered the accelerator board market for these machines, since most accelerator boards require that you remove the original CPU and plug the accelerator board into the CPU socket. The physical design of these machines' CPUs prohibits clip-on alternatives.

The accelerator-and-soldered-CPU issue aside, upgrading a Mac is generally straightforward, since most models provide at least one slot. With the single-slot SE, SE/30, LC, and IIsi, there isn't much room to grow, so you need to choose upgrade options carefully. Fortunately, several SE accelerators accept large-screen video boards via piggyback connectors. And as the LC and IIsi become increasingly (continues)
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Requirements for Mac version of CompuServe: Mac Plus or later model Macintosh with at least one megabyte of RAM, Mac System 6 or later version; hard disk, one 800K or double-sided 525K floppy drive. Hayes compatible modem recommended.

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popular, we'll probably see more multifunction boards that cram several upgrades into one slot.

Strategies for Discontinued Macs
We'll look at some specific upgrade strategies, starting with discontinued Macs. See "Where to Buy Upgrades" for a list of upgrade vendors and representative products.

Mac 128K, 512K, and 512KE You can upgrade a 512K Mac to a 512KE by buying Apple's Macintosh Plus Disk Drive Kit, which also includes the 128K Mac Plus ROM chips. But the 512KE lacks the SCSI circuitry needed for fast hard drives, and it lacks sufficient memory to run most of today's programs. For that reason, it's better to buy both the disk drive kit and the Macintosh Plus Logic Board Kit to get a full-fledged Mac Plus. If you own a 128K or 512K Mac, you can also assemble the equivalent of a Plus by using Apple's Mac Plus ROM chips along with third-party SCSI and memory hardware from firms such as Computer Care, Dove Computer, and Newbridge Microsystems. However, now that the Plus has been discontinued, rumor has it the 128K ROM chips and Apple's upgrades may not be available for long. (Some upgrade firms are reporting ROM scarcities now.) Given all this, it may make more sense just to buy a new Mac.

Considering the poor track record of Plus and pre-Plus power supplies, if you do opt for an upgrade, you'll probably want to beef up your power supply using the $80 Power Up kit from Total Systems Integration, which replaces the supply's most failure-prone parts. You can either have a dealer install the kit or send the power-supply board to TSI for installation ($148 including the kit).

Mac Plus If you've outgrown the Plus, your best option is to sell it or supplement it with a new machine. Accelerators and large-screen adapters are available, but the Plus's weak power supply and lack of a fan make these upgrades somewhat risky (note the power-supply comments above). (continues)
There's more to comparing LaserJet PostScript® Language Emulation Cartridges than just the name

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<td><strong>PostScript Cartridge</strong></td>
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To learn how you can get more for less, call your nearest dealer or contact: Pacific Data Products, 9125 Rehco Road, San Diego, CA 92121, (619) 597-4633, Fax (619) 552-0889.

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Mac SE There's a brighter future for this recently canned Mac, whose expansion slot can reliably accept accelerator boards and large-screen monochrome monitor adapters (sorry, no color). Apple's SE/30 Logic Board Upgrade is even more appealing, providing Color QuickDraw, a more up-to-date expansion slot, and support for virtual memory under System 7.0. Keep in mind, though, that an SE expansion board (such as an accelerator or large-screen video board) won't work in an SE/30's slot.

Mac Ilcx This workhorse Mac II can last for years, thanks to three NuBus expansion slots and a large selection of boards to fill them. (The term NuBus refers to an industry standard that describes the physical and electrical design of the slots and the boards that go in them.) However, all but the very first Ilcx machines contain soldered rather than socketed CPU chips, and as mentioned earlier, that's a problem for accelerator boards. DayStar Digital is the only firm offering Ilcx accelerators (PowerCard 030, in 25, 33, 40, and 50MHz versions), and you need to send in your machine's logic board to have a CPU socket installed. (If you can't bear the downtime, some DayStar dealers will swap logic boards for an extra charge.) A better upgrade alternative may be Apple's Ilci logic board, which gives you faster performance, a slot for a cache memory card, and new ROM chips that support more than 8MB of memory under System 7.0.

Mac II, IIX With six NuBus slots, these two may have the brightest future of all. Accelerators such as those from DayStar Digital and Siclone Sales & Engineering provide 68030s with clock rates of 33MHz to 50MHz, for speed that rivals the top-of-the-line Ilcx. Speaking of which, the Macintosh Ilcx Logic Board Upgrade retails for just $2999 plus memory—a deal so good it's created a hot market for used Ilc's and Ilcx's and helped push down prices for Ilc and Ilcx accelerator boards.

Strategies for Current Macs Just because a Mac is still being manufactured doesn't mean there isn't room for improvement.

Mac Classic The Classic's soldered (rather than socketed) CPU chip promises to make life difficult for accelerator developers. Still, several 68030 upgrades for the Classic have been announced at this writing, and others will probably follow. Large-screen video adapters are also available. Given the challenges the Classic presents to CPU clip manufacturers, you might want to make sure the wrinkles have been ironed out before buying a product that clips onto the Classic's CPU.

Mac SE/30 It's a good thing this Mac is reasonably fast, because no accelerator boards are available for the current model. (Dove Computer's MaraThon 030 Accelerator is available for early SE/30s, whose CPUs were socketed.) Large-screen and color video boards are available, however.

Mac LC Several accelerators have been announced for the fledgling LC, as well as Dynamac's $99 LCDevice board, which contains sockets for a 68030 CPU and a 68882 math coprocessor chip. Dove has a similar product on the drawing board. DayStar Digital plans to develop an accelerator, but representatives told me the machine's small power supply presents a considerable design challenge—it supplies only 4 watts to expansion boards, versus 15w in the Ilcx. The LC's soldered CPU complicates things too. Video hardware is just beginning to appear for the LC; one noteworthy product is Dynamac's LCDisplay, a liquid-crystal display (LCD) technology similar to that used by many portable computers. PSI Integration's Bus Adapter Card lets you use SE/30 expansion boards and

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<th>Company</th>
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<td>Aox</td>
<td>617/880-4402</td>
<td>DoubleTime-16 accelerator for SE</td>
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<td>accelerators and cache boards for Il series</td>
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<tr>
<td>Dove Computer</td>
<td>913/763-7918</td>
<td>accelerators and CPU upgrades for most Macs; SCXI and memory upgrades for 128K, 512K, and 512KE</td>
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<tr>
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<td>415/748-1600</td>
<td>video upgrades for most Macs, including Classic</td>
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<td>Mac Doctor Electronics</td>
<td>415/994-2131</td>
<td>Brainstorm series of memory upgrades for 128K and 512K Macs</td>
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<tr>
<td>Newbridge Microsystems</td>
<td>613/592-5080</td>
<td>accelerators, memory, and CPU upgrades for most Macs, including 128K and 512K; graphics accelerator for Il series</td>
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<td>Novy Systems</td>
<td>504/427-2258</td>
<td>Mac20MX accelerator for 512KE, Plus, and SE</td>
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<td>Orchid Technology</td>
<td>415/682-0300</td>
<td>MacSport II cache board for original Mac II</td>
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<td>PSI Integration</td>
<td>408/559-5544</td>
<td>cache board, 030 slot adapter for Ilx</td>
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<td>Radius</td>
<td>408/434-1010</td>
<td>accelerators for Plus and SE; video upgrades for most models</td>
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<td>Second Wave</td>
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<tr>
<td>Siclone Sales &amp; Engineering</td>
<td>408/262-8201</td>
<td>accelerators for Mac II, Ilx, and SE; memory upgrades for Portable</td>
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<tr>
<td>SuperMac Technology</td>
<td>400/245-2202</td>
<td>SpeedCard accelerator for SE</td>
</tr>
<tr>
<td>Total Systems Integration</td>
<td>503/345-7395</td>
<td>memory, SCXI upgrades, and accelerators for 128K, 512K, Plus, and SE</td>
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gran des abound.

board, which plugs into the Portable's Direct Slot. NuBus compatibility means a huge selection of boards, but some, including Apple's own graphics accelerator, draw more current than the IIci's power supply can deliver. Determine the power requirements of any NuBus board you plan to buy for the IIci. DayStar Digital and Dove plan to support the IIci with accelerator and CPU upgrade boards, but have not announced specifics.

Mac IIci One of the most popular and inexpensive upgrades for this fast Mac is a cache board. Citing reliability problems, Apple yanked its Macintosh IIci Cache Card from the market last year, but there's a large selection of third-party boards. (Apple's should be available again by the time you read this.) Another way to speed up the IIci is to use a NuBus video board instead of the machine's built-in video, whose design can slow down the machine, especially in its 16- and 256-color modes. (This speed-up tip applies to the LC and IIci too.) No accelerators are available for the IIci.

Mac IIfx Given this machine's blazing speed and exotic design, it's not surprising that no accelerators are available for Apple's top-of-the-line Mac. Memory, storage, and video upgrades abound.

Mac Portable One of the most useful upgrades for the Portable is an external video monitor adapter. Two are currently available: Aura Systems' ScuzzyGraph, which attaches to the Portable's SCSI port and can drive monochrome or color monitors; and Computer Care's Video Mac Pac board, which plugs into the Portable's Processor Direct Slot (PDS) and supports monochrome monitors.

Finally, it's worth noting that Second Wave offers expansion chassis for most Mac models. These external boxes contain expansion slots and power supplies. The Plus and Portable chassis let you use SE expansion boards, while the SE/30 and II-family chassis support NuBus boards.

Upgrade or New Machine?
Buying the right upgrade requires pinpointing your Mac's weaknesses. Do programs take too long to start, or documents too long to open? You might need a faster hard drive (or any hard drive, if you don't have one). Once a program starts, does it run sluggishly? Which operations are sluggish? Do calculations take too long? A math coprocessor or an accelerator or logic board upgrade might be in order. Do true-color graphics ooze onto the screen? You might need a graphics accelerator. If you answer "all of the above," think about a new, faster machine.

Last but far from least, it's important to assess your financial options to determine which will cost less: upgrading an existing Mac or selling it and buying a new one. Before last October, upgrading an existing machine usually made better financial sense, since the only alternative was a considerably more expensive new machine. Now that Apple has lowered prices and introduced the more affordable Classic, LC, and IIci, the decision isn't as easy. Given the cost of hardware upgrades—and the compatibility and reliability risks that sometimes surround them—a new machine may be the smarter buy. That's especially the case if you want to take a big leap forward, from, say, a 1MB SE to a 4MB, 68030-based machine that supports sound recording. And even if a new machine costs slightly more, the extra features it provides may be worth the cost.

There is another plus to buying a new machine: in doing so you get a blank slate that is ready to accept all the upgrade options that will be developed for it. That knowledge will be comforting when the next convoy of new trains starts rolling out of Apple Station.

See Where to Buy for contact information.

Jim Heid is a contributing editor of Macworld. His latest book, coauthored with Peter Norton, is Inside the Apple Macintosh (Brady, 1989).

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I'm good at desktop publishing. But desktop accounting scared me.

The thought of doing bookkeeping for my design studio got me uptight.

When I heard "balance sheet," I broke into a sweat. I know type, advertising, printing. Now I was forced to do our books. No choice.

We were on our third part-time bookkeeper in eleven months, and she was called away suddenly. Sound familiar? But I'm the boss and the buck stops with me. We had bills to pay, payroll checks to write, invoices to send, taxes to set aside. And deadbeats to collect from—only I had no idea who owed us how much or for how long. Some suppliers may have even thought of us as deadbeats. I needed to know our cash flow, and get a handle on all this. But I didn't have a lot of time.

Step one: find an accounting program that feels as familiar as our Macs, that starts out easy, but has lots of reserve firepower for later on.

I found atOnce! The manual looked orderly. I dug in...

The familiar with the unfamiliar at Once starts you off with a tutorial that uses HyperCard, one of my old favorites. I was at home.

Numbers are my nemesis, but the tutorial was actually fun and got me comfortable. It takes you step by step through the program, and gives you some easy-to-swallow accounting basics so you're not reading a foreign language. There's context-sensitive help, just in case.

And while you learn, you can start to set up your books. So it doesn't come in a flash and you sweat a little. But you do it and you learn.

I started off light. Double-clicked on one of the default charts of accounts and my General Ledger was practically set up for me. Then entered a few client names in Accounts Receivable, to get an idea of what was coming in. Prepared six invoices—and atOnce! calculated sales tax. Nice. Printed the invoices which I redidied in atOnce!—realigned a field here, change a font there. The usual.

Then ran a Customer Aging Report to identify the slow-payers (I had no idea such a terrific thing was even possible).

What I didn't know was costing my company. I discovered a key client who hadn't paid in two months. I called and collected and now he wants to know about atOnce! I wrote payroll checks for the staff, and sent our bank a balance sheet I printed out myself—no sweat.

From fear and loathing to passion. Now I even study the management reports atOnce! generates. I'm still an art director. But atOnce! helped me become a better businessman.

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Insights on MacInTax
HINTS TO HELP MAKE DOING YOUR TAXES, ALMOST—FUN?

BY CHARLES SEITER

MacInTax is, by most accounts, the most successful special-purpose program yet released for the Macintosh; it's won Macworld's World Class award for best tax planning/preparation or personal finance program for the last four years. Other than speed increases and the accommodation of IRS schedule modifications, the program stays nearly the same from year to year. Nonetheless, power users (MacInTax power users tend to be CPAs who prepare hundreds of returns year-round) keep finding underused and, occasionally, even undocumented features. Here are some tips and hints for getting the most out of MacInTax 1990. I would like to acknowledge help from SoftView (Sue Morgan, Russ Sprouse, and Jeff Felder), writer George Beckman, and tax attorney Rick Seim.

Mistakes and Missing Fields
MacInTax keeps track of mistakes and missing fields in data entry but recognizes that at 10:30 p.m. on April 14 you may simply need to get a return printed, even if the program thinks you haven't filled out the form properly. Thus the program will print out forms even if they don't meet its rigorous logical standards.

Nonetheless, MacInTax lets you inspect your forms to look for errors and incomplete areas. Hold down the Option key, press Return, and the cursor jumps to the field the program thinks contains a mistake (see "Options for Errors"). The program checks for these errors: (1) sign errors such as a plus or minus sign where the program expects no sign; (2) size errors, where an entry is larger or smaller than the expected range; (3) incomplete entries; (4) entries in IRS-defined blank zones; (5) format errors, in which an entry the IRS expects to be Y or N, for example, is filled in with a number; and (6) box-checking errors, in which you have checked a set of options that the IRS will find inconsistent.

A Few Hints
Before you reach for the phone to call either SoftView or the eternity-on-hold 800 number provided by the IRS, remember that if you double-click on the text for any line in a form, MacInTax gives you a little window displaying the IRS instructions pertaining to that part of the form (see "Help from Big Brother").

Besides the IRS's instructions, SoftView includes hints and other advice for preparing returns. Make sure you scroll all the way down the pop-up instruction box until you get to the heading Tax Hints—some of this advice can save you serious money.

Saying No to Corruption
On occasion files become corrupted. This may show up when you try to save the file—the system typically gives you the message "THIS FILE USES FORMS THAT ARE NOT AVAILABLE" and returns you to the Finder. In the Finder you can see the right form, but the last modification date doesn't correctly show the last time you worked on the file. The recommended safety precaution is to lock all your forms using Get Info from the desktop. This way, if you find your system crashing often, you won't have to do anything other than restart, and although the data you were entering at the time of the crash may be lost, your original files will be preserved.

Instant Access
When you click on a line in Form 1040, the Edit menu shows the instructions, itemizations, or worksheets currently linked to that line, and you can select one of these documents and open it directly. This is a good way to nav-
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2. If the Seller cannot ship your order when promised, you must be notified in writing prior to the promised date. The notice must specify a new date if available, and must give you the opportunity to (a) cancel with a refund; (b) agree to a specified delayed shipping date, or (c) agree to an alternative date.

3. The Seller’s notice must include a postage-paid reply envelope or card so that you can return your preference. If you do not respond, the Seller may assume you agree to the delay.

4. Even if you agree to an indefinite delay, you retain the right to cancel at any time before the merchandise has been shipped.

5. If you cancel an order that has been paid by check or money order, the Seller is obligated to mail your refund within seven business days. If you paid by credit card, the Seller must credit your account within one billing cycle following receipt of your cancellation. Store credits or vouchers are not acceptable in place of a refund.

6. If the item or order is unalikeable, the Seller may not send substitute merchandise without your consent.

DO’S AND DON’TS

By mail:
- Confirm prices, including sales tax and shipping fees, before you order. Your purchase may be exempt from sales tax—check your state laws on sales taxes.
- Read the instructions of handling, packing, and shipping fees in legal and mail order tax service rates.
- Determine the precise specifications of the merchandise, such as model, size, components, etc.
- Confirm the price and expected delivery date as advertised.
- State on your order whether you will accept substitute merchandise if the item specified is unsatisfactory. If you won’t accept a substitute, state that your order should be returned. It you cancel an order that has been paid by check or money order, the Seller must credit your account within one billing cycle following receipt of your cancellation. Store credits or vouchers are not acceptable in place of a refund.
- Keep copies of your order and all associated correspondence. Your records should include the company’s name, address, and phone number, a description of the merchandise, the canceled check or money-order carbon, the date you mailed the order, and any sales slips and shipping receipts.
- Do not insure your order. It is the Seller’s responsibility to make sure you receive your merchandise.

By phone:
- Note the name of the person who takes your order, and the time and date of your conversation.
- Make a record of your order, the price, promised availability, and the expected delivery date.
- Save all correspondence, including your canceled check or money-order carbon and any written confirmation sent by the Seller.

Q & A
- Does the advertised merchandise include all necessary parts and accessories that are included in a unit already manufactured?
- Are they made by the same manufacturer? Is the version the same as advertised?
- Is the product compatible with the hardware/software you intend to use with Macintosh?

PROBLEMS:

If you can’t discount a form or worksheet, it means that you have something linked to it. This may be another form, spreadsheet, worksheet, or statement; or it may be an itemization. Discard the linked item or items first, and then the program lets you discard the original item. If you aren’t sure what documents you have opened, use the Open Forms command to view a complete list of all documents, then delete them manually.

A Form with Two Views
Since IRS forms are often long compared to the dimensions of a compact Mac screen, you may want to see one part of a form while you are working on another part of the same form.

Worksheets menu. This worksheet is similar in design to the actual Schedule K-1 the IRS publishes. MacInTax automatically carries forward the many variations of the K-1-type income and deductions to the proper form and schedule (this is time-consuming, verging on impossible, to do manually with paper forms) and provides an audit trail that backs up the information filed with your return.

Following this recommended worksheet-oriented style, enter your tax payments on the Tax Payments worksheet. If you have federal and/or state withholding, and you complete the W-2 summary worksheet, the Tax Payments worksheet is automatically opened for you. The total of your state payments made in the current tax year automatically carries over to Schedule A and also to the state return.

The program uses the dates of your tax payments, if applicable, to compute the information necessary for Form 2210, Underpayment of Estimated Tax.

Discarding Linked Items
If you can’t discount a form or worksheet, it means that you have something linked to it. This may be another form, spreadsheet, worksheet, or statement; or it may be an itemization. Discard the linked item or items first, and then the program lets you discard the original item. If you aren’t sure what documents you have opened, use the Open Forms command to view a complete list of all documents, then delete them manually.

MacInTax allows you to open the same form twice, placing it in two independently scrollable windows. After opening a form from the menu, hold down the Option key and select the same form again. This opens the form in another window, and you can then independently resize and position the two windows on screen for simultaneous viewing. This doesn’t create another copy of the form, just another view of the same form.

Finely Tuned Fonts
The fonts shipped with MacInTax are individually fine-tuned for each font size to make the text fit properly in crowded forms. Be sure to install all the fonts and sizes recommended for this year’s product for the printers you intend to use with MacInTax (Adobe Type Manager doesn’t fix this situation).

Looking Forward
The advantage of using a sophisticated tax-preparation program is actually two-fold: you make it easier to prepare this year’s return, and you also make it easier to plan ahead. With MacInTax, throughout the year you can plan for filing your taxes by entering the current year’s data in last year’s forms. Specifically, you can put each individual piece of data (that is, each transaction) into an itemization, adding to the file periodically. If all your income appears as a single lump on a W-2 with proper withholding, this is not so critical, but if you are self-employed with several variable sources of income and lots of deductions, it’s a practice that lets you estimate your total tax liability at any point in time. Furthermore, by the end of the year your taxes are almost complete. You can use the Converter on the Utility...
disk to move the accumulated data into the new year's forms.

The program provides two options for converting this data: (1) to bring forward the prior year's tax information that would be applicable to this year's forms, or (2) to transfer all data from last year's forms to this year's. You want this second choice if you have been storing all the transactions in itemization lists.

**First Items of Business**

MacInTax support staff and power users all emphasize the advantages of using the program's itemization capabilities. By using itemizations, you document entries and provide a clear audit trail showing the source of each entry.

Here's an itemization example. Suppose you are a professional actor and want to itemize, on line 2 of Form 2106, your transportation expenses to and from the set of the Woofy-Bits Dog Food commercial. You select Form 2106 from the Forms menu and double-click in the data entry area of line 3 (see "Hot Items"). A blank itemization for that expense then appears. You can also open the itemization for that line by highlighting the line, and then selecting Itemize Line 3 from the Edit menu or pressing #-1.

Now you can enter your transportation expenses into the itemization as shown in "Hot Items." As you enter data, MacInTax automatically totals the expenses and keeps track of the number of items you've entered. MacInTax then posts the total back into Form 2106 on the appropriate line. If you need to include additional transportation expenses to the total at a later time (perhaps you get called back for a cat food follow-on), simply open the itemization again and add the new information. The amounts are automatically updated. This proves valuable as a memory aid not only if you are audited but also when you prepare next year's taxes.

By using nested itemizations, you can create itemizations for individual amounts within the main itemization, for more complete and accurate documentation. To create a nested itemization, open an itemization window for the expense involved. For example, suppose you have entered data on lines a through d of a base itemization.

**HOT ITEMS** Itemizations are a great MacInTax strength—they let you keep running totals through the year, and they provide valuable evidence for audits. Itemization work-sheets pop up when you double-click on fields in the appropriate forms.

ZERO ISN'T NOTHING

Double-clicking on a blank field gets you the worksheet for calculating the field entry. If the field shows a zero, the program sees that as a value and won't help you. When possible, calculate at the worksheet level.
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Here's our list of some of the latest versions of Mac software that were announced at the time we went to press. We hope you'll find it useful. The first price is the upgrade cost for registered owners; the second price is the current list price. (Send your update announcements to Updates, Macworld, 501 Second St., San Francisco, CA 94107.)

AutoSave II version 1.1 is user configurable, with a Save option that can be set for time periods of from 1 to 99 minutes and lets you use automatic saves for up to 50 programs. Also includes an Ask Before Saving feature that allows you to temporarily disable the auto-save feature on a document-by-document basis. Magic Software, 402/291-0670 or 800/342-6243. Contact vendor for upgrade cost; $49.95 new.

BackFax version 1.5 adds the option to have Send and Receive automatically turn on at the time you start the computer. Also enables user to create a complex fax from several different programs. Solutions, 802/658-5506. Contact dealer for update policy.

ScriptEdit version 2.0 lets you edit HyperCard scripts while the program is active. Has five Clipboards that can each store up to 32,000 lines of text; has a menu that displays all handlers or functions in the current script; and includes GREP searching, which allows user to search for script text based on a description of the text. Somak Software, 619/942-2566. $25; $99.95 new.

Virex version 2.84 combats three additional Mac strains of the ZUC and nVIR viruses. HJC Software, 919/490-1277. $15; $99.95 new.

## PRODUCT UPDATES

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**Bold** — last time the product is being listed.

* = minor update.

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**Req.** — min. RAM and system software required.

**Rev.** — last time (fin past year) reviewed this or an earlier version.

**Price** — cost for update to registered owners. 

* — contact your dealer for update policy.
## PRODUCT UPDATES

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**DISK DRIVE LOCK™**

PROTECT THE INFORMATION YOU DEPEND ON!

- Prevent anyone from copying your data.
- Protect your data from harmful viruses.
- Prevent the unauthorized use of your drive.
- Installs easily and quickly - just lock it on.
- Removes easily and quickly

Macintosh models DLK-260 & DLK-261 to fit Mac drives. Model available for 5 1/4" & 3 1/2" drives to fit IBM and compatibles.

Quantity pricing available. Purchase orders accepted. Send for catalog.

**Secure-It, Inc.** 18 Maple Ct East Longmeadow, MA 01028
1-800-451-7592

Circle 239 on reader service card.

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**GeoSell!**

Frankly, if we had your customer list, we'd dump it. Right into GeoQuery. The software that turns any ordinary list into an instant, interactive sales map.

For a free GeoQuery demo disk, call 1-800-541-0181. It's the one call that can make your other calls really pay off.

**GeoQuery**

Put Your Business On The Map.™

1-800-541-0181

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1-800-451-7592

Circle 239 on reader service card.
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To have products listed in this section, send upgraded software, an outline of changes since the previous release (indicate if it's a maintenance upgrade), upgrade price, minimum RAM and system software, suggested retail price, company name, mailing address, and phone number to Updates, Macworld, 501 Second St., San Francisco, CA 94107.
In an unprecedented move, Key Tronic Corporation introduces the first limited "lifetime warranty" for our new MacPro Plus™ keyboard! We're so sure of the reliability, so proud of the quality and so committed to customer satisfaction that we've decided to put our product on the ultimate line. If your MacPro Plus should quit working before you do — and it's our fault — we will repair or replace it. Free!

Warranties are important — but so are product features. The MacPro Plus is compatible with all Macintosh® computers. The 105-key layout offers productivity features such as interchangeable Caps Lock and Ctrl keys, period/comma lock capability, adjustable key feel and dual legend keycaps to provide easier, more efficient use of your Mac.

If that's not reason enough to use a MacPro Plus, we'll throw in a free copy of Tempo II™ a macro package from Affinity Microsystems ($149.00 suggested retail price), and the connecting cable you need for your Mac ($14.95 suggested retail price), just for the asking. This means you get a $368 value in a $179.00 keyboard, plus a warranty against manufacturer defects that lasts a lifetime.

All you have to do is ask for the Key Tronic® MacPro Plus — the first and last word in keyboard performance, value and reliability!

Call us for more information at 1-800-262-6006 (within Washington State or from Canada, call 509-927-5515).

*So long as the original purchaser owns the product. Some additional conditions apply. See full text of warranty.

Circle 289 on reader service card
Now that the new Macintosh you've always wanted is finally within reach, you'll no doubt also want all the software you can get your hands on.

That would be Microsoft® Works.
Works comes with a word processor for reports, memos and letters.

There's also a spreadsheet for number-crunching and business graphics. A database for managing lists. Communications capabilities. And, of course, drawing tools (after all, this is a Mac).

Works is powerful, easy to learn and marvelously affordable. And now it comes with a free Small Business Success Kit—a $120 value. For the dealer nearest you, call (800) 541-1261, Dept. P62.

Then go get that Mac. Get Microsoft Works. And get going.
WHERE TO BUY
A Guide to Products Featured in This Issue

This listing provides companies and phone numbers for products mentioned in this issue. Allow several weeks for responses to reader service inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

Reader Service


Adobe Type Manager: Adobe Systems; 415/961-4400, 800/544-8835; fax 415/961-3769.


Algebra I Homework Tutor: Missing Link Software; 201/721-2560.

AutoMac II: Microsoft Corp.; 206/882-8080, 800/462-9400; fax 206/883-8101.


Brainstorm series: Brainstorm; 415/569-2151; fax 415/569-2155.

Bubble Help for HyperCard: Randal Jones; 22307 65th Ave. W. Mountlake Terrace, WA 98043.

Bus Adaptor Card: Pinnacle Systems; 415/569-8288; fax 415/569-8297.

Sales International: 408 559-8544, 800/622-1722.


Color MacCheese: Delta Tao Software; 408/730-9556; fax 408/730-9337.

Color Studio: Ivernet; 201/845-6100, 800/435-8973; fax 201/645-4708.

Cosmic Osmo: Activation; 415/329-0800, 800/227-6000; fax 415/522-0260.

The Dancing Mouse: Wonderthread Learning Center; 604/876-5006.

Desk: Digidesign; 415/688-0600, 800/333-2137.

DeskPaint & DeskDraw: Zedcor; 602/881-1841.

Desktop Mike: Articulate 1999; 800/473-4776; fax 408/952-7100, 800/962-3434.

Dialoger Professional: theResult Software; 919/490-3292, 800/365-9304; fax 919/490-2903.


Double-Time 16: Arc; 617/890-4402, 800/232-1269; fax 617/890-8415.

Earthquake Preparedness Stack: Data Systems; 415/854-8288; fax 415/854-8297.

Earthquest: Earthquest; 415/521-5838; fax 415/522-3817.

Easy Color Paint: Creative Software; 201/665-9661, 800/367-6899.


El Verbo Simple: Jason Sluzevich; 719/598-4670.

Ethereal Products: 408/764-5000, 800/384-5003.

Apple Computer: 408/595-1010, 800/776-2333; fax 408/974-6726.

APT Communications: 301/831-1182, 800/842-0626; fax 301/831-5255.

Asante Technologies: 408/734-4844, 800/662-9666; fax 408/734-4846.


Dayna Communications: 801/531-203, 801/359-9135.


Farallon Computing: 415/595-9100; fax 415/595-9200.


MacProducts USA: 512/343-9560, 800/622-3475; fax 512/343-6141.

National Semiconductor Corp.: 408/721-5000; fax 408/970-0905.

Network Resources Corp.: 408/263-8100; fax 408/263-8121.

NetWorth: 214/869-1331; 800/544-5255; fax 214/556-0841.

Navatech: 415/311-7815; 800/468-8682; fax 415/311-6445.

Rascal Interplan: 908/263-9929, 800/526-8255.

Shiva Corp.: 617/252-6300, 800/498-3550.

Sulane Electronics: 619/490-5050; fax 619/490-5055.

Technology Works: 512/794-8533, 800/688-7466; fax 512/794-8520.

Tri-Data Systems: 408/727-3270, 800/874-3282; fax 408/980-6565.

Ungermann-Bass: 800/999-3236.

Webster Computer Corp.: 408/954-8054; fax 408/954-1832.


FastTrack: Computer System Associates; 619/566-3911; fax 619/566-0381.

Hyper-ABLEDATA: Trace Research and Development Center; 608/262-6966; fax 608/262-8848.

HyperMailbox: Kenji Takeuchi; 312/241-6322.

HyperRegister: George Pytluk; 604/533-4706.

INTERFACE: Bright Star Technology; 206/451-5697; fax 206/454-1062.

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225

DATEASK
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137

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ColorPage T16
2120

MASTERCARD
Color II
500

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2120

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- Compatibility guaranteed. 
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- $3. Airborne Overnight continental US. 
- Hardware over 10 lbs will be shipped ground. 
- Same day shipping.
- Returns
- Call for a R.A. number before return.
- Restocking fee may apply.
- Money Back Guarantee.
- Most products have a 30-day money back guarantee. Please inquire when you order.

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Since 1987

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Quantum Internal</th>
<th>Quantum External</th>
<th>Value Internal</th>
<th>Value External</th>
<th>Super Value External*</th>
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</table>

Two year warranty on Quantum drives, one year warranty on Value and 90 days on Super Value drives. *Thirty day warranty on used drives, available in limited quantities.

Trade in your old drives:
100MB Quantum External $50 off with trade
200MB Quantum External $100 off with trade
45MB Removables and Up
Call us about your other drives

Macintosh Memory

<table>
<thead>
<tr>
<th>Model</th>
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<tr>
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<td>1X6 SIMMs 80ns</td>
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IBM Memory

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<td>IBM PS/2 M-70/2MB</td>
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<td>Compaq Deskpro 386/4MB</td>
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<td>IBM PS/1/2MB</td>
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<td>Sun Model 3160 4/40 Sparc / 4MB</td>
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Parts

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<td>Fans</td>
<td>$10</td>
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<tr>
<td>Power Supplies</td>
<td>$50</td>
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</table>

CD-ROM for $549

- Toshiba CD-ROM Drive
- Sample Disk
- All connecting hardware
- 1 year warranty

Look for the “Others” $15 handling fee while we club them with VALUES
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**HARD TO BELIEVE**
- We buy quality components in huge volume & pass the savings to you!

**It's easy to see why**
**POWERDRives are**

**HARD TO RESIST**

---

<table>
<thead>
<tr>
<th>Mbytes</th>
<th>Mechanism</th>
<th>Access</th>
<th>Int.</th>
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<td>Removable SyQuest</td>
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<td></td>
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<td>$575</td>
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</table>

25ms. Includes 45Mb cartridge. Extra Cartridge $5.75.

**CD/ROM** $599

External optical storage unit. 150ms access time.
Uses Toshiba or Chirnn mechanism - your choice.

**Memory Upgrades**
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**150Mb Teac Tape Backup** (w/ tapes) $599

Ext. incl. "Express Tape" software. Extra Tape $49.
### DISKETTES

<table>
<thead>
<tr>
<th>Size</th>
<th>Density</th>
<th>Price</th>
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<tr>
<td>5.25&quot; DS</td>
<td>1 MB</td>
<td>$4.99</td>
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<tr>
<td>5.25&quot; HD</td>
<td>2 MB</td>
<td>$7.29</td>
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### DATA CARTRIDGES

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<td>DC 2000</td>
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<td>DC 3000</td>
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<td>DC 3120</td>
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### TAPE BACKUP PRODUCTS

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<td>Black Tape (700-2400-CS)</td>
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<td>DEC TK-50</td>
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<td>DEC TK-70</td>
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### DISKETTE CONNECTION

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<td>CS-500 HD</td>
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<td>CS-600 HD</td>
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### DISKETTE CONNECTOR

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<tr>
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<td>$15.95</td>
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### OPTICAL DISK - CALL for PRICES

<table>
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<th>Size</th>
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<tr>
<td>5.25&quot; Double Side (18188)</td>
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<td>5.25&quot; DS Data Tape Plus (87066)</td>
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<td>5.25&quot; High Density (88268)</td>
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<td>5.25&quot; HD Data Tape Plus (87262)</td>
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<tr>
<td>3.5&quot; IBM Format (87410)</td>
<td>$15.65</td>
</tr>
</tbody>
</table>

### THE BEST COLLECTION OF CONNECTIVITY PRODUCTS EVER ASSEMBLED

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---

**The Third Wave Shopping Mart**

**Storage Devices**

<table>
<thead>
<tr>
<th>Quantum</th>
<th>Internal Standard Premium</th>
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<tr>
<td>40</td>
<td>18ms (12ms with Cache)</td>
</tr>
<tr>
<td>52L</td>
<td>17ms (&lt;12ms with Cache)</td>
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<td>105</td>
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**Media**

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**SIMMs**

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<td>IHC SIMMs (1, 4mb)</td>
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**UltraCombos**

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**Video, Printers, Add-ons**

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<tr>
<td>DayStar Powercards</td>
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<tr>
<td>Radius Accelerators</td>
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<td>TT MicroLaser PS35</td>
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<td>Seiko ColorPoint PS</td>
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<td>Microtek3002S Color</td>
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<td>Epson ES300C (600 dpi)</td>
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**Combo Drives**

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<td>SuperMac Video Systems</td>
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<td>Seiko Triton 14&quot;</td>
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<td>Sony 1304 14&quot;</td>
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<tr>
<td>Ikekami Triton 19&quot;</td>
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Circle 114 on reader service card

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Third Wave Computing
18268 Kramer Lane, Austin, Texas 78758 (512) 832-8262 • (512) 832-1533 (FAX)

Graphic Design ©Three A, D, Inc., 1991, Photography ©Jack Purcell Photography, 1990-91. This ad was produced using a Macintosh IIc, Macintosh IIfx, Macintosh IIx, with Third Wave removable drives. Quantum 1015 internal drives, a Nikon LS slide scanner and a Microtek 3002S color scanner. It was output on a Compugraphic 9600. Software used includes Adobe Illustrator, Adobe Photoshop, PageMaker, and Microsoft Word. (Macintosh, Illustrator, Photoshop, PageMaker, Quantum and Word are trademarks of their respective companies.)

Most deliveries via Federal Express.

(800) 284-0486
<table>
<thead>
<tr>
<th>Laser Printer Sale</th>
<th>ScripTEN PostScript Laser Printer</th>
<th>CrystalPrint Publisher I Laser Printer</th>
<th>CrystalPrint Publisher II Laser Printer</th>
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<td><strong>$1,649</strong></td>
<td><strong>$1,899</strong></td>
<td><strong>$2,395</strong></td>
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<td></td>
<td>10 Pages per minute</td>
<td>8 Pages per minute</td>
<td>8 Pages per minute</td>
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<td>11 Font Families (35 typefaces)</td>
<td>11 Font Families (39 typefaces)</td>
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<td>Solid Blacks for graphics</td>
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<td>Solid Blacks for graphics</td>
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<td>Letter, Legal and transparencies</td>
<td>Letter, Legal and transparencies</td>
<td>Letter, Legal and transparencies</td>
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<table>
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<tr>
<th></th>
<th>PS17 Microlaser PostScript Laser Printer</th>
<th>PS35 Microlaser PostScript Laser Printer</th>
<th>QMS-PS® 410 PostScript Laser Printer</th>
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<tbody>
<tr>
<td></td>
<td><strong>$1,499</strong></td>
<td><strong>$1,799</strong></td>
<td><strong>$1,999</strong></td>
</tr>
<tr>
<td></td>
<td>1.5 Megabytes of RAM</td>
<td>1.5 Megabytes of RAM</td>
<td>2 Megabytes of RAM</td>
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<tr>
<td></td>
<td>6 pages per minute</td>
<td>6 pages per minute</td>
<td>4 pages per minute</td>
</tr>
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<td></td>
<td>17 typefaces</td>
<td>35 typefaces</td>
<td>Letter, legal, envelopes, and</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>transparencies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Auto switching between Macintosh and</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>IBM</td>
</tr>
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</table>

PostScript® is a registered trademark of Adobe Systems Incorporated.

Visa, MasterCard, and American Express accepted NO surcharge. Your Credit Card will not be charged until your order is shipped. We accept COD orders, additional $5.00 charge. AZ residents add 6.5%. All shipments made by Federal Express.

Standard Air which is 1 to 2 day service. COD's Shipped by UPS 2 day air. Call for shipping costs. Products purchased in error are subject to a 20% restocking fee. All prices subject to change without notice. All products subject to availability.
### Scanners

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care</td>
<td>Typist</td>
<td>$459</td>
</tr>
<tr>
<td>Microtek</td>
<td>300GS</td>
<td>$1,249</td>
</tr>
<tr>
<td></td>
<td>300ZS</td>
<td>$1,699</td>
</tr>
<tr>
<td>Abaton</td>
<td>300GS</td>
<td>$1,199</td>
</tr>
</tbody>
</table>

### Special

- **Texas Instruments**
  - PS 17 Microlaser with Interface: $1,499
  - PS 35 Microlaser with Interface: $1,699

### Monitor Systems

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnavox</td>
<td>TWO YEAR WARRANTY 14&quot; Color Monitor</td>
<td>$439</td>
</tr>
<tr>
<td></td>
<td>MacSync 14&quot; Color Monitor</td>
<td>$439</td>
</tr>
<tr>
<td></td>
<td>Seiko 14&quot; Color Monitor</td>
<td>$589</td>
</tr>
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</table>

### Removable Disk Drives

**Special**

- **SyQuest 42 Removable Cartridge**
  - $439 (cartridge not included)

### Hard Disk Drives

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imprimis</td>
<td>300</td>
<td>$1,349</td>
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<tr>
<td></td>
<td>330</td>
<td>$1,499</td>
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<tr>
<td></td>
<td>360</td>
<td>$1,799</td>
</tr>
<tr>
<td>Quantum</td>
<td>120</td>
<td>$589</td>
</tr>
<tr>
<td></td>
<td>170</td>
<td>$679</td>
</tr>
<tr>
<td></td>
<td>210</td>
<td>$849</td>
</tr>
<tr>
<td></td>
<td>24S</td>
<td>$549</td>
</tr>
<tr>
<td></td>
<td>24L</td>
<td>$2,699</td>
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### Fax Modems

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abaton</td>
<td>InterFax 24/96</td>
<td>$289</td>
</tr>
<tr>
<td></td>
<td>Dove 24/96</td>
<td>$279</td>
</tr>
<tr>
<td></td>
<td>Orchid 24/96</td>
<td>$419</td>
</tr>
</tbody>
</table>

### Accelerators

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DayStar Digital</td>
<td>Fast Cache 12i</td>
<td>$269</td>
</tr>
<tr>
<td></td>
<td>PowerCache 40 MHz</td>
<td>$929</td>
</tr>
<tr>
<td></td>
<td>PowerCache 50 MHz</td>
<td>$1,649</td>
</tr>
<tr>
<td>Radius</td>
<td>Accelerator 16 for Plus/SE</td>
<td>$599</td>
</tr>
<tr>
<td></td>
<td>Accelerator 25 for SE</td>
<td>$999</td>
</tr>
</tbody>
</table>

### Fax Modems

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abaton</td>
<td>InterFax Modem 24/96</td>
<td>$289</td>
</tr>
<tr>
<td>Dove</td>
<td>24/96 Fax Modem</td>
<td>$279</td>
</tr>
<tr>
<td>Orchid</td>
<td>24/96 Fax Modem</td>
<td>$419</td>
</tr>
</tbody>
</table>

### UPS

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>Safe Power Systems</td>
<td>Safe 250</td>
<td>$189</td>
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<tr>
<td></td>
<td>Safe 400S</td>
<td>$369</td>
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### Memory

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imprimis</td>
<td>TWO YEAR WARRANTY</td>
<td>$299/$399</td>
</tr>
<tr>
<td></td>
<td>180</td>
<td>$399/$459</td>
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<tr>
<td></td>
<td>170</td>
<td>$589/$689</td>
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<td></td>
<td>120</td>
<td>$879/$779</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>$1,269</td>
</tr>
</tbody>
</table>

### Printers

<table>
<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kodak</td>
<td>Diconix Color 4 Printer</td>
<td>$1,169</td>
</tr>
<tr>
<td>NEC</td>
<td>SlientWriter 90</td>
<td>$1,699</td>
</tr>
<tr>
<td>OMS</td>
<td>QMS PS410 PostScript</td>
<td>$1,999</td>
</tr>
<tr>
<td>Qume</td>
<td>CrystalPrint Publisher I</td>
<td>$1,899</td>
</tr>
<tr>
<td></td>
<td>CrystalPrint Publisher II</td>
<td>$2,395</td>
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<tr>
<td></td>
<td>ScripTEN PostScript</td>
<td>$1,649</td>
</tr>
<tr>
<td></td>
<td>Smart Label Printer</td>
<td>$199</td>
</tr>
</tbody>
</table>

### Special

- **NEC**
  - Portable CD with Interface: $449
  - External CD with Interface: $499

*while supplies last

For Ordering and Technical Support Call 1-800-333-3353 (FAX #602-345-2217)

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- **8-Bit Business System.**
  - 8.1 Video Card non Upgradable, 20" (17" enamelled monitor) (CT20)...
  - 75 Hz...
  - $2795

- **8-Bit SystemPro 20**.
  - VisionPro* VideoCard, 20" Hologram Trinitron (CT20).
  - 75 Hz...
  - $3249

24-bit VisionPro Interface Upgrade Kit

With purchase of any system...

- $600

- **All VisionPro Interface cards have multi-monitor support**, (Sony 19" & Apple 13"), support BlockRead transfer & acceleration, Upgradeable 8-bit to 24-bit cards, Pan/Zoom 2X & 4X and virtual desktop. Business system video cards offers Pan/Zoom 2X & 4X and virtual desktop.

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  - Apple 13" RGB...
  - $749
  - Seiko 14" Trinitron CM 1445 Hi-Res Monitor w/Tr/Swivel...
  - $589
  - Hitachi 14" MVX Super Hi-Res Monitor w/Tr/Swivel...
  - $575

**Video Interface/cards**

- **8-Bit Vision ST 813** for 13" or 14" Monitor...
  - $275
  - 24-Bit Vision ST 2413...
  - $375

**Vision ST Upgrade Kit (8 - 24 Bit)**...

- $135

**VisionPro 8 - 24 Bit Upgrade Kit**...

- $700

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- MacClassic i fully loaded...
  - $1219
  - Mac SE/30...
  - $1499
  - Mac LC...
  - $2149
  - Mac II...
  - $2499

- Also fax/call for quote on complete Apple Macintosh pro... (fines on the above).

- **Corporations, (on approval)**...
  - **Bids requested**

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- **1Mb**
  - Surface Mounted ...
  - $43

- **2Mb**
  - Surface Mounted ...
  - $44

- **4Mb**
  - $159

**NEW**

- 32Mb Dallas MicroPro 17.3Mb memory upgrade...
  - $139

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- **MacTel Extended Keyboards:**
  - English...
  - $99
  - German...
  - $119

- **Golden Triangle**: Disk/Win - CALL

- **Syquest Technology**
  - SQ 400...
  - $69

- **Texas Instruments**
  - MicroLaser PS-17
    - w/17 fonts...
    - $1599
  - MicroLaser PS-35
    - w/35 fonts...
    - $1899
  - 1Mb TM MicroLaser PS card XL...
    - $139
  - MicroLaser XL...
    - $149

- **Ordering informations**

- No exchange for Visa or MasterCard. Your credit card will be charged until your order is ready to ship, upon receipt and will be charged for the total amount of the order, shipping and handling included.

- Payment can be made by credit card, check, money order, company purchase order or Visa/MASTERCARD.

- Payment must be received prior to shipping.

- **Shipping and handling charges are not included**. For complete shipping details, please consult the MacTel product catalog.

- **Pricing is subject to change without notice** and all products subject to availability.

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**Also ask for:**

- **Removable & Cartridges system**

**INDEX Hard Drives**

- **Economy series**:
  - All INDEX Economy drives include MacTel HD Utilities and 1.4 Mb PD.

- **Quantum 3.5”**
  - ProDrive HD
    - 40 Mb 12 ms...
    - $1299
  - 52 Mb 12 ms...
    - $1339
  - 80 Mb 12 ms...
    - $1479
  - 105 Mb 12 ms...
    - $1499
  - 170 Mb 12 ms...
    - $1729
  - 210 Mb 12 ms...
    - $1849

- **Imprimis 5.25”**
  - Wren Half-Height drives
    - 445 Mb 15 ms...
    - $1699
  - 320 Mb 16 ms...
    - $1259
  - 330 Mb 16 ms...
    - $1619
  - 640 Mb 10 ms...
    - $1819
  - 650 Mb 10,7 ms...
    - $1900
  - 1,2 Gb 16 ms...
    - $2099

**All INTERNAL DRIVES** include Bracket cables and software, everything to plug-N-go.

- Fits only MacInt/Clax & Maciiff. All INDEX externals Harddrives are supplied with universal power supplies, for world-wide adaptability. Backmatic V-2 and AutoSave II are registered trademarks. All INDEX “ELITE” harddrives are bundled with Backmatic V-2 & AutoSave II software.

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**France**: 033/87-73-83-20

**Circle 142 on reader service card**

---

**mactel**

**Technology Corporation**

**Professional Solutions For Today’s Macintosh Professional.**
### A Few Magic Tricks

#### Magic Hard Drives

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Size</th>
<th>Price</th>
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<tbody>
<tr>
<td>Quantum</td>
<td>40 MB hard drive</td>
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<td>$259</td>
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<td>Quantum</td>
<td>80 MB hard drive</td>
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<td>Quantum</td>
<td>160 MB hard drive</td>
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<tr>
<td>Quantum</td>
<td>240 MB hard drive</td>
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#### Magic Tape Backup

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<tr>
<td>MagiTape 60</td>
<td>1/4&quot; tape</td>
<td>$679</td>
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<tr>
<td>MagiTape 55</td>
<td>1/4&quot; tape</td>
<td>$699</td>
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<tr>
<td>MagiTape 13 1/4&quot;</td>
<td>1/4&quot; tape</td>
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#### Magic Video

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<thead>
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<th>Model</th>
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<tbody>
<tr>
<td>MagicView 19&quot; B/W Plus W/remote</td>
<td>19&quot; inch</td>
<td>$2099</td>
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<tr>
<td>MagicView 19&quot; B/W Plus W/remote</td>
<td>19&quot; inch</td>
<td>$2999</td>
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<tr>
<td>MagicView 19&quot; B/W Plus W/remote</td>
<td>19&quot; inch</td>
<td>$3999</td>
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#### Magic Modems, & Fax Modems

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<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
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<tr>
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<tr>
<td>Magic Modems</td>
<td>56K modems</td>
<td>$299</td>
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#### Magic Networking

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<tr>
<td>MagicNet</td>
<td>10MB network</td>
<td>$18</td>
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<tr>
<td>MagicEthernet</td>
<td>10/100 BASE-T</td>
<td>$249</td>
</tr>
<tr>
<td>MagicEthernet</td>
<td>10/100 BASE-T</td>
<td>$249</td>
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#### Connectors

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
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<td>A/V connectors</td>
<td>56K modems</td>
<td>$99</td>
</tr>
<tr>
<td>A/V connectors</td>
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<td>$199</td>
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<tr>
<td>A/V connectors</td>
<td>56K modems</td>
<td>$299</td>
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</tbody>
</table>

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- **MacProducts USA 1-800-MAC-DISK**
- **MacProducts Canada 1-800-624-3475**
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- **Thailand 622234 7531**
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DayStar 33, 40 & 50 MHz PowerCard Call!
DayStar SCSI PowerCard (0 Meg) $995
I'R 32K IICi Cache Card Call!!
Sigma DoubleUp Data Compression Card Call!!
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I'R SE/FX 40 MHz 68030 $1995
(with 68822, 32K Cache, 4 SIMM Sockets!!)

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E-Machines T16 $1395
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Sigma PageView Call!
SuperMac SuperMatch Call!!

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Pinnacle Micro Call!
Mass Micro MO Call!
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Storage Dimensions Worm $2725
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NEC Portable $395
Toshiba $695
Pioneer DRM-600 Minichanger Call!

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Mass Micro DataPak $649
FWB HammerDisk44 Call!

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Challenger VP2400 V.42 bis (MacUser #1) $175
Hayes V-Series Ultra 9600 $795
Practical Peripherals 9600SA $499
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- **You Pay** $3,049

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- Macintosh Classic, 4mb RAM, 105mb hard drive, 144mb FDHD, Apple Classic Keyboard, Classic Monochrome built-in display.
- **You Pay** $1,689

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- **You Pay** $7,269

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- **You Pay** $4,955

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- RasterOps 24s NEW: $339
- RasterOps 24s: $799
- Radius Pivot/GS: $1,195
- RasterOps 24L 19" System: $549
- Radius Pivot/GS: $330
- Insignia 20" Trinitron: $1,859
- Apple RGB 13" High Res: $690
- Seiko 14" CM-1445 Color: $559
- MacSync 14" Color Monitor: $425

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- Tl MicroLaser/PS35: $1,799
- Ti MicroLaser/PS17: $1,689
- NEC Silent Writer 2 Model 10: $1,599
- QMS ColorScript 100: $7489
- Apple LaserWriter PNT: $2,200
- Express Phone Net Connector: $20

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- All APPLE prices: Call
- All RasterOps prices: Call
- All NEC prices: Call
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<tr>
<th>Capacity</th>
<th>Internal</th>
<th>External</th>
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<tbody>
<tr>
<td>40 mb</td>
<td>$299</td>
<td>$389</td>
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<td>52</td>
<td>329</td>
<td>429</td>
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<td>105</td>
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<td>105 LPS</td>
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<td>120</td>
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<td>170</td>
<td>729</td>
<td>829</td>
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<td>210</td>
<td>859</td>
<td>959</td>
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### MAXTOR 15 - 17ms Access

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<thead>
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<th>Capacity</th>
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<th>External</th>
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<tbody>
<tr>
<td>40</td>
<td>Low Profile, fits LC, Classic &amp; Si tool!</td>
<td>$299</td>
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<tr>
<td>80</td>
<td>Low Profile, fits LC, Classic &amp; Si tool!</td>
<td>429</td>
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<td>200</td>
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<td>859</td>
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### Conner 25ms Access

<table>
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<th>Capacity</th>
<th>Internal</th>
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<tr>
<td>40</td>
<td>Low Profile, fits LC, Classic &amp; Si tool!</td>
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<td>120</td>
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### Syquest

- 45 meg Removable: $549
- Dual 45 Meg: $999

- All include one cartridge + $72 per cartridge for additional cartridges

### Teac 155mb

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Internal</th>
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<tbody>
<tr>
<td>173</td>
<td>Half Height 999</td>
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<td>300</td>
<td>Half Height 1499</td>
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<td>300 mb</td>
<td>Half Height 1249</td>
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<td>Half Height 1499</td>
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<td>425</td>
<td>Half Height 1899</td>
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<td>630</td>
<td>2199</td>
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<td>1 Gig</td>
<td>2999</td>
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### WREN Drives 10.7 - 16ms Access

- Quantum & Maxtor 200 Internal Drives fit Mac I/II/SE/SE30/Cv/CIFc
- Conner & Maxtor 40 and 80 Internal drives fit Mac IIS/LC and Classic
- WREN Internal Drives fit Mac I/IIIC/IIIFc

### Syquest

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## Software

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## Accessories

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<td>Internal</td>
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(Macworld Subscriber Study 1990)

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(Macworld Subscriber Study 1990)

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The Macworld Catalog

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Over 150,000 sold!

Mouse

PLASTIC: Blue, Platinum, Gray, Red & Black

Size: 81/2x11

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725.75 144 5.25

72 3.00 3.25 3.50

$75.00 $45.00

MacInKer™, the Automatic Ribbon Re-inker, re-inks any printer ribbon (black & color) for 5 c.

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Free shipping! Choice of materials:

COTTON CANVAS MAC, SE, II, & PRINTERS Beige w/Gray Trim Breathable Static-Free

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MAC, SE, II, & PRINTERS

Beige w/Gray Trim Breathable Static-Free

NEW! Seal-Skins for Keyboards

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Turn to the Product Launch Section of Macworld for information on the new products in the Macintosh industry.

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DIDADADODAT?

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DeskPaint supports B&W, Gray Scale, and Color bitmaps (2, 4, 8, 16, and 24 bit), PICT2, TIFF, and MacPaint® files, filters, rulers, soften, blend, intelligent lasso and paint bucket, transparent paint, graduated fills, distort, free rotate, multiple windows, and more.

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You can create calm and beauty where you live, too.
Join me and plant a tree.
For your free booklet, write:
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Nebraska City, NE 68410.

The National Arbor Day Foundation
Let NewGen satisfy your hunger for high-resolution with an affordable 800 dpi printer!

Add powerful applications like PageMaker®, FreeHand® and Adobe® Type Fonts to produce typeset quality output at your own facility.

The NewGen TurboPS/480 can produce PostScript® language compatible output at 800 x 400 dpi, nearly four times the resolution of other laser printers. And when we say PostScript compatible, we mean it, including Type 1 fonts, special effects and EPS files from all your favorite applications and programs.

The NewGen TurboPS/480 is a complete printer with built-in AppleTalk®, parallel and serial ports. And unlike some printers, it works in mixed Mac-PC environments, and it doesn't require an internal PC processing board or dedicated server.

To show you how confident we are that you'll be impressed with 800 x 400 dpi output, we printed this page at actual size, including the menu which was output as color separations.

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Dealer inquiries welcome.

Resolution close up, 18 point Garamond Italic enlarged 500%
# Best-Sellers

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<td>Recent or forthcoming products of particular interest.</td>
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| Meeting Maker | On Technology |
| Group calendaring software |
| SpaceShip Warlock | Reactor |
| Interactive science fiction adventure on CD |
| FontMonger | Ares Software Corporation |
| Font-format conversion between PostScript and TrueType |

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during December 1990.

*Does not include hard drives installed at the factory.
"The Abaton scanner gave me great definition in just minutes."

Every issue of my newsletter takes shape easily now that I use the Abaton Scan 300/GS. Because this 8-bit scanner delivers 256 shades of gray. That's 240 more than the 16 shades you get from a 4-bit scanner. And that means each scanned image has more tone and better definition.

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You're tripping over your keyboard. Your CPU needs its own desk. Your monitor is too low. That report you're working on has vanished. Paper is everywhere.

But don't give up.
What you need is some help from Kensington.
Increase valuable desk space with our new Keyboard Shelf for the compact Mac, or with Keyboard Slideaway® for the Mac II.
Both do more than just get your keyboard out of the way.
Keyboard Shelf's recessed storage compartment is ideal for holding pens, disks and other desk items. And Keyboard Slideaway extends a narrow desktop into a wider workspace.

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What's more, Kensington's products fit right in with the design of your Mac. The styling is complementary. The colors identical. Even the same materials are used.

Kensington.
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