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StartUp

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Fifth Annual
MacUser
Editors’ Choice Awards
BY THE EDITORS OF
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Our annual salute to the best
new Macintosh hardware and
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before. After surveying a
strong field of contenders,
we picked the winners and
runners-up in more than 40
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It's no accident that the high performance of Canvas™ evokes images of a jet fighter in full flight.

Fact is, its technical drawing power renders Canvas remarkably adept at evoking almost any kind of image you could want.

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About MacUser

The Golden Guys

Who’s shorter than Andy Hertzfeld, weighs less than Inside Macintosh and started hefting a Mac long before the Portable was even a glint in Jean-Louis’ ear? MacUser’s Eddy, of course.

The solid bronze symbol of MacUser’s annual Editors’ Choice Awards may not be as widely known as his distant cousins Oscar, Emmy, and Tony, but when the winners are announced at our gala ceremony, the nominees’ hearts pound just as audibly. Just page through the advertisements in MacUser (or any other Mac magazine, for that matter) to see how proud past and present recipients are of their Eddies.

1990 marks the fifth year that MacUser’s editors have singled out the best new products for the Mac, and plenty has changed since January 1986 — for both the Mac community and its most prestigious award. When Eddy debuted, it wasn’t clear whether he was a she or a he. Not until a real statue was sculpted by noted Mac artist Mike Saenz the next year was the issue resolved.

And not until those first statues arrived did we realize that the figure needed a name. Fortunately, no one could agree on how to spell Macie (Macey? Mackie?), so Eddy carried the day.

Since then, Eddy has changed little outwardly, though he finally traded up to an SE in 1989 (long after the rest of the MacUser office had done so). The awards he represents, however, have had to keep pace with a fast-growing and constantly evolving market.

Back in 1986, we recognized just 22 categories — all of them for software products. This year, we’re recognizing 40 categories in both software and hardware. In addition, this year we introduce two special Eddies that will be awarded to individuals in the Mac community. One recognizes distinguished achievement; the other salutes a rising star.

So look for the man with the Mac in his hands — he’s MacUser’s symbol of quality, innovation, and excellence.

New Guy in Town

This issue of MacUser sees some important changes. Longtime contributing editor Jim Seymour is leaving us after many months of insightful analysis. We’ll miss his unique perspective on the Mac. At the same time, we’re delighted to welcome a new columnist and contributor who has a distinctly personal outlook on the Mac — Guy Kawasaki. This former Mac evangelist, ex-software CEO of A&JUS, and current best-selling author will share his thoughts on the Macintosh Way every month — both in a regular column and with regular excerpts of the world according to Guy that will add a little irreverence to our Start-Up section. Watch out, Dvorak!
Four reasons why 1990 will be the year of the workgroup.

It's already happening. More and more companies are embracing the idea of workgroup computing. For good reasons, too. Like the ability to swap files, send electronic mail, share printers, and work together more effectively than ever before.

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LETTERS

Japanese reader Tetsuya Ishikawa writes that he was "surprised at 'To John Sculley from Japanese Macintosh Users' (December '89, pages 106 and 107). I wonder why MacUser's editors quoted the article in Japanese instead of English? I don't think U.S. readers do understand the article." In case anyone else was confused, the "article" was an eye-catching-but-enigmatic advertisement by Pascal, a Japanese distributor. Tetsuya's right, though: We've haven't a clue as to what it says. We do have it on good faith, though, that it's no more litigious than the rest of the magazine.

ATM: PostScript, not Posthaste

Adobe Type Manager (ATM) made my Mac Plus slower than a Commodore 64, even after I adjusted the RAM cache per Adobe's manual. In Ready.Set.Go! 4.5, for example, the screen scrolls like molasses, and it takes 90 seconds or more for text to change after I select a new type size or font. Worse yet, whenever I try to send documents to the DeskWriter, I get an error message telling me my printer is out of memory after only half a page has printed.

What gives? Although Adobe advertises compatibility with only a minimum Mac Plus, is it possible that I have to upgrade to 2 megabytes of memory in order to use ATM?

Marcy Poulos
Grand Rapids, MI

Unfortunately, comparable as used by software publishers doesn't always translate to practical as used by software purchasers. As our February '90 review of ATM indicated, the program is very slow on 68000-based Macs and uses 200K of RAM, which severely limits its usefulness for owners of 1-megabyte machines.

— JB

Truth in Typesetting

MacUser's December '89 issue carries an ad for Adobe Type Manager. The ad shows "unretouched photographs" of a Mac Plus running Word 4.0 and an ImageWriter printing out the document.

I purchased ATM, installed it on my Mac Plus, launched Word 4.0, and entered the same text displayed in the advertisement. My results did not match the ad's nicely spaced type.

This very effective advertisement purports to show that ATM is compatible with low-level hardware configurations and standard word-processing programs. I would appreciate it if you could ask Adobe to explain how this misleading ad was really prepared. I don't know how many others fell into the trap of buying ATM only to find out that what they saw was definitely not what they got.

Jacob Shekel
Brookline, MA

Hold that call to David Horowitz. You're right about its being Word 4.0 in the advertisement, but you're wrong about the impossibility of reproducing the on-screen display. How did Adobe do it? By applying the Condensed Spacing option in the Edit Character dialog box. — JB

Instant Font Access

In "Hot Type: Rising Font Wars" (StartUp, December '89), James Bradbury mentioned that ATM won't work unless you have the outline version of the font in your System folder. The shareware DA SetPaths lets you access printer fonts from a single drive on a network. I find it extremely convenient to put certain fonts into the same folder as the job they are needed for and to open the SetPaths DA to make the necessary path for ATM to work.

Al Telles
Lakeside, CA

Thanks for the tip. SetPaths is available from its author, Paul Snively, at 5519 Park Lodge Court, Apt. E, Indianapolis, IN 46205; (317) 253-5970. The shareware fee is $20. — JB

Apple's Geography Lesson

Here in Venezuela, the mentality is 99-percent MS-DOS, although I'm doing my part to change that. Recently, however, I wrote to Apple about some problems I was having with my Mac SE. Its response was to tell me to contact my local dealer in Buenos Aires, Argentina. I wrote back explaining that Venezuela is a good deal closer to Florida than to Argentina, not to mention cheaper to get to. Does Apple have any intention of being serious in Latin America (and buying a world atlas)?

Alfredo J. Dominguez
Caracas, Venezuela

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June 1989

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with Apple’s Map reveals that Miami (1,370 miles) is indeed closer to Caracas than Buenos Aires (3,170 miles). But then, so are New Orleans (2,010 miles), Chicago (2,510 miles), and Fargo, North Dakota (3,000 miles). But you are closer to Buenos Aires than you are to Cupertino (3,870 miles). — JB

This Mouse Condemned

I enjoyed Ken Landis’ review of non-relational, or flat-file, databases (“In Single File” November ’89). One statement regarding FileMaker II, however, is erroneous. Although FileMaker II’s documentation and your article both state that the size of a file is limited only by the size of the disk drive, this is not the case. A bug in the software cripples the mouse after 32,768 (2^15) records. If you use the mouse to try to edit or select a field in a record past that number, FileMaker kicks you back to the first record in the file.

I called Claris and explained the situation, and it stated that there were no plans to fix this bug. So buyers beware: If you need to keep a file of more than 32,767 records, FileMaker II may not be the program for you.

Kevin S. Cummings
Urbana, IL

A Claris spokesman confirmed that the company “has documented the bug and will fix it but can’t commit to any specific schedule for that as of yet.” — RI

Smarter, Better Software

I agree with Paul Somerson (“Software to Watch Over Me,” July ’89) that better, more intelligent software is the best thing that could happen to computers (even the Mac). The Mac is good, but the software is going to have to be awesome. You or me or any host of Apple dealers won’t be able to talk people into buying machines (and shouldn’t have to). It will be the software itself that determines whether or not people can benefit from computers.

Eric Rick
Ola, FL

Shareware from Elsewhere

I was surprised to read the “50 Best Shareware” article (December ’89), listing BMUG (Berkeley Macintosh User’s Group) as the only source of Macintosh public-domain and shareware software. No mention was made of the hundreds of other user groups around the country that provide shareware and public-domain programs.

One such user group is the Boston Computer Society Macintosh Group (BCS•Mac), the world’s largest non-profit Macintosh user group, with more than 12,000 members. BCS•Mac has an extensive, high-quality virus-free, software-exchange library, with more than 100 disks priced at $4 each for members. Most of the 50 programs mentioned in the article are also available from BCS•Mac.

Jonathan Carpenter
Boston Computer Society
Somerville, MA

BCS•Mac also sells one of the best public-domain CD-ROM collections we’ve seen: PD-CD4.0, which costs $125. For more information, contact it at 48 Grove St., Somerville, MA 02144; (617) 625-7080. Both BCS and BMUG have international membership. To find out how to contact the user group nearest you, call (800) 538-9696, ext. 500. — JB

Old Dogma, New Tricks

Robert Wiggins directed the brunt of the blame for recent Mac-interface violations toward programmers (December ’89). Surprisingly, he places little blame on Apple. The consistent interface that made the Mac what it is today is due entirely to Apple’s dogma, but where is that dogma now?

Apple has given programmers full-color capabilities, pop-up menus, and a myriad of other goodies but has in no way specified how to use them. Adding to this confusion, Apple supports HyperCard — an application that is the epitome of Mac-interface violation — as “official system software.”

Philip and Dimitri Zarboulas
 Daly City, CA

Alas, Apple’s Developer Technical Support has eschewed the dogma in favor of the dogcow. Of course, Apple is
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"Best Alternative Storage System"—MacWorld 1989
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Bill's Due
I was thrilled to see Bill's Dingbats, a PostScript-compatible font designed for the Macintosh in 1986, included in your "50 Best Shareware" article (December '89). Thrilled—and somewhat dismayed. A couple of years ago, I left a shareware version of Bill's Dingbats with its accompanying documentation and a request for an $8 shareware fee on GEnie and CompuServe. Hundreds of people have downloaded the font, and it has since appeared in many shareware catalogs and user-group libraries. I have seen symbols from the set used in publications nationwide. To date, though, only 23 people have returned the $8 shareware fee.

I'm glad that Bill's Dingbats has been of use to so many people. Could you let your readers know that I created the font and that it was made available to the shareware community by U-Design Type Foundry, 201 Ann St., Hartford, CT (in case anyone has lost the address of where to send the $8)?

Bil Tchakirides
Hartford, CT
Send those fees in—if only to thank Bill for not naming his font Tchakirides' Dingbats! —YZ

Extra Reading Credit
I take strong exception to your review of the 11 best Macbooks (December '89). Although I own many of the books you list and use them semiregularly, you omitted the best technical reference to date: The Apple Macintosh Book by Cary Lu (now in its third edition).

Randy M. Zeitman
Philadelphia, PA
Sorry, Randy (and Cary). For readers who want to make it an even dozen, The

Special Delivery . . .
Now that Apple's Portable is a fait accompli, a low-priced Mac is next on a list of wish lists. The consensus from readers is that such a machine should cost about $1,000 and come with a floppy-disk drive, a modest hard-disk drive, ADB, a built-in screen (but with an optional external monitor), and a 68000 processor. Of course, different people used different reasoning to reach this conclusion. Ann Greenberg of Brooklyn, New York, wants to see Apple "keep it real simple and sort of cheap. Build your consumer base at the bottom, reaching for the top, rather than just 'skimming the cream' of the wealthy corporations." A similar populist viewpoint comes from Judy Tuccinardi of Mt. Airy, Maryland, who appears to have an advanced case of Amiga-envy: "I see other computers with large monitors and in COLOR for a lot less money than what a Macintosh with COLOR and a large monitor would cost."

From the other end of the spectrum, an "16M kinda guy" with his "hand on a pot of money," Sam Mellen of Nepean, Ontario, Canada, writes: "Though a $1,000 portable could be everyone's first choice, it is just plain not possible. Our use is foremost for a Macintosh. But it is also for a good 'dumb terminal' replacement."

Also piping up for the business user is Jason MacArthur of Marlboro, Vermont, who believes that "for this machine to succeed it would have to appeal to businesses and end users alike. If Apple did this, it would make the Mac an ideal business machine. The software is already there. The only thing missing is an entry-level data-entry machine."

Speak Up:

CD-ROM isn't exactly new anymore, but neither has it taken the Macintosh community by storm. Despite Apple's apparent commitment to the medium, Apple's own player is more notable for technical glitches than runaway sales. If 1989 really was a make-or-break year for CD-ROM, then maybe it's time to start looking for the Next Big Thing.

What can Apple do to make you buy a CD-ROM drive?

Send your thoughts to Special Delivery, c/o MacUser, 950 Tower Lane, Foster City, CA 94404.
The software that helps Federal Express deliver buildings overnight.

Ric Honey, a project manager of new construction for Federal Express, knows a little about deadlines.

"People say to me, 'We need this building next month.' I say, 'But that's a 1-year project.' They say, 'OK, 3 months.'

"Managing 4 or 5 projects like that can mean a paper trail of over 600 forms at a time. All with pen and paper. I knew I had to do something."

So Ric looked into a database program for his Macintosh. "I chose Double Helix because I didn't want to learn a programming language.

"I had a spreadsheet, and I knew it could do 'macros.' But I couldn't. If I could tell it in English what I wanted, fine. But I'm an awful typist. One finger. Try doing macros with that!

"When they told me about Double Helix, I said 'You mean I don't have to read anything? All I do is drag around icons, pictures? This is great!"

Now Ric and his team run the Double Helix multi-user application he created. He reports it's already cut 25% off his paperwork time.

"I just tell Double Helix what I want. And I get it.

"I wish my whole life was like that!"

For a Double Helix brochure or test flight kit, call Odesta now at 1-800-323-5423. (In IL, 708-498-5615.) Current users, ask about our special upgrade offer.

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Now you can have everything you ever wanted in a laser printer. Without paying the price.

Introducing the lowest priced laser printer in history: the $1399 PLP™ II from GCC Technologies. GCC developed the very first personal laser printer in 1987, and has over 10,000 satisfied users... more than everyone else combined.

Finally, a revolutionary printer at a revolutionary price. In fact, at $1399, it's nothing short of a technological marvel.

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Three years of research and development have put the finest printer technology right on your desktop: a combination of the newest third generation laser engine, GCC's own custom designed integrated circuits, and the market's most sophisticated QuickDraw™ imaging software yet.

Features such as a silent "sleep" mode, a very user-friendly LCD display and an envelope printing desk accessory have been carefully integrated to create a laser printer that truly is personal.

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Because PLP II includes 6 outline font families (for a total of 22 individual fonts), its razor-sharp, clean output can be shaped, scaled, and rotated to any point size — all at a full 300 dpi.

These outline fonts, combined with GCC's powerful QuickDraw imaging software, give you unlimited flexibility in producing perfect documents from such applications as PageMaker, Word, Excel, MacWrite, MacDraw, Persuasion, and Canvas.

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GCC has made acquiring your new PLP II just as easy as using it. If you would like to see a demonstration and purchase your PLP II today, simply visit one of GCC's authorized dealers. For the location of the dealer nearest you, call 800-422-7777.

To order direct from GCC, call us toll-free from 9 AM to 8 PM (EST) on weekdays, or 10 AM to 4 PM (EST) on Saturdays. Our trained staff can answer your questions and offer advice on any of our products. (Be sure to ask for our free catalog.) Orders received by 8 PM (EST) will be shipped the same day via overnight delivery for only $9.

What's more, when you buy direct from GCC we guarantee satisfaction. If after trying PLP II for up to 30 days you aren't completely satisfied, return it and we'll cheerfully refund your money.

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PLP II carries a full one year warranty on parts and labor. We also offer repair service at any Xerox® carry-in service center, or at any one of hundreds of GCC Technologies dealers.

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Still Wacky After All These Years

I disagree with John Dvorak’s column “Abyss-ness Plan” (December ’89). The “wacky enthusiasts” who made the Mac what it is today are not gone. Just read through MacUser. Does Mr. Dvorak really believe that “lemminglike business geeks” are the people who buy some of the arcane stuff that appears in its pages? How many corporate executives need 500 different fonts or 20 different DAs in their System Folders?

Jason Paskowitz
Bayside, NY

Slimmer but Slower

Michael Swaine’s “Slimming the System” (December ’89) contains good advice for users of dual-Hoppy Macs, but hard-disk users should be warned that taking files out of the System Folder could make their systems less efficient under certain conditions.

When compared to UNIX and MS-DOS, the Mac’s operating system has a major disadvantage: The user cannot define a path through their folders that applications can follow in order to locate files that are needed during program execution. The only such path is a predefined one: The System automatically searches the System Folder when an application requires a configuration file, a program overlay, or other information stored in files. If applications are placed in the desktop-level directory (that is, not inside a folder) so that their icons are visible on the desktop, and if the files that these programs need are not in the System Folder, then the application cannot locate

If you use Microsoft® Excel, this book puts you in the driver’s seat. Whether you’re a novice spreadsheet user, a Lotus® 1-2-3® convert, or a power user, EXCEL IN BUSINESS has the answers to all your questions about Microsoft Excel. More than 900 pages of explanations, examples, and tips make EXCEL IN BUSINESS the most comprehensive tutorial and reference book available today. It’s completely updated to version 2.2. You’ll find everything you need to know about using Microsoft Excel’s worksheets, charts, databases, and macros. It’s packed full of practical examples and step-by-step tutorials. And you know it’s authoritative—it’s from Microsoft Press.

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Maximum Performance for the Mac II Series

Mac286™ brings the power of an IBM® AT to your Macintosh® II. An on-board 8MHz Intel 80286 processor with 1 megabyte of memory allows you to run MS-DOS and Macintosh programs simultaneously while keeping your Mac's memory free. The Mac286 recalculates a 64K Lotus worksheet in just 7 seconds compared to a software-only emulator which takes 47 seconds to perform the same task. Only Orange Micro's Mac286 matches AT-based MS-DOS performance appropriate to the power of your Mac.

Application Compatibility

Because the Mac286/86 solutions are Intel microprocessor based, they offer the highest level of MS-DOS compatibility available. You can use d-Base IV™, Lotus 1-2-3™, WordPerfect® or MS-Word® simultaneously with your favorite Mac programs.

Sharing High Performance

Mac286 and Mac86 don't just add DOS to your Mac, they blend the two environments to maximize your productivity. Mac286 and Mac86 are fully compatible with the TOPS™ network. With an optional utility, you have full use of Apple's SuperDrive™, allowing you to boot DOS applications directly from the Mac disk drive. Copy and paste from MS-DOS programs right into MacWrite™, PageMaker™, or other popular Mac software. You can transport files between Mac and MS-DOS formats in two quick steps with Mac286's D:Drive feature. Whatever your MS-DOS application, Mac86 or Mac286 provides the performance and compatibility you need.

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Mac86™ is a high performance MS-DOS coprocessor for your Mac SE*. With the power and speed of a PC XT, the Mac86 creates a second computer within your SE, capable of independent tasks even while you work in Macintosh applications. Priced to compete with software-only solutions, Mac86 is the clear choice when MS-DOS performance is important.

*Not compatible with MAC SE/30

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these files. So the application displays an Open dialog box — and the tedium begins; the user must locate the file manually.

The hard-disk-drive user who follows Swaine’s advice about moving configuration and other application files out of the System Folder may wind up spending a good deal of time manually performing tasks that ought to be automatic.

Bryan Pfaffenberger
Palo Alto, CA

Hey I Can Write Letters!
In the dog-eat-dog world of software development, you take what you can get. Thank you for including Hey I Can Print! in StartUp (December ’89). I realize our packaging and documentation are a little on the low-budget side, but users love our product. I can supply you with hundreds of testimonials. (So what if we write some of them; everyone else does it!) Really, we have numerous satisfied users.

You might be interested to know that the next version of Hey I Can Print! is on the way. It will be called Hey I Can Draw, Page Layout and Print! Hey I Can Print! 2.0 will feature real packaging and a new publisher.

Bruce Waris
R&B Software
Boston, MA

Now there’s a great new way to manage your personal finances with Microsoft® Excel. With the MICROSOFT EXCEL MONEY MANAGER, you don’t have to be an expert Microsoft Excel user — this superb template package makes it simple. These ready-to-use templates and macro sheets work seamlessly with Microsoft Excel. Use them for:

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SuperMac's revolutionary new 24-bit True Color graphics system puts the "quick" back in QuickDraw.

Our Spectrum/24 Series III 24-bit graphics card gives you the fastest QuickDraw acceleration on the planet—making painfully slow QuickDraw operations up to 25 times faster. In fact, some operations in 24-bit mode (like scrolling and screen-fills) are now faster than in 8-bit mode. Some are even as fast as in one-bit mode.

And we accelerated QuickDraw on every Series III 24-bit graphics card—because we consider it a necessity, not an accessory. It's plugged right onto the board, at no extra cost. So it's the only single-slot True Color solution that saves you power and money, as well as time.

And when it comes to looks, nothing more impressive than the super-sharp, flicker-free image of our new 19" Trinitron and other color displays. With their 75 Hz refresh rate and Apple-standard 72 dpi WYSIWYG screen-image, True Colors never looked better—all 16.7 million of them. We can even give you accelerated QuickDraw for your Apple 13" monitor with our new, low cost ColorCard/24.

All in all, it's just the kind of innovation you'd expect from the company that invented large screen color for the Macintosh.

So mosey on in to your local dealer and try your hand at accelerated QuickDraw. Ask for a showdown between our Spectrum/24 and any other 24-bit graphics system your dealer can round up.

And for those of you who don't need 16.7 million colors at once, we've also enhanced our Spectrum/8 family—rated "best in its class" by InfoWorld Labs—to give you the sharpest, clearest 8-bit color graphics you can buy.

Call us at 1-408-773-4498 ext. 300 for more information and the name of your nearest SuperMac dealer. Or FAX us at 1-408-735-7250 (dept. 300) for a list of worldwide distributors.
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Now you can treat any Group III fax machine in the world as a remote printer for your Mac. With the Abaton InterFax, you can print letters, reports, and memos in Los Angeles, New York, London, and Tokyo, even if your office is in Peoria.

And all your documents will look as good off the fax as they would off an ImageWriter. No blotchy letters, streaky lines, or dirty smudges like normal faxes. With the Abaton InterFax, even your fine print is perfectly legible.

And the InterFax gets your fax out fast. MacWEEK rated it the fastest fax for the Mac. That's because the friendly InterFax software compresses your file first, then sends it out. So it takes less time to transmit.

You can also use the InterFax as a Hayes-compatible data modem to communicate with other asynchronous devices. Which makes it a great deal as well as a great tool. But that's not the only way it saves you money. With the InterFax, you can schedule when faxes are sent—like right before a telephone conference, or after hours when the rates are lower. And because the InterFax receives as well as it sends, you can screen faxes before you commit them to paper.

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If you want to know why The Macintosh Buyer's Guide rated the InterFax 9.3 (out of a possible 10), call Abaton at 1-800-444-5321. We'll fax or mail you more facts about the InterFax. Then you can start faxing (and printing) all over the world.
in the past few months, we’ve seen an especially nasty virus out there. This virus won’t corrupt your files or scramble your hard disk — it’s a lot more insidious. The virus is a venomous new round of Apple-bashing. While MacUser certainly roots for Apple to succeed, we’re no apologists for the company. We take pride in remaining as objective as possible. If we see something we like, we say so. And if a product comes up short, we’ll let you know.

Fortunately, Apple has made it easy for us to have good things to say by designing a series of sensational products in recent years. Of course, no record is perfect. For instance, as we noted, its terrific Portable boasts a long slate of winning features but could stand to shed a few pounds and inches. And while Apple has produced and midwived some wonderful CD-ROM software, its original player wasn’t at the top of the heap.

Still, few companies can boast Apple’s shining overall performance. Apple’s entire Mac II line has turned heads since Day 1 and keeps getting better with each new release. Its machines’ built-in networking abilities have made it the darling of departments everywhere. Its sumptuous printers have set new quality standards.

And its trademark intuitive user interface has not only stood the test of time but has also spawned a litter of copycat desktops, most of which are runty, wheezy, and slow.

Businesses have figured this out. At least the smarter ones have, the firms that truly care about productivity and employee satisfaction. Macs have become a significant force in companies of all sizes, despite K mart-style pricing of IBM clones, the entrenched smugness of the DOS high-priest MIS class, and the endless promises that the very next generation of every Intel-based system was finally going to be standard and easy.

If this sounds to you like knee-jerk DOS bashing, it’s not. It’s just another way of repeating the message Apple has used successfully in its ads: Stick a user in front of a Mac and a similarly configured PC and see which one actually gets used.

But there’s trouble in paradise. Page through the opinion columns of just about any non-Mac publication these days, and you’re likely to see some misguided pundit predicting the demise of Apple. Why is this happening?

1. The Wall Street voodoo shamans are sniveling that Apple’s stock price is down. To them this means the jig is up and that any sane person should throw all his Macs in the back of a truck and unload them at the swap meet before the rubes catch on.

They mutter that Apple’s market value took a billion-dollar hit in just one week in December. What they forget is that back in March of last year, the stock was in similar shape but rocketed skyward by the end of May. These entrails examiners attribute the current state of affairs to a pair of events:

- First, customers are passing over lower-performance Apple systems such as ancient Apple IIs and Mac SEs in favor of higher-powered ones. Such buyer sophistication is somehow suspect. The naysayers fail to mention that the Mac market is shifting from bargain-minded individuals to serious business users with bigger needs and deeper pockets. Which has been Apple’s strategy all along.

- Second, the Portable’s high-tech active-matrix screen has been in short supply.

So, because short-term earnings seem to mean everything in this country, this pair of temporary conditions has the gloom-and-doom prophets unloading Apple shares for chump change. Which is crazy, since what both these events really mean is that Apple has put together a slew of extremely capable, popular, upscale systems that business buyers are craving.

Besides, while stock prices may tell pension-fund managers which companies may be buying chips most shrewdly this quarter, they’re anything but foolproof indicators of technological or marketing prowess.

2. The columnists are twittering that DOS-hardware vendors are slashing prices so ferociously that Apple can’t compete without losing the farm. The Wall Street Journal recoiled in horror recently at the fact that the Mac Plus was actually selling for a street price of less than $1,000. And worse, that manufacturers were so driven to desperate acts that they were forced to give away software!

This recalls the old joke where the jeweler’s assistant missreads a price tag and sells a $995.00 item for $9.95. When the jeweler learns of the sale, he’s initially furious but later admits, “Well, it’s OK, we still made five bucks on it.” Apple doesn’t lose money on a thousand-dollar Mac or mind tossing in ten bucks’ worth of disks and manuals either.

No matter what, some businesses are going to be seduced by the seeming savings in buying $500 no-name DOS clones. Some people bought Yugos too. In the long run, both are busts.

3. In this news-crazed what-have-you-done-for-me-lately world, several wags are grumbling that Apple hasn’t churned out anything dazzling for a while. The company that revolutionized the computer indus-

By Paul Somerson

Apple-Basher Bashing

Apple’s shining overall performance is not without its problems. Apple’s entire Mac II line has turned heads since Day 1 and keeps getting better with each new release. Its machines’ built-in networking abilities have made it the darling of departments everywhere. Its sumptuous printers have set new quality standards.

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The Wall Street voodoo shamans are sniveling again — but their reasoning is suspect.
try and turned the words productivity and interface into something more than just ad agency hype is now expected to produce machines that can levitate off the desk and transmute base metals into gold. Ignoring for the moment that Apple’s SkunkWorks is, by all accounts, working on some pretty breathtaking stuff with color, video, sound, alternative input, dazzling output, and even sexier interfaces, what are these Apple bashers using as a yardstick? These days top-of-the-line DOS systems are remarkable for three reasons: First, in many ways they’re essentially just very, very, very fast replicas of dated IBM PC XT technology; second, the standards wars on the IBM side are starting to get so catty and dirty that they should bring in Hulk Hogan and put the battles on UHF; and third, prices of the hottest DOS hardware are beginning to claw into minicomputer territory.

Apple isn’t perfect either; it still doesn’t support real-time, preemptive, protected-mode multitasking, and its sizzling System 8 interface is not exactly on its way through the shrink-wrap machine. But its hardware certainly doesn’t take a back seat to anyone else’s, and its user interface can still do laps around the competition. Macs are still clearly superior systems. Period.

4. Finally, they’re all arguing that OS/2 and Presentation Manager are beginning to deal the coup de grace to Apple. Are they serious? Have these guys ever actually used a Mac side by side with a typical IBM clone running OS/2 and PM? The Mac Interface is seamless and silky. OS/2 is clunky and quirky. The Mac interface was designed into the system and the system was built as a graphics machine from the beginning. OS/2 feels like something slapped on that degrades performance, like a catalytic converter; and the tepid PM graphical abilities seem like a kludged-upafterthought. On a typical IBM clone, all they really do is slow everything w-a-y d-o-w-n . . . .

Besides, the Mac user interface runs decently on even a lowly Plus and works consistently on every Mac model, OS/2 and PM won’t work on any of the millions of 80286-based machines and won’t budge on newer systems without 3 megs of RAM plus pricey video and storage hardware. And while there’s precious little application software out there for OS/2, there is plenty of system competition for it from Windows, old DOS diehards, and third-party multitaskers.

Years from now, when the annoying corners are smoothed off OS/3 and commodity supercharged IBM clones are sufficiently plentiful and apps are written to make OS/3 shine, business may actually use it. But by then, all hardware platforms will be interconnected, and Apple will have widened its interface and technology leads. You can bank on it.
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Enhanced Printer Compatibility
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More Fantastic Fonts!
The Grappler LX includes five standard fonts. You'll be able to enhance documents and clarify correspondence with new emphasis and flair. You can now use Swiss, Courier, Dutch, Garamond, and Zapf Chancery Medium Italic in a variety of sizes. For large outline fonts of any style, use Adobe Type Manager™ (ATM) which is fully compatible with the Grappler LX.

Other Orange Micro Printer Products
The Grappler 9 Pin provides owners of Epson-compatible dot matrix printers a cost-effective method of printing directly from the Macintosh. The Grappler Spooler lets Grappler 9 Pin and ImageWriter owners work while printing. For economy-minded Hewlett-Packard LaserJet and DeskJet Plus owners, the Grappler LS provides Macintosh printer compatibility. For additional fonts, try AlphaBits, a collection of seven popular typefaces.

With nearly 1 million Apple printer interfaces sold, Orange Micro sets the pace in compatibility solutions. Call a local Apple Authorized dealer or Orange Micro today to receive additional information or to order the Grappler LX.

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With the MAC-101, you can work the same fast, simple way.

But MAC-101 can find them a real job. By using our MasterStrokes enhancement software to assign them dozens of mouse or keyboard commands.

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your mouse works—without leaving your keyboard.
And turn functionless function keys into a major resource.

It’s the only keyboard that works with every model Macintosh.
It’s also the only one Microsoft recommends for Word” 3.
The only one Aldus’ recommends for PageMaker.
The only one Ashton-Tate recommends for FullWrite Professional.
And the only one Letraset recommends for Ready, Set, Go!”

Function is as function does.
Since the function keys on an Apple Extended Keyboard don’t relate to most Macintosh software, their only real function is to take up space.

But for IBM types who are feeling their way around on the Mac, the news is even greater:

Because our keyboard is laid out in a standard configuration that’s identical to the IBM PC.

Which means that anyone who’s used to an AT or PS/2—or a Selectric—for that matter—will instantly know the MAC-101 like the back of their hand.

And type on it accurately, with the confident touch that comes only from tactile, positive-response keys.

“Superb.”
That’s how PC Magazine sizes up the MAC-101. While MacWEEK calls it “the most important accelerator you can buy for a Macintosh.”

You can buy it for under $195—software included.
And since it carries a two-year warranty, you’ll be enhancing your piece of mind right along with your Mac.

So call 800/826-5398 (in California 800/592-9602) and find out where you can lay your hands on the MAC-101.

Once you do, you won’t let go.
One of the questions most frequently asked by Macintosh users, especially those who’ve just had a Mac land on their desks out of the blue, is: “Where do I go to learn all the little tricks of the trade? In other words, how do I become a power user?”

In the MS-DOS world of the IBM PC, it’s easy to progress from novice to expert; all you have to do is learn some arcane commands and you’re a pro. Becoming a Macintosh power user is more problematic. Mac programs make life so simple while hiding their complexity so well, that it’s hard to dig beneath the surface ease of use to find out what’s going on. You can buy books, but most Macintosh books seem to aim either for the pure novice or zip straight over your head into the complex realm of the programmer. So what’s a poor Mac user to do?

At the same time, one of the questions most frequently asked by Mac hardware and software companies is: “How do we best differentiate our offering from the competition’s?” After features and pricing, the answer usually comes down to support, and the question becomes: “How do we give the best possible support without going bankrupt?”

It turns out that these two seemingly unrelated questions have a common answer: Go on-line. For some reason that no one has ever adequately explained, most Macs in the early days were sold with modems. Even today, compared with other kinds of computers, a higher percentage of Macs have modems attached to them. People with modems like to use Macs, and if you go on-line on one of the hundreds of local Macintosh BBSs (bulletin-board systems) or to one of the national information services such as CompuServe, GEnie, Prodigy, America Online, MacNet, Delphi, or NWI, you will find hundreds, even thousands, of other Mac users. They’ll be sharing information and even some nifty software (such as some of the shareware and freeware products you read about each month in “Bobker’s Dozen”).

Many of the people you’ll meet on-line are power users themselves, and most of them will be happy to answer questions and explain things to a newcomer. You can even learn just by observing as users help each other, but your best bet is to charge right in and ask your own questions. (And remember, the only really dumb question is the one you don’t ask.)

For vendors, on-line is a wonderful place to support products. The people who frequent on-line services are often opinion leaders (including some of the computer press); maintaining an on-line presence lets these people know you care about your product and gives them a place to get product-support questions answered without the busy signals and missed callbacks of a telephone support system. Many companies providing on-line support have high-level executives fielding questions about policies and future company direction, as well as programmers answering the really tough technical questions that no one else understands.

All you need to get on-line is a modem and some software. Before you buy a modem, though, check to see if your company has special purchasing agreements with companies selling modems; you might save a few dollars. Also, make sure you even need a modem: You may have access to a modem server over AppleTalk in your office; why buy if you don’t have to?

When shopping for a modem, concentrate on the 2,400-bps models. Most commercial services, and even many local BBSs, support 2,400 bps, and faster is better (and cheaper) for going on-line. You’ll also see some 9,600-bps modems, but most commercial services do not offer 9,600-bps service yet, and there are conflicting types of 9,600-baud modems — so for now, stick to 2,400.

Your software choices aren’t quite as wide as the selection of modems, but a good many options are available. The three most popular general-purpose terminal programs are MicroPhone II, Smartcom II, and White Knight (formerly Red Ryder). Any of these will get you on-line with most major services and local BBSs. CompuServe offers special software, the CompuServe Navigator, that makes using its service easier. Prodigy, America Online, and MacNet all require the use of their own special software, which you get when you buy their startup kits.

Once you have your modem and some software, you’re ready to go on-line. So where should you go? The least expensive option is to try local BBSs. You can find out about them by word of mouth or from your local user group. When you log on to a local BBS, you’ll be interacting primarily with other local users, so you can think of it as an extension of your office.
If your statistical software is limiting your vision, who knows what you might be missing?

You may not know it, but most statistical software won’t let you see in color. Even if it’s made for a color display, you might overlook something you really need to know. But with Data Desk, the color you see isn’t just for decoration. In fact, it’s part of a visual approach to data analysis you won’t find anywhere else. One that reveals your data in surprising new ways. So you see solutions and opportunities that were never visible before.

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What good are all those Fonts and Desk Accessories if using them is a hassle? Suitcase II sets you free!

Suitcase II is the award-winning software that gives you unlimited access to all your fonts and desk accessories, all the time. Without having to use Font/DA Mover to install and deinstall them. Without cluttering up your system file. Without anything to stand between you and your creativity.

Imagine being able to view an unlimited number of fonts in their own typefaces at any moment, picking and choosing among them without breaking stride. Imagine never having to search through a cluttered System File to find what you need.

Imagine never having to deal with font ID conflicts. never having to restart your system to install a Desk Accessory you need. Imagine spending your time creating instead of juggling fonts and DAs.

Imagine Suitcase II on your Macintosh…

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You can even schedule automated backups to take place at any chosen time. Even when you’re otherwise occupied.

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INTRODUCING NEW DISKLOCK
Unbreakable password protection for the Macintosh

It's sad but true. All it takes is a few minutes with your back turned, and an intruder could walk away with your most confidential data. And you'd never even know it!

Unsurpassed Password Protection
Now the leader in hard disk security announces the ultimate data protection system for your Macintosh. DiskLock works with any SCSI hard disk to provide foolproof password protection for individual files, folders, or your entire hard disk. You can even protect all three levels with different passwords for absolute maximum security. DiskLock automatically locks your files when you shut down or leave your Mac unattended, and alerts you to any unauthorized access attempts.

Sophisticated Data Encryption
State-of-the-art data encryption adds yet another layer of security. Without the proper password, your confidential files appear to contain nothing but gobbledygook!

Multiple Security Levels.
DiskLock lets you give each user password access to just the files you choose (word processing files for your secretary, accounting files for your bookkeeper, etc.). The master password gives you access to all files and folders.

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If DiskLock's automatic virus checker detects an infection when you log in to a file, it notifies you and stops running immediately.

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I worked very hard to get this space as a columnist in MacUser (I even had to write a book as a screen test), so I'm not going to disappoint you. In one short sentence, the purpose of this column is to celebrate owning a Macintosh; the Mac — along with the magazines SPY, Car and Driver, and Esquire — is my inspiration.

This first column is dedicated to Mac users who just don't get the "Macintosh Way." (There are a lot of them now, because IBM PC owners have started buying Macs, and Macintosh is making it in business.) The Macintosh Way is an idealistic approach to doing business. It means doing the right things and doing things right. It is absolutely antagonistic to the Status Quo and Mediocrity.

Those of you who practice the Macintosh Way need read no further. Those of you who don't probably should. Here are the most important exercises presented in my book 'The Macintosh Way,' with their answers; they cover the history of Macintosh, the work environment, support, and marketing. Reading these exercises is a quick way to get an MBA — a Macintosh Business Administration degree.

THE HISTORY OF THE MACINTOSH

Exercise: Give the employees of your company fresh orange juice. Buy a grand piano for your foyer. Let them fly first class. Give them massages every Friday afternoon. Did they create a Macintosh?

The Macintosh Division at Apple had special perks such as fresh orange juice, a Bosendorfer grand piano, flying first class, and company-paid massages on Thursdays and Fridays. Some people think that these perks motivated us to create Macintosh. Nothing could be further from the truth.

An idealistic dream to enhance the productivity and creativity of people and to change personal computing caused Macintosh. We probably would have created Macintosh even if we had been drinking Kool-Aid. Extravagant perks don't usually cause people to create a great product. Otherwise, oranges would be an endangered species in Silicon Valley.

Exercise: It may be said of men in general that they are ungrateful and fickle, dissemblers, avoiders of danger, and greedy of gain. So long as you shower benefits upon them, they are all yours; they offer you their blood, their substance, their lives and their children, provided the necessity for it is far off; but when near at hand, they revolt. — The Prince, Machiavelli

Why was Machiavelli wrong?

- a. He didn't give stock options to his employees.
- b. The market for IPOs was poor at the time.
- c. The capital gains tax in Italy was too high.
- d. He never met Steve Jobs.

This is an old quote — predating even Xerox PARC. Unfortunately, many companies treat their employees this way today. Or companies think that the promise of quick riches from options, IPOs, and capital gains are the key to finding and keeping great employees. According to the Macintosh Way,

THE WORK ENVIRONMENT

Exercise: If one programmer can finish a product in one year, then a six-programmer team can finish the product in:

- a. two months.
- b. Never.
- c. one year.
- d. two years.
- e. time for the board of directors meeting.

Great products are intellectual and artistic works. Often companies consider product development an assembly-line process. Nothing could be further from the truth. Throwing more programmers or artists at a project doesn't mean it will finish faster. Or be better.

Therefore, the answer can't be two months. It could easily be never. One year is being optimistic. Two years is most likely. In time for the board meeting is the answer for the management team that leaves "to pursue other interests." The best way to find out how long programmers will take

If you were stumped by the exercises in my book 'The Macintosh Way,' here's a handy crib sheet.

By GUY KAWASAKI
Good plans start with simple Outlines! Only KeyPlan allows you to outline what needs to be done and quickly turn it into a full-blown plan.

Turn your outline into a Flow Chart! Only KeyPlan allows you to quickly turn your outlines into Plan Views. Real PERT graphs that show the dependencies of the steps in your outline.

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Support

Exercise: Call the downtown Seattle Nordstrom store and ask to speak to Bruce, Jim, or John Nordstrom, or John McMillan.

Exercise: Call Apple at (408) 996-1010 and ask for technical support.

If you call both Nordstrom and Apple, you’ll find that it is easier to talk to the founders and president of Nordstrom than to technical support at Apple. Nordstrom is a $2-billion chain of department stores based in Seattle that is spreading across the nation. It has incredible customer service.

A Nordstrom store forces improvements in customer service for all of the stores around it. Great support means putting the customer in control, taking responsibility for your shortcomings, not pointing the finger, underpromising, and overdelivering. To be honest, it’s also much easier to write about great support than to achieve it.

Marketing

Exercise: Send a StuffIt document to anyone in the Macintosh community. The people who can read it are in The Cult. The people who can’t are not.

In most markets, there is a “head” that contains power users; aficionados; and a small percentage of luminaries, analysts, press, and dealers. It’s easy to find people who are in The Macintosh Cult because they use cool utilities such as StuffIt. (StuffIt is a shareware utility by Raymond Lau that compresses files to save disk space and reduce E-mail transmission time.)

A Cult is intrinsically elite, more discerning, less tolerant of mediocrity, and more willing to accept new ideas. It’s a good place to start your marketing because those within it are the people whom everyone else asks, “What do you use?” “What do you recommend?”

Conclusion

Don’t ever let anyone tell you differently: There is a better way. The Macintosh Way. It means a great environment, a great product, great support, and great marketing. But you already knew that, so put down this magazine and go spread the word.
The Macintosh Curmudgeon: Jaundiced Jargon

If you think the technical mumbo jumbo of videotape, RAM, and ROM is confusing, consider the business side of the Apple/Macintosh vocabulary. Here's some help with a few words for the would-be wise:

**Apple consulting**: A mathematical formula to increase the sales/employee ratio while deteriorating the bottom line.

**Apple Marketing**: The largest group of migrant workers in California.

**Adobe Type Manager**: Software that generates psychological profiles of people who form strategic alliances with those they fear against those they hate.

**12-month warranty**: Nine months of free AppleCare.

By Guy Kawasaki
Redeployment:
A layoff that does not affect the stock price.

Sabbatical:
An extended vacation to prepare for being redeployed.

Offsite:
The gathering of upper management at exotic places to discuss how to save money by redeploying people.

Seniority:
The experience of surviving two reorganizations.

The Macintosh Weigh:
The total poundage lost by Louise Kohl, Robert Wiggins, Mike Boich, and Tom Rielly. Currently equal to about 50 cans of Crisco.

NewsLine
Reports and Analysis

XEROX SUES APPLE
SAN FRANCISCO, CA — In a move that many observers have expected for years, Xerox has filed a $150 million copyright infringement suit against Apple Computer, claiming that Apple derived the Macintosh (and earlier Lisa) computers from programs that Xerox developed at its Palo Alto Research Center (PARC) in the early '70s. The suit seeks to have Xerox declared the sole owner of key elements of the graphical user interface, including the Finder. Xerox's suit states that Steve Jobs saw a demonstration of Smalltalk at Xerox PARC in 1979 and that other Apple employees saw a demonstration of Xerox's Star program in Houston in 1981. Xerox alleges that Apple's design and the appearance of the Lisa and Mac system copied substantial portions of the Xerox code seen at those sessions. In response to the suit, Apple's Carleen LeVasseur said that although Apple acknowledges Xerox's role in originally developing many of the ideas subsequently implemented in Apple products, ideas can not be copyrighted. Xerox spokesman Thomas C. Abbott said that the suit was filed after the companies failed to reach an out-of-court settlement in early December.

PROMETHEUS SUSPECT SUBPOENED
NEW YORK, NY — A former Apple Computer engineer, Grady Ward, has been served with a grand-jury subpoena in connection with the nuPrometheus League's distribution of material purported to be proprietary Apple system code last June. Ward has denied any involvement in the incident but has agreed to cooperate with the FBI, which is investigating the case. Ward reports being told he is one of five suspects with access to the code who the FBI believe are most likely to have disseminated the software.

SUN SETS ON US MEMORIES
MOUNTAIN VIEW, CA — In another big blow to US Memories, the nascent U.S. DRAM consortium, Sun Microsystems has decided not to invest in the venture. Sun's decision was based on the company's recent signing of agreements assuring it a plentiful supply of DRAM chips from various suppliers. Sun's decision came close on the heels of Apple's rejection of US Memories for similar reasons.
**Phone Line Manager 103**

It’s not enough anymore to have separate phone lines for voice and data communications. Now that the fax is becoming an essential part of the office, La Cie’s handy Phone Line Manager 103 is a superb way of avoiding the expense of additional phone lines.

Connect a phone line to the Phone Line Manager, and then connect your fax, modem, and phone to it. The calls for the fax are usually given priority so it can receive incoming faxes, unattended. Simple commands that you program when you connect the phone line allow people calling in to reach your modem. If special signal tones aren’t generated, your phone rings.

Setup is easy as pie, and the program does exactly what it promises to do. There’s a slight degradation in voice-communications quality and, I’d imagine, of modem-connection quality, but I never had any difficulties that could be even remotely blamed on the Phone Line Manager. It’s an excellent value and worth a place in every modem office, $199.95. La Cie, 16256 S.W. 85th, Suite 306, Tigard, OR 97224; (800) 999-0143 or (503) 884-0143.

**Macintosh Portable**

The Mac Portable needs a lot more work before it can be called perfect. It’s heavy (about 16 pounds in the case) and far too pricey ($7,597 with hard disk, extra megabyte of memory, and modem — the extras shouldn’t be considered options). However, it is also the best portable/laptop ever made.

The up-to-12-hour battery life is excellent. The screen is a star — readable from a wide range of angles and under a variety of lighting conditions (the notable exception being low-light situations). Its speed is roughly twice that of an SE and quite adequate. The special software is virtually perfect.

Aside from reducing weight and price, Apple needs to make a few other changes. The keyboard should be extended with function keys. The screen should have a backlighting option, since it’s nearly unreadable in dim light. Even 2 megabytes isn’t enough to run HyperCard under MultiFinder, and so far, static-RAM SIMMs larger than 1 megabyte are nonexistent. Still, the Macintosh Portable is the best CPU of its type — ever.

$7,597 (including hard-disk drive, extra megabyte of RAM, and modem card). Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; (408) 956-1010.

**Baker’s Dozen**

How could I not like a game with a name like Baker’s Dozen?

It’s a solitaire variant I haven’t seen before that is just what a good solitaire game should be: mindless, moderately easy to win if you try, and addictive. The display is cramped, and the artwork on the cards, while nice, is not up to the standards of Mike Castie’s shareware solitaire games (Klondike, Canfield, and Golf). The score and statistics are displayed in a font that’s too small for my aging eyes, and there’s no support for color in this version. Still, it’s playable and a lot of fun.

Version 1.0. Shareware; $10 with Montana 2.0 (another solitaire game). Eric Snider, 4841 Woodcliff Hill Road, West Bloomfield, MI 48322; (313) 663-2918.

**Moriarty’s Revenge**

Tracking bad guys around the globe is the aim of this pleasant game. In the course of your pursuit, you learn some geography and sharpen your reasoning powers. In each of the many scattered locations, you get a choice of various places to “investigate.” By going to the correct places, asking the right questions (from the choices displayed), making the correct deductions, and hurrying on to the next place on the globe, you catch the villains. You need to make use of the built-in game-playing aids (note forms and the like), and the Rand McNally Pocket Atlas that comes in the package.

The simplest level is fairly easy, and the ultimate level is very difficult. The graphics are nothing special — and not in color. The game is copy-protected, and MultiFinder incompatibility is a serious annoyance. This isn’t the ultimate Mac game, but it is a pleasant way to pass time.

Version 1.01. $19.95. Bull City Software, P.O. Box 51816, Durham, NC 27717; (919) 490-1277.

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**Bobker’s Dozen**

Good Things and Small Packages

**1. Phone Line Manager 103**

**2. Macintosh Portable**

**3. Baker’s Dozen**

**4. Moriarty’s Revenge**

*BY STEVEN BOBKER*

Bobker’s Dozen, c/o MacUser
950 Tower Lane
18th Floor
Foster City, CA 94404

Your suggestions, comments, and products for consideration are welcome.
5 INIThound

This is strictly pro gear. A nonprogrammer might find most of the INIThound output interesting, but there's not much more that anyone but a programmer, network administrator, or system administrator can do with it but stand back and marvel.

INIThound is an INIT that loads itself first at the beginning of the INIT loading process and then has the ability to examine in minute detail what every other INIT does as it loads. Among the things it tracks are all memory changes and allocations, and all trap patches. You not only see what was done but also the order in which the changes occurred.

This kind of information is vital in tracking and eliminating INIT conflicts.

Reports are ordered up from a dev or Control Panel interface. The reports are well designed and are available at several levels of detail, from simple one-page listings to full-detail reports (the full-detail report for my Mac ran 36 pages). Users can also use this cdev to enable and disable INITs during startup. Sets of INITs can be saved and enabled or disabled as a group, simplifying debugging.

Version 1.0. $125. Cambridge Information Ware, P.O. Box 1236, Cambridge, MA 02238-1236; (617) 484-8364.

6 SuperANOVA

If you create mathematical or statistical models, check out SuperANOVA.

It's a slick general-linear-modeling program. The interface is as elegant and intuitive as I have ever seen in a program of this complexity. And it has a huge range of features — all readily accessible.

A word of warning is in order, however. This is not a general statistics package — you need some knowledge about general-linear-modeling before you start. The manual is wonderful and very detailed, but it doesn't waste any time on any of the basics.

Data entry is easy, and data can be imported from virtually any source. The number crunching is quick and smooth. A good selection of 'canned' models is included, and your own work can be saved as Do-It documents so that you can quickly use it again for similar jobs.


7 Letterforms & Illusion

Letterforms & Illusion is a barrel of fun. It was coauthored by Scott Kim, the graphic artist best known for Inversions, a collection of typographic designs that can be viewed from a variety of angles and still make sense. Letterforms & Illusion lets you create your own inversions, but there's more to it than that. It's a set of visual puzzles, images, and games that are fun to fool around with and that help you learn about words and type.

All the special fonts necessary are included. These fonts can also be used in your own graphic creations. A specially modified version of MacPaint is also included, as most of what you'll be creating is elaborate bit-mapped graphics.

Letterforms & Illusion teaches you a lot about type and should make you more aware of what good — and bad — design is. It makes an education in graphic design a pleasure. $39.95. W.H. Freeman and Co., 41 Madison Ave., New York, NY 10010; (212) 676-8400.

8 Preditor

Programmers create their code in specialized programs called editors that generally include advanced search features and automatic checks of various delimiters.

Preditor is the newest of these editors. It's a good one, with rectangular-editing ability (you can select a column of material to work on).

Preditor's searching abilities, which are somewhat difficult to access, need to be better documented. Experienced programmers shouldn't have too much difficulty with Preditor's version of GREP, but newcomers won't be able to take advantage of its full power. The interface has its strong points, and once it is thoroughly learned, it's OK. But there are too many buttons and boxes that either don't do anything except provide data, or don't do what you expect. Plan to spend some time coming to grips with this interface.

Version 1.0.1. $80. Evatec, P.O. Box 218058, Portland, OR 97228; (503) 267-6765.

9 The FileMaker Report

The best FileMaker power tool arrives every four to seven weeks in an envelope. It's called the FileMaker Report, and it's a newsletter overflowing with tips, articles, fixes, and other useful information for users of all versions of FileMaker. FileMaker Report has been produced by FileMaker experts since the earliest versions of the program and owes no allegiance to any of the program's publishers, including the current publisher, Claris. That lets the newsletter's producers call the shots as they see them.

The overall quality is excellent. If you're using FileMaker and not getting the FileMaker Report, you're not getting as much as you can out of your software.

Five issues/$27. Elk Horn Publishing, P.O. Box 126, Aromas, CA 95004; (408) 726-3148.
Perceive is a music-education program aimed at the school environment. Although its segmentation and structure make it excellent in that setting, it's also useful for individuals wishing to study on their own.

The package consists of six modules of varying quality. The first module, called Tutor, is for ear training in major scales, all three forms of minor scales, the pentatonic scale, and much more. Drills are scales, intervals, triads, and seventh chords. It's impressive. MiniDesignWave takes user-entered numeric descriptions of sounds, draws the corresponding waveform, and then plays the sound. MiniWaveDraw does the same thing, only in reverse. You draw the wave, and the program plays the sound and provides a numeric array that describes it. The Sound Machine lets you combine a variety of sounds and hear the output. Tunings lets you hear and experiment with historical systems of tuning.

I got the most from Tutor, Drill, and Tunings; more advanced students would find the rest of the package more useful.


ThunderScan has been around for a long time. It was the first scanner for the Mac, and comparatively speaking, it still does an acceptable job, albeit very slowly. It also provides a use for that old ImageWriter you've had laying around since you switched to laser printing. An ImageWriter carries and moves the scanning mechanism — it replaces the ribbon cartridge — and also moves the image past the scanner head. That means the image to be scanned must be on a single, loose sheet of paper. That detail might prove to be a significant drawback. Overall, though, the mechanical design is ingenious. A standard power accessory for Macintosh II is required for Macintosh II-series machines.

ThunderScan can scan up to 32 levels of gray, but because of monitor limitations, you can only see 16 gray-scale levels on gray-scale monitors. The scanned images are bit maps but can be saved as PostScript files as well. There's more than adequate range of contrast, brightness, and size controls. The only drawback is speed. It can take 15 minutes, give or take a few, to scan a busy full-page graphic. If you have the ImageWriter and the time, however, you can duplicate or surpass the results of setups that are far more costly. For input on a budget, ThunderScan is still a viable answer.


When you talk about odd software, don't ever leave Synchronicity off the list. From one viewpoint, it's only an elaborate version of the Book of Changes or I Ching. From another viewpoint, it's an elaborate stress-reduction and decision-enhancing tool. If you really want to, you can even see it as a game. I'm usually skeptical of software like this, and I didn't expect much from it. I was pleasantly surprised, however.

Synchronicity's graphics are excellent, the sound's good, and the overall program provides an excellent way — for me, at least — to relax and reduce stress. Taking breaks can increase your productivity, and Synchronicity is a good diversion.

A shareware version is available, but it lacks many of the full version's features and disables itself after a certain number of uses. Get the full version; it's much better.

Version 2.0. 848.85. Visionary Software, P.O. Box 68191, Portland, OR 97267; (603) 248-6200.
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### Graphics & Design

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★ Sony ... 60 day MBG
3297 3½" DD/DD Disks (10) ............... 14.
6148 3½" DD/DD Disks 3 Pak (30) ....... 35.
3298 3½" HD Disks 1.44 Meg (10) ....... 25.
6373 3½" HD Disks 3 Pak (30) ............ 67.
★ MAXELL ... 60 day MBG
2792 3½" DD/DD Disks (10) ............... 15.
2793 3½" HD Disks 1.44 Meg (10) ....... 29.
★ 3M ... 60 day MBG
3943 DC2000 Tape Cartridge ............. 20.

ACCESSORIES
★ Avery 60 day MBG
4864 Disk Labels 3½" (Qty. 250) ........ 13.
5392 Disk Labels—Laser 3½" (Qty. 630) ... 29.
Cost/Schedule Workshop:
Forecasted Estimate at Completion

The CSW (Cost/Schedule Workshop) is a collection of interrelated project-management tools for handling large, sophisticated projects. It's primarily intended for use with government contracts. Each program in the CSW is a stand-alone application, but the tools can also share information by copying and pasting. A forthcoming free upgrade to Data Manager software will allow ASCII import and export with code translations and currency conversions (handy for multinational projects). CSW is also being marketed with MicroPlanner Plus and MicroPlanner Xpert, more-generalized project-management systems, and the future version of Data Manager will allow direct import and export between CSW and MicroPlanner.

FEAC (Forecasted Estimate at Completion) is the part of CSW that you can use to develop an EAC (Estimate at Completion) or to test the feasibility of a contractor's EAC. For each WBS (Work Breakdown Structure) in a contract, you enter the data necessary to calculate an IEAC (Independent Estimate at Completion) and a FEAC. Once you've entered the required information, CSW: FEAC creates a report to allow you to compare the IEAC and EAC with the BAC (Budget at Completion) and EAC for the contract.

FEAC is a straightforward program that does one thing well. If all of the acronyms in the preceding paragraph are just alphabet soup to you, you should probably skip these offerings. But if these kinds of projects are your stock-in-trade, the CSW is worth a long look.

Cost/Schedule Workshop:
Responsibility Assignment Matrix

The RAM (Responsibility Assignment Matrix) is a cornerstone of the Cost/Schedule Workshop. RAM can produce project-management matrices, dictionaries, and indexes based on data for each WBS (Work Breakdown Structure), OBS (Organization Breakdown Structure), and Cost Account element in a project.

To use RAM, you enter data into the WBS Dictionary, OBS Dictionary, Cost Account Dictionary, and the Contract Criteria. The Responsibility Assignment Matrix and the Cost Assignment Matrix show relationships among WBS and OBS hierarchies and cost-account locations, responsibility and cost assignments, as well as schedule and cost status. RAM indexes let you list frequently used information. There's a Cost Account Index, an OBS index, and a WBS index (which complies with the Defense Department’s DA-A-3023/M-126-1).

You can format the matrices, dictionaries, and indexes in any font or style, and other formatting options are available, so RAM can produce very attractive, easy-to-read reports. For such a specific-use program, RAM is surprisingly powerful and follows the Mac interface well.

Cost/Schedule Workshop:
Performance Measurement Data Analysis

If tracking the progress of large projects—especially defense contract work—is what you do, this software is for you. PMDA (Performance Measurement Data Analysis) tracks contracts by WBS (Work Breakdown Structure) or OBS (Organization Breakdown Structure) and can produce a variety of analysis reports and graphs so you can track contract performance.

The data you enter includes contract, line-item, and selection criteria: line-item costs; and currency conversion. A few of the reports available are Schedule Variance Analysis, Cost Variance Analysis, and Work Remaining Analysis. Ten preformatted charts can be drawn, and up to ten user-customized charts can be created.

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Cost Management System

If you have to bid for business and need to do detailed cost estimating or want to keep control of your costs, take a look at CMS (Cost Management System).

CMS is a combination application and database written in FoxBASE+/Mac 2.0, so in spite of being a stand-alone application, it has a few idiosyncrasies that come from its database roots. But CMS also takes advantage of the capabilities of FoxBASE+/Mac to produce a wide variety of attractive and useful reports.

To use CMS, you create a job, which includes job and client information; and sections, tasks, and prices, which are independent units and can be used for more than one job. The ability to reuse sections, tasks, and prices makes repeated similar jobs fast and easy. For construction jobs, the 16 standard CSI divisions are included in CMS as sections, along with associated tasks and example base prices.

Once the job, section, task, and pricing information is entered, you can perform cost estimating with five reports, including a detailed estimate; a time-phased estimate; and direct-cost, combined, and adjusted summaries. To perform job costing, you can copy information from an estimate or create a new job.

You can use CMS to track the progress of a job and its costs, with nine available reports. CMS can also interface with your general-ledger accounting system and exports files in four formats (Satori, SBT, tab-delimited, and standard delimited).

Constructimator II

Constructimator II is an Excel template with associated macros that can be used to semiautomate the job-costing process, but it lacks the power and flexibility of CMS.

Constructimator II has drawbacks. Because the worksheet also serves as a checklist of possible costs, it’s large, which makes performance sluggish when you’re entering data, unless you turn off automatic recalculation. The documentation is sparse, so you need to understand job costing and cost estimating (as well as Excel).

Constructimator II’s biggest flaw is that the worksheet and macros are protected, so you can’t customize them or make any changes. Excel 2.2 detected an error in the printing macro, for example. While ignoring the error produced the expected output, it would have been nice to be able to fix the problem. Spend the extra money and get CMS.


Construction Project Management System II

CPMS II is a set of Excel templates for residential- and commercial-construction-project management.

The main worksheet has three major sections: Bid and Schedule, for setting up cost estimates and assigning completion dates; Cost Control, for comparing subcontractor invoices with the bids from Bid and Schedule; and Payment Control, for keeping track of disbursements for invoices from Cost Control. CPMS II suffers from the same drawbacks as Constructimator II, but the main CPMS II worksheet is smaller, so performance is somewhat better. Still, this is a high price to pay for locked Excel templates, and Softouch’s protection scheme may not fit in with your needs.

$85. Softouch Software, 5200 S.W. Macadam, Suite 255, Portland, OR 97201; (503) 241-1641.
Finally, Apples

The HP DeskWriter.
$1195.

The HP ScanJet Plus.
$2190.

There are more than 8,000named varieties of apples:
including Newton's Head, Melon, Chantenay Rouge
Pommes, Northern Spy, Sheegate, Emporia Spire
Bullle, Old Faithful, Gilrflower, Winesap, Large White
Winter Banana and Monmouth Pippin.
Hewlett-Packard presents the first complete line of peripherals designed specifically for the Macintosh.

The HP DeskWriter personal printer delivers laser-quality text and graphics for much less than other 300 dpi printers. Along with such features as whisper-quiet operation and a compact 15" x 17" x 8" footprint.

The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning. You get both image processing and text recognition for what you would expect to pay for a 4-bit scanner.

And the HP PaintJet color printer puts hundreds of colors right on the desktop. So nearly everyone can create a masterpiece of fine art. Or a masterpiece of business. Because PaintJet can handle everything from spreadsheets to overhead transparencies. Of course, each of our peripherals is backed by the same high level of service and support you've come to expect from HP. Call 1-800-752-0900, Ext. 275G for your nearest authorized HP dealer. And watch the Apples blossom.

There is a better way.
**DeltaGraph**

**DeltaGraph is a fantastic value and the best charting and graphing tool around.**

If simple 2-D graphs are worth a thousand words, then the dazzling 3-D graphs that DeltaGraph creates are worth a million. This charting and graphing program is a solid package that lets any Mac user produce business graphics worthy of the best high-priced consultant at a fraction of the cost.

**WHAT IT IS** DeltaGraph can create 22 different types of two- and three-dimensional charts in black and white on a Mac Plus or SE, or using 256 colors (from a palette of 16.7 million colors) on a color machine. Chart types include 2-D line, column, bar, and pie formats, plus 3-D column, area, ribbon, surface, scatter, scatter line, and wireframe. Drawing, text, and blending functions let you add graphics and customize a chart in any way you wish.

DeltaGraph can import its data from tab or comma-delimited text files, and from WKS, SYLK, Excel, and Trapaze files. With a supplied DeltaGraph macro, users can even link an Excel file with a DeltaGraph file, so that any update to the Excel data can be reflected in a DeltaGraph Notebook (the program’s name for a data file). DeltaGraph can also export graphs in PICT, EPSF, and Adobe Illustrator formats, so sophisticated touch-ups are easy.

Your graphs are generated from a Notebook, which looks like a multipage spreadsheet that supports simple mathematics and dimensions of 256 columns by 10,000 rows. Up to 20 graphs can be associated with a given Notebook file, with each Notebook having as many pages as memory allows.

Although not as mathematically robust as Synergy Software’s KaleidaGraph (reviewed in February ’90), DeltaGraph concentrates on graphics and leaves complex math to the user’s spreadsheet program. In keeping with its graphics emphasis, DeltaGraph also supports plotters (with the appropriate driver) and film recorders.

**HOW IT WORKS** Using DeltaGraph starts with the data Notebook. After entering the data into its spreadsheet-like array, you select the information you want to chart (DeltaGraph supports discontinuous selections), and a graph is created after you choose the Plot command from the Chart menu. DeltaGraph then displays the Choose Chart Type dialog box, which offers three main pop-up menus: Standard, 3-D, and Custom. Once you’ve selected the correct type and pressed the plot button, the chart appears in a new window. You can change the minimum and maximum for the x, y (and z) values, change the scaling from linear to logarithmic, and change the axis placement by clicking on the chart and selecting the Axis command from the Chart menu.

One of DeltaGraph’s most innovative features is the Chart menu’s 3-D View command. The command produces a dialog box that lets you change the orientation (elevation and rotation) of a 3-D graph. The elevation is the horizontal viewing angle, and the rotation is the vertical viewing angle. You can either enter the values in the dialog box or click on an arrow and watch a three-dimensional box rotate on the screen.

Once a chart is created, you can turn to DeltaGraph’s drawing tools to embellish it with draw objects such as lines, boxes, ovals, circles, rounded boxes, polygons, arcs, arrows, and even Bezier curves. Once the graphic elements are drawn in, they can be grouped for easy manipulation. Essentially, DeltaGraph has the combined capabilities of a high-powered graphing package and an object-oriented drawing package.

About the only shortcoming DeltaGraph has is its manual, which does not give enough examples of how each graph is set up and is printed in black and white. It’s ironic that a package with such advanced color-charting capabilities would show examples of 3-D charts and color wheels in black and white. DeltaPoint says that that decision was made in the interest of keeping the price down, so although it may look odd, it’s not necessarily a bad trade-off.

**THE BOTTOM LINE** DeltaGraph is a solid, excellent package that performs flawlessly. Users looking for the cutting edge in 3-D graphing should get their hands on this program now.

— **Jeffrey A. Steinberg**

**Get Info**

**DeltaGraph**

- Published by: DeltaPoint, 200 Heritage Harbor, Suite G, Monterey, CA 93940; (408) 648-4000.
- Version: 1.0.
- Requires: System 6.0.2 or later.
- Application Size: 753K.
- Compatibility: Mac Plus or later.
MarkUp

A multiuser editing tool seems like a good idea, but MarkUp isn't.

MarkUp sounds like an editor's dream, but in reality it's just a novelty — and an expensive one at that. Its main problem is a schizophrenic interface that forces you to work in a draft-type environment while editing text. The inconsistent and time-consuming interface is frustrating enough to make anyone give up after five minutes and return to using an old-fashioned red pencil.

WHAT IT IS

MarkUp is a multiuser editing and review application that lets you put individuals' comments on transparent overlays that leave the original documents created in another application intact. These documents can come from word-processing or page-layout programs, graphics packages, and so on. The document owner accesses the overlays, separately or merged into one document, and adds the changes to the original. It sounds less painful than it is in practice.

MarkUp does have some good features — its security and organizational functions are first-rate; it can import documents from nearly any Mac application; it allows reviewers outside an organization to add overlays; and, best of all, it lets you put the document on a server so that reviewers can make changes (and view each other's changes) simultaneously. Unfortunately, its primitive interface eclipses its assets.

HOW IT WORKS

The tear-off tool palette includes standard draw tools, plus pop-up notes for detailed comments. A separate palette of proofreaders’ marks is accessible via an Option-click, and any one of eight colors can be applied to everything except framed and shadowed text boxes (text can be colored). Although the tools themselves are adequate (in fact, the shaded rectangle is an excellent highlighter), using them is a cumbersome process.

For example, double-clicking on a tool in the palette brings up the Attributes menu (color, thickness, screen percentage, or shape). You can set default attributes, but when you want to make changes, you can't automatically apply your menu selection by double-clicking on it. Instead, you have to click on the new attribute and then on OK. This makes simple tasks ponderous, and it's inconsistent with most other draw programs, which apply OK with a double-click.

You can double-click on the text tool all you want, but to get its attributes, you have to go up to the Options menu. Worst of all, the Undo command works only with a cut, copy, or paste method.

Although pop-up notes look like oversized text boxes, they're really an overlay layer with the same attributes as that layer. To write something in these notes, you have to click on the tool palette, place the note marker on the overlay, open the note, open a text field in the note, and finally add your message. Ouch!

As for the proofreaders’ marks, their pop-up menu stays on-screen only while you're selecting a tool, so you have to open it again and again if the document needs a lot of correcting. In addition, the marks are so tiny, they're practically invisible.

Because you can edit only one page at a time, you can't scroll through a document. If you want to skip pages for a quick comparison, you have to save all your changes on the current page (which you may not want to do until you’ve looked at another page) or not save any of your changes (which you probably also don’t want to do).

MarkUp doesn’t make rewriting easy or obvious. In an overlay, text is inactive, so you can’t alter it. To make it active so you can revise it, you have to go through a complex routine involving closing all overlays, extracting the text, pasting it into the Clipboard or Scrapbook, and then pasting it into a text field on a pop-up note. And since MarkUp is page-based, you have to keep coming back to this note, which means saving, returning to the page with the pop-up note, saving, and so on.

Besides providing a couple of paragraphs in the introduction, the manual, which is otherwise pretty good, almost completely neglects to explain how to add the reviewers’ final comments to the original document in its original application. MarkUp needs a section in the tutorial devoted to the steps in the process of merging comments into the original.

THE BOTTOM LINE

If all you want is organization and security for your shared documents, MarkUp might be worth it. But if you want a quick and efficient way of managing your editing, this isn’t it.

— Victoria von Bie

Get Info

MarkUp

List Price: $245 (one user), $495 (two users), $995 (five users).
Published by: Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301; (818) 991-6540.
Version: 1.01.
Requires: System 6.0 or later, 1 megabyte, and Mac II or SE/30 for color.
Application Size: MarkUp, 226K; MarkUp Administrator, 78K; MarkUp Reader, 85K; Document Creator, 92K; MiniMarkUp (for remote users), 154K.
Compatibility: Mac Plus or later.
"Before you can ask, 'Where's my file?' you'll be reading it."

"It happens all the time: You sit down, ready to work. Then, because you have hundreds of files on your hard disk, you waste time looking for the file you want. If you find it, you have to run a word processor to see what's inside.

That's crazy. And that's exactly why we created the On Location™ desk accessory: to make finding and viewing files as fast and simple as possible.

The fastest way to find and view files
You don't have to remember file names to use On Location. Just type in a word or two from the file you're looking for. So if you need the letter you wrote to John Simmons about the insurance policy, type 'Simmons' and 'insurance.' Within seconds, On Location scans its index of all the text on your hard disk and finds your letter.

And you don't have to open your word processor to read the file. Double-click on the file name, and you'll instantly see the text, including the original fonts and styles for word-processing documents. You can also copy text to the clipboard, or launch the file directly into its application program.

The story behind the speed
On Location is so fast because it stores an extremely compact index of your hard disk. (This index usually takes up less than two percent of the disk.) As you save and move files, On Location automatically makes note of the changes. Then, when your Mac is idle, On Location indexes the name and text of these files.

We call that steady, silent process 'background indexing,' and On Location is the only Mac product to provide it. Background indexing means that On Location is always up-to-date and ready to work when you are.

It took us months to fine-tune On Location. But it's only going to take you a few minutes to appreciate On Location's power—and to learn how to use it.

On Location offers unmatched speed and convenience
- find a file by typing its name or words it contains
- search an entire hard disk in seconds
- view and copy text from files, without opening applications
- see actual fonts and styles for leading word processors, including MacWrite II™, Microsoft® Word, WriteNow™, and WordPerfect
- directly open files and application programs
- move, copy, rename, and delete files
- find text in most files, including HyperCard™, PageMaker™, and Microsoft® Excel
- search for all forms of a word ('fuzzy matching')

Requires Macintosh® Plus or above, with a hard disk and System 6.0 or above.

One-year guarantee
We're proud of On Location. All products should work this way. And all products should come with this guarantee: if you're unhappy with On Location for any reason during the first year you own it, you may return it for a full refund.

Try On Location. You have nothing to lose—and a lot to find."

Mitch Kapor, chairman, ON Technology.
**MUltimedia**

**ColorSpace Ii/FX**

Mass Microsystems has brought live 24-bit video to the Mac screen.

Multimedia is more than just a hyperhip buzzword. There actually are some useful products available on the market. The ColorSpace Ii and ColorSpace FX boards from Mass Microsystems are pioneers in desktop multimedia, or more precisely, desktop video. The boards and accompanying software give video producers the ability to add special effects, titles, and graphics to live video images for display on an RGB or NTSC monitor, or output onto videotape.

**WHAT IT IS** The ColorSpace FX board converts composite video signals (NTSC or PAL) to RGB for display on a Mac monitor. It also processes the kinds of special effects you commonly see on the opening credits of TV new shows, such as spinning and shrinking video windows containing live-action video. The video input can be from a camera, videotape player, or videodisc.

The ColorSpace Ii lets you mix live video with computer graphics so you can add titles to video presentations. The board's three software-switchable video inputs can be selected at any time. The Ii is also a versatile video-display board that outputs RGB signals to various Mac monitors (including Apple's) and sends composite signals to an NTSC monitor. The Ii can be run without the FX, but only if you display the video on an NTSC monitor.

A typical ColorSpace presentation might consist of a videotape or videodisc and a computer-graphics application created with HyperCard. SuperCard, Authorware Professional, or MacroMind Director Interactive. For HyperCard and SuperCard developers, Mass Micro includes a stack with XCMD and XFCN resources to control special effects. Demo HyperCard stacks show what can be done, but don't expect to accomplish much unless you know something about HyperCard programming. For anyone willing to sign a nondisclosure agreement, Mass Micro offers a free developers' kit that lets you into the source code.

The boards also come with several useful utilities. An application called MacTV can be used to watch a football game in a window on your Mac instead of on your TV, but it could also be used more practically to monitor a private stock-quotation channel while you worked on a spreadsheet. Because the hardware completely bypasses the Mac CPU, the video in MacTV (or any other application running with the ColorSpace Ii/FX combo) runs smoothly, without slowing down any normal Mac applications or operations.

A Digitizer DA lets you digitize a video frame (as a frame grabber does) and store it as an 8- or 32-bit color PICT2 file. Although the Ii board displays live video in 24-bit color, it displays graphics in 8-bit color only, so you can't display the image in full color once it's been digitized.

The Desktop Video DA lets you key the video to show through any single color on the Mac screen when video and Mac graphics are combined (a process commonly called chroma-key). This means you can limit the video to a window or to any lettering or shape that's the color you've picked.

Unfortunately, turning off the chroma-key mode also turns off a handy one-inch view box in the DA window. Other abilities include completely replacing Mac graphics with video, although getting back to the desktop is not very elegant, requiring one of several two-step keyboard commands.

**HOW IT WORKS** Although the functionality is certainly there, the ColorSpace Ii/FX pairing shows a few signs of having been rushed to market too soon. The interface's quirks would be easier to handle if the documentation were better. The thin, poorly organized manual contains errors in text and diagrams and is incomplete, which makes installation harder than it should be. If there's a conflict between what seems right and what the manual says, you're probably better off going with your instinct.

In addition, Mass Micro reported that the initial manufacturing run of ColorSpace Ii boards being sold at press time were rebuilt from older ColorSpace II boards. This included the replacement of old parts and the addition of jumpers and new parts. This manufacturing method could prove troublesome for long-term reliability — the Ii board we received showed imperfect workmanship, with below-spec hand-soldering and heat-shrinking. However, the board did work perfectly during the time we reviewed it.

**THE BOTTOM LINE** Overall, we can recommend the ColorSpace Ii/FX combination — especially if you're a developer exploring interactive video. It delivers live-video-overlay functionality, as advertised. However, a little time might give us a more complete package.
— John Rizzo

**Get Info**

**ColorSpace Ii and ColorSpace FX**

List Price: ColorSpace Ii, $2,299; ColorSpace FX, $3,499.

Manufactured by: Mass Microsystems, 550 Del Rey Ave., Sunnyvale, CA 94086; (800) 522-7979 or (408) 522-1200.

Compatibility: Mac II series.
Introducing the WACOM Super Digitizer.

"Wacom tablets are the top choice for artists."*
"A dream come true!"
"The lightest, most comfortable pointers around."
Such have been the reactions of graphic artists and other users to Wacom's new Super Digitizer (SD) series.

Understandably. For these new state-of-the-art systems have no cord, no battery, no magnets. So the stylus is ultralight, weighing only 1/3 ounce (11 grams), making it as light and natural to use as a ballpoint pen. No frustration in untangling wires either.

Best of all, pressure-sensitive input. Now your artwork can reflect each creative stroke. Use Deneba's latest UltraPaint™ or other software to vary brush thickness, colors, airbrush density and gray scaling. These and other special effects are varied by the pressure you apply on the stylus. No wonder artists and designers across the country are raving about the creative, responsive feel of Wacom's Super Digitizers.

Wacom. Specializing since 1983 in the world's finest cordless digitizers.

"Wacom tablets are the top choice for artists."*
"A dream come true!"
"The lightest, most comfortable pointers around."

When it introduced the Personal LaserPrinter in 1987, GCC Technologies irreversibly changed the landscape of laser-printer pricing—from skyscrapers to affordable housing. The PLP philosophy is simple: Put 300-dpi laser-printing power into the hands of individual users who don’t need networking capability or PostScript output. (The company later introduced the Business LaserPrinter option for people who need those capabilities.)

The PLP II is a completely redesigned and upgraded edition of the original, inside and out, with several significant improvements (as well as a few pleasant bonuses). The best news is the price: The PLP II lists for $1,399, and you can probably find it discounted for substantially less. Almost as good is the news that the troublesome—and messy—toner cartridge has been replaced by a sealed mechanism. Assembly is a clean-hands operation, and a painless one at that.

One of the nicest new features of the PLP II is that it automatically powers down to a low-power, nearly silent “sleep” state whenever it hasn’t been used for a user-definable period of time: it takes only a few seconds to warm up when you’re ready to print again.

The software also includes a handy envelope-printing and address-database DA, a spooler, kerning controls, and support for printing nearly edge to edge. The PLP II ships with a basic collection of six Bitstream outline fonts and also supports the Adobe Type Manager. A new front panel has controls and indicators that do everything from manual printing to telling you when it’s time to change the consumables.

On the negative side, printing is, if not slow, no speed demon. The OkidataOL-400 laser engine is rated at a respectable (for printers in this price range) four pages per minute. But complex pages can tie up your Mac for many minutes, although you can speed things up by adding RAM to either your Mac or the printer (the PLP ships without any internal RAM but can be upgraded to 1 megabyte).

The PLP II is an outstanding value and an excellent choice for anyone who wants a Mac laser printer but doesn’t want to spend the big bucks for an Apple model.

— Jon Zilber

**Get Info**

**PLP II**

List Price: $1,399.

Manufactured by: GCC Technologies, 580 Winter St., Waltham, MA 02154; (617) 890-0880.

Requires: Mac Plus or later; hard-disk drive.

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**BetaWatch**

**Products on the Horizon**

PAGEMAKER 4.0 incorporates all the color capabilities of PageMaker Color Extension and adds long-awaited features for word processing, typography, and large documents. A spelling checker and a search-and-replace capability are finally available via the Story Editor, a special window that lets you do rapid text editing and then pour the text back into the layout. Fifty new features include in-line graphics and paragraph rules (both of which move with the text) and text rotation (but only in 90-degree increments). A separate Table Editor utility can generate tables that are imported into PageMaker as PICT files. Enhanced typographic features include kerning to within .001 of an em; five levels of tracking; and improved control of hyphenation, widows, and orphans. Type sizes now range from 2 to 650 points, and you can adjust type sizes and leading in .01-point increments. A new Set Width control condenses or stretches type from 5 to 250 percent. The new version supports document lengths of up to 999 pages (given enough disk space). A Links dialog box shows every text and graphics file that’s been placed into the document and is automatically updated — very handy if you print documents at a service bureau. On the minus side, PageMaker 4.0 can still open only one document at once, and it has no numerical-scaling or internal color-separation abilities.


ETA: Second quarter 1990.

ALDUS PREPRINT is a color-separation utility that can handle entire files from either PageMaker Color Extension or PageMaker 4.0, including Tiff and EPSF images. (Color PICT files are not supported.) This midrange color solution stresses ease of use, so it doesn’t offer all the features of high-end products. It does offer limited editing of Tiff images, however, including global tweaks for sharpness, lightness, contrast, and color saturation. On the output end, you can print composites on a laser printer or create film separations — including masks — on a Linotronic. The Print options have several levels, depending on the user expertise. You can override the defaults and select everything — from screen angles and ink overprints to dot-gain compensations, total ink coverage, and paper stock. (Aldus PrePrint replaces Aldus Separator, the color-sep utility originally slated for release with PageMaker Color Extension.)


ETA: Second quarter 1990.
A quality product from MacShopper

The next best thing to a new Mac is a Power User's Memory Upgrade!
1MB SIMMs Modules...
Now only $95 each.*

Now you can unlock the awesome power in your Mac and use it to its full potential with a Power User's Memory Upgrade from MacShopper. By replacing the existing 256K memory chips with our powerful 1MB memory modules you can bring more brain power to your Mac than you thought possible.

Right now our price for these high quality SIMMs (Single Inline Memory Modules) is lower than ever. And a memory upgrade is easy to install yourself, in not much more than half an hour.

WHY MORE MEMORY?
Have you noticed that some of the latest software requires too much memory to run on your Mac? Would you like to run MultiFinder plus two or more programs—all at the same time? Are you tired of having to quit your word processor just to answer a question from a spreadsheet?

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ing 1 megabyte (1MB) of memory. To upgrade, you can replace each 256K
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The Mac II, IIX, IICX and SE/30 each come with a total of eight slots.
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Super 3D and Swivel 3D

These excellent 3-D tools complement each other perfectly. Serious 3-D artists should get both.

If you've ever created a 3-D scene using a conventional drawing program, you know how hard it is to edit or render that scene from a different viewpoint. Two veteran 3-D programs—Super 3D and Swivel 3D—can relieve that drudgery. Both have comfortable interfaces and have been upgraded with added functionality and speed.

Super 3D's interface makes it a good choice for artists migrating from 2-D programs. These Super 3D objects started as outlines, which were spun (the cup and the urn) or extruded (the urn's handles and the book). SpinWheel scroll bars help you handle objects and orbit the world. The drawing tools and camera control palettes can be moved or hidden. Multiple cups and pencils are clones of their respective master objects. The background is an imported painting.

Common Ground

Super 3D and Swivel 3D have object-creation environments that are relatively easy to learn, even though they work in radically different ways. Both let you move, resize, and free-rotate objects or specify their precise location, scaling, and orientation numerically. Zooming in and out is simple with either program, although Super 3D offers more ways to change your viewpoint.

Extruded and lathed objects can be created with varying degrees of smoothness, and both programs can form irregular shapes by connecting a set of differently shaped cross sections.

You can access up to 256 colors to shade your objects, but each program renders its colors slightly differently. Super 3D's dithered-coloring scheme can produce a wide range of apparent colors. Swivel 3D's solid-color shading is more pastel, and its color range for a given model is more limited. Either program can import a color picture as a backdrop or as a template for manual tracing.

Animation is key to both programs, and producing tweened animation sequences is relatively easy. The animation viewpoint can be assigned to an object that acts as a flying camera, and the resulting 3-D movies can be saved as PICT files and exported to other programs such as MacroMind Director, VideoWorks II, Studio/1, and SuperCard. Super 3D's animation interface makes you use a pop-up dialog box each time you shoot a manually arranged key frame. Swivel 3D's animation interface is painless and intuitive. Its acceleration/deceleration options and smoothing of angular motions are a big help in achieving a natural look.

Super 3D

Super 3D's work environment is a familiar object-oriented drawing scheme with standard tools for creating basic shapes. Your 3-D objects begin as clicked-out 2-D outlines that gain a third dimension through extrusion or revolution. You can also use an imported PICT outline as a starting point. Another way to create depth is to use the powerful Sweep Surface function, a souped-up extrusion process that progressively rotates and scales a cross section. Super 3D lets you construct objects in full context, so you can use nearby shapes for reference and precise matching.

You can have multiple views of a world, and each view can be in any rendering mode with any lighting settings. This can help with tricky positioning and reshaping chores. In any view, you have four independent light sources.

The master-object system can simplify building, and later implementing major changes to, a model. A document can have an unlimited number of master objects, each in its own window, and you can use master object copies many times in one model, without adding much to the size of the document. Moreover, any change you make to a master object is reflected throughout the model.

Super 3D has three solid-rendering modes: Faster, Better, and Best. Hidden-surface problems occur frequently in the Faster and Better modes and occasionally in the Best mode.

For flexibility, Super 3D can export a scene as an object-oriented 2-D snapshot in PICT or EPSF format, but the fineness of detail depends on the current rendering mode: In Faster, object facets are filled polygons; in Best, each facet is composed of many thin lines — thousands of them in a large image.

You can save true 3-D models in VersaCAD format. They can also be saved as text, which produces a list of short instructions for creating the 3-D model that can be imported into other programs for analysis or modification.

Swivel 3D

The key to Swivel 3D's appeal is its excellent rendering speed, presentation accuracy, and unique ability to link 3-D elements in a machinelike structure. These qualities make it a good brainstorming tool.

Its object-manipulation interface is clean and natural. By using the mouse plus the Shift, Option, and Command keys, you can quickly grab, move, resize,
That's right. For the third year running, the readers of Macworld magazine have voted the Kensington Turbo Mouse® "Best Input Device" for Macintosh® computers.

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and reshape objects. Grids for both attitude and position help objects snap into place without tweaking.

All Swivel 3D objects are constructed in a special view, with the main scene out of sight. You start defining an object by drawing its cross section. A bat, a ball, or a coin, for example, all have circular cross sections. Tracing out the side and top views determines how the basic cross-sectional shape will be resized and distorted to form the final object. You can move, add, or remove points along the three outline views at any time. It’s a powerful shaping system that sounds simple, but what an object’s three views should look like isn’t always obvious — and you’ll definitely have to experiment.

Swivel 3D lets you link items in several ways. Every link has a “parent” object and a “child” object. Links can be stiff, as in conventional groups; ball-jointed, in which the components pivot but don’t separate; or rubbery, in which the child elements move and turn independently but aren’t left behind when the parent object moves. You can even specify how much freedom each child object is allowed relative to its parent — a door might swing no more than 90 degrees, for example, or a sliding part might travel up to 1.5 inches.

Each Swivel object can now include up to eight fields of data for storing part numbers, types of materials, and so on. The data are exportable to spreadsheets and help combine the jobs of design and materials accounting.

Swivel 3D can export its worlds as 2-D snapshots in both bit-mapped and PICT, as well as EPSF object-oriented formats — including a fully editable and well-shaded version for Illustrator 88. Any projected images are omitted from the object-oriented exports.

Separate but Equal
Super 3D’s working style makes it a good choice for a broad range of users, especially those just migrating from 2-D programs. Its vertex-level editing gives you precise control over every facet of your objects, and its master-object system can save your sanity when you need to make global changes. For general-purpose 3-D, Super 3D is a good choice.

Swivel 3D’s speed, shadows, image projection, and easy animation make it an ideal artist’s tool. Its exports make great starting points for enhancement in color paint programs and its mechanical linking talents take it into basic model making and interactive demonstrations.

Both programs have much to offer, yet each lacks important features that the other has, so if you’re a serious artist, get both. The money you spend now will be great frustration insurance.

— Salvatore Parascandolo

PERSONAL FINANCE

Checkwriter II

Checkwriter II tries to knock off Quicken but just misses the target.

With the success of Intuit’s Quicken, it was inevitable that another company would enter the personal-finance/small-business market with a similar product. Aatrix Software, well known for its popular payroll package, has set its sights on Quicken with its Checkwriter II system. Is Checkwriter II a Quicken-killer? The answer is no.

WHAT IT IS Checkwriter II is a well-designed, highly functional checkbook-based personal or small-business accounting system, but the program doesn’t have the same highly refined feel of Quicken. Checkwriter II places your checkbook at the center of your financial universe. By entering payments and receipts and assigning them to a type of ledger account, you get a full general-ledger system that uses your checkbook register as the point of entry. Checkwriter II does not have an advantage over Quicken in that it can be used as both a DA and an application.

You can keep an unlimited number of Checkwriter II ledgers for your different checking accounts, and each account can support a different format for printing checks.

Checkwriter II handles all types of bank fees. Any kind of bank fee can be
entered directly into the check ledger. For estimating balances, all account balances can easily be viewed on-screen. Checkwriter II stores voided check numbers, as well as the information originally contained on them, leaving a record for audit-trail purposes. Tax-deductible checks, which are put into their own ledger account, can also be viewed separately.

Following in what is becoming a tradition of Mac-based accounting systems, Checkwriter II allows you to combine multiple fonts and any graphic that can be cut and pasted through the Clipboard. Aatrix provides a form for ordering blank checks from Deluxe Computer Forms and Supplies, but Checkwriter II supports checks from any forms printer.

Checkwriter II supports all kinds of recurring payments and deposits and reminds you when those checks are due (you have to tell the system to print the checks). The number of budget categories is unlimited, as is the number of payee names and addresses Checkwriter II can store. If you choose not to print your checks with the system, you simply enter the information through the register to use Checkwriter II’s record-keeping ability.

**HOW IT WORKS**

The benefit of using Checkwriter II is that it painlessly organizes your financial information by monitoring how you receive and spend funds. Checkwriter II summarizes your financial activity into eight reports: income versus expense (a profit-and-loss statement), budgeted versus actual expenditures, recurring payment or deposit list, cash-flow projection, tax summary, check-ledger summary, budget-type summary, and uncleared checks. Checkwriter II can also present much of your financial information in pie, horizontal, or vertical-bar charts.

A powerful feature is Checkwriter II’s search report. Using any keyword criteria, you can link all your related transactions, which makes organization easy. The search report links memos, descriptions, dates, or amounts. These four criteria can be used alone, or in combination, to produce detailed reports.

Checkwriter II lets you build a list of recurring charges or addresses and reminds you when it’s time to make a payment. It can’t print the checks automatically, however.

Checkwriter II makes good use of the Mac interface and offers well-designed documentation. The on-line Help system is complete but a little onerous to use. Checkwriter II can import or export information using simple text files.

Overall, as a stand-alone product, Checkwriter II does an admirable job. The system is easy to install and use and definitely adds value. It’s not, however, the Quicken-killer that Aatrix wants it to be. Quicken’s user interface and documentation still hold an edge, albeit a smaller one than they did over the original Checkwriter.

Quicken runs more smoothly than Checkwriter II, and with its interface into MacInTax, Quickens fleshes out as a more comprehensive system. Add to that Quicken’s inherent tax-itemization capability, and it definitely offers more for taxes, which is usually the requirement of a home finance package. Quicken can also automatically batch first-of-the-month recurring payments and check prints, a valuable feature Checkwriter II doesn’t have.

On the other hand, Quicken can’t run as a DA, doesn’t offer graphics as Checkwriter II does, and requires special check stock. All three of these are important improvements for Checkwriter, but they’re not enough to unseat Quicken.

— Ken Landis
FOR THOSE OBSESSED WITH PERFORMANCE, A HARD DISK THAT MATCHES YOUR OBSESSION.

Today there are any number of peripherals designed to push the performance envelope of the Macintosh. But none pushes harder than an ingenious new series of hard disks from GCC Technologies.

Its name is UltraDrive S: a complete family of 40 to 175 MB hard disks that relegates all others to the status of underachievers.

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Simply stated, UltraDrive S is the fastest hard disk in its class. A distinction made possible by an on-board RAM cache that speeds access to recent or sequential data requests. By a capability called 'one-to-one interleaving' that feeds you data as fast as your Macintosh can take it. And by amazing average access times as low as 12 ms.

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MacWrite II

MacWrite II's first upgrade makes it a great choice for mixed working environments.

In just under two years, I’ve seen three packages called MacWrite, and the latest version is by far the best. MacWrite II version 1.1 isn't a major upgrade, but it does pack enough improvements and new features to earn that extra half mouse I withheld when I looked at version 1.0 a few months ago.

Because this is essentially a minor upgrade, all my positive comments from the August 1989 review still apply. MacWrite II is an excellent program — it's easy to use, is powerful, and has a terrific interface. The most significant negative aspects, thankfully, have been fixed.

MacWrite II version 1.0 was a dog on 68000-based machines, and that is the primary reason it was denied a higher mouse rating. Formatting and scrolling speeds are acceptable, but even an above-average typist can outtype the display without too much effort. Version 1.1 has addressed the problem but not totally conquered it. The display speed is much better, but the overall feel is still slightly sluggish. A fast typist (someone in the 80-word-per-minute range or faster) working on a Mac Plus or SE could probably still outtype the screen. This is a significant improvement, nonetheless, and considering the amount of screen information the program supports, it may be unrealistic to expect anything faster.

But version 1.1's most significant improvement is Claris' adoption of an open-hooks architecture that the publisher calls XTND. It lets the program use DataViz's MacLinkPlus Translators (or any other developer's translators that meet Claris' published specifications) directly from a pop-up menu. Opening a foreign document or saving a file in a different format is easy: Just place the appropriate translator that comes with MacWrite II in a special folder in your System folder, and that translator will appear on a pop-up menu in MacWrite II (adding the MacLinkPlus Translators requires a slightly different procedure — you must put the MacLinkPlus Translators into the same folder as MacWrite II). By taking this approach, MacWrite II can now read and write to as many different formats as you have translators (at last count, you could get more than 100 in DataViz's MacLinkPlus set alone). This makes MacWrite II an excellent choice for companies that are using PCs, Macs, and even mainframes.

Claris has also added several small but welcome refinements. For example, version 1.1 now has a Go to page option — although surprisingly, it can't be accessed with a menu command, but requires a Command-key combination or a double click on the current page indicator (shades of Word 3.0r). You can also now view the Font menu in the standard System font (Chicago) with an Option-select (the exact opposite of the way this is done in any other program if you use Suitcase II), fractional widths are supported as a preference, and window settings are saved with a document.

MacWrite II still has a few minor annoying features, such as being able to save a file to a different format only with the Save As command, an inflexible spelling checker (I'd like to be able to turn the suggestions list off), and no “keep lines together” option to prevent paragraphs from being split across pages. But these are small quibbles. With its improved performance on 68000-based Macs and the addition of its powerful translators, MacWrite II is an excellent balance of power and simplicity. It's a great choice, both for people in mixed environments and for anyone who wants a powerful, easy-to-use word processor and doesn't need the specialized features such as style sheets, tables, and inter-application linking that Word 4.0 offers.

— Russell Ito

Origins

Origins is a terrific piece of CAD programming, but a little-less-than-terrific CAD program.

Origins is Deltasoft's first 2-D drafting and 3-D rendering CAD (computer-aided design and drafting) program. It's an incredible piece of code, but as with most first tries, it has more than its share of rough edges. WHAT IT IS Origins uses a unique approach to building objects that Deltasoft calls Point Orientation. Instead of drawing objects, Origins draws each object as a collection of mathematically independent points, any one of which can be used as a handle for rotation or reshaping. Origins conforms to the spirit of the Macintosh Human Interface Guidelines, but Apple has never specified standard ways to create and manipulate 3-D objects on a 2-D screen. Origins takes a
"Two or three years from now, the typical laser printer will be a lot like the Business LaserPrinter*: small, light, with a SCSI connector for a hard disk, and inexpensive." That's how Publish! described our Business LaserPrinter (BLP), a true PostScript printer for Macintoshes, IBM's® and IBM compatibles. We'd only add that the future has arrived ahead of schedule.

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Origins is a 2-D drafting and 3-D rendering CAD program with an unusual interface. It uses three views (top, front, and side) to build a 3-D object. It is reasonably fast, but its biggest weakness is its interface. The plethora of palette tools and menu choices is overwhelming.

The cursor changes shape — often subtly — to indicate the current tool, which can be confusing and irritating, especially if you're working on a large monitor on which the cursor is just a tiny speck on a vast work area. For precision keyboard entry of coordinates and dimensions, you bring up a dialog box by simply pressing the Enter key while performing any drawing operation.

Deltasoft's Bezier sculptured-surface tool lets you create a mesh of connected points that can be pulled and stretched into any shape.

How It Works

Although Origins makes it easy to create solid objects, it's impossible to drill holes through them. High-end CAD programs support Boolean operations on solids — you can add, subtract, and intersect them in various ways. There is no way to do this in Origins.

This reflects a problem with many CAD programs — they're excellent tools for creating designs that can't be realized. Origins is great for designers who think like mathematical topologists — but engineers need software that thinks like a machinist, and architects need software that thinks like a construction worker.

Deltasoft is now developing Origins-Solids, an add-on solid-modeling package that works with Origins, as well as with IGES and DXF translators, plotter drivers, and other modules.

A common problem with CAD software is 3-D vertigo. After a series of rotations, pans, zooms, and transformations, a user can get lost in space. The 3-D rotation tool in Origins is very intuitive — a floating palette resembling a TV remote control, with buttons for pitch, roll, yaw, zoom, and pan. But it's still possible to send your design off the edge of the screen, with no easy way of bringing it back.

The well-illustrated manual fills more than 360 pages, but it is repetitious rather than instructive. The same boiler-plate text is used to explain one tool or function after another. It also wastes space extolling the uniqueness and power of the program — a judgment that should be left to users. Deltasoft includes a "getting started" booklet and a quick-reference card, but no tutorial. A HyperCard stack documents the tools and functions, but it's not enough. A program this complex needs a tutorial.

Written entirely in assembly language, Origins' monochrome version is designed to run on a minimally configured Mac 512KE. Most competing programs (Super 3D, Swivel 3D, Dimensions) demand considerably more memory. The color version of Origins was delightfully fast on a Mac II and Ilcx, especially in generating renderings. The code is "32-bit clean," and a revision that runs on the Mac Ilci is already shipping.

Origins is an excellent value, combining both 2-D drafting and 3-D rendering in a single package for $600. Deltasoft has packed a lot of good ideas into the program, but the interface and documentation still need a substantial amount of work. Origins clearly shows promise, but you would do better to wait for the next version. With a little work, Origins could become an excellent program instead of just a fair one.

— Mike Markowitz

Get Info

Origins

List Price: Monochrome, $495; color, $595.
Published by: Deltasoft, P.O. Box 55089, Tulsa, OK 74155-5089;
(918) 250-5594.
Version: 1.0.
Requires: System 6.0 or later and two 800K disk drives; hard-disk drive and math coprocessor recommended.
Application Size: 517K.
Compatibility: Mac 512KE.
(Monochrome); Mac II (color) or later.
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**COMMENTS**

**Communications**

**America Online and Prodigy**

America Online may be the on-line service of the future, but Prodigy is a crude IBM port.

Two new national services have recently released Macintosh software, but all they have in common is that they're new to the Mac.

**America Online**

The first and better of the two offerings is America Online, which started out as AppleLink Personal Edition. When Apple withdrew its blessing from the project, the developer — Quantum, best known for its Commodore products — took over entirely.

The software makes good use of the Mac interface — including 8-bit color in the opening screens. Navigation is easy, and there's a good variety of Mac-related information and programs to download. From what has been said and shown to date, America Online should be a force to reckon with in the electronic world fairly soon.

Messages are not threaded by topic, and it can be difficult to follow related chains or read lots of messages. This will become an increasingly serious drawback as time passes. Quantum says it will have threading by early 1990, but past experience with other on-line services suggests that providing it may not be an easy task.

Performance varied during our tests. Sometimes 2,400 bps came through as 2,400 bps and sometimes it seemed like 300 bps. The time of day didn't seem to make a difference; performance often varied widely during a single session. Quantum is aware of this problem, and has sent an on-line letter to all Mac subscribers that says it will be adding more computing power to eliminate the performance peaks and valleys. Right now performance rates a decidedly mixed review.

America Online costs $5.95 per month (although one free hour of off-peak service is included) and $5 per off-peak hour (6 p.m. to 6 a.m.) or $10 per peak hour of connect time. These are decent prices if you're actually getting full speed. It's not a good value at the lower speeds too frequently encountered during testing, however. Neither CompuServe (with its excellent MAUG area) nor GEnie needs to worry about America Online — yet.

**Prodigy**

The other new on-line service is Prodigy, the result of a collaboration between Sears and IBM. The software is as crude as you'll see running on a Mac — and that's a Mac without MultiFinder (or even DAs), because Prodigy can't handle either. There's no use of standard Mac fonts (everything is bit-mapped graphics), and the colors are bright but simple — similar to those in MS-DOS games.

The screen display is slow, but your modem has to work frantically to reveal the little bit the screen actually contains. That means that there's virtually no hope
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Or how about just one really important reason: When you ask industry critics which word processor they use day-to-day, the answer is always the same: WriteNow. Still the word processor of choice in the Macintosh world.

Reviews

"WriteNow is the definitive Macintosh word processor. It's easy to use, powerful, and comfortable... Highly recommended."
—JOHN DVORAK, INDUSTRY COLUMNIST

"[WriteNow] might be The Best Program I've Ever Used. On any computer—it's the fastest Macintosh word processor I've ever seen."
—JIM SEYMOUR, MACUSER MAGAZINE

Even if WriteNow is your first Mac application, you'll be up and running in no time. We rate ease of learning excellent.
—INFOWORLD MAGAZINE

Awards

1989 Editors' Choice Award,
'Best New Word Processor'—MACUSER

1989 Readers' Choice Award,
'Best Word Processor'—MACAZINE

#1 Rated Word Processor in Macintosh PC Week Poll of Corporate Satisfaction,
—PC WEEK MAGAZINE

Comparison of Leading Word Processors

<table>
<thead>
<tr>
<th></th>
<th>WriteNow 2.2</th>
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<td>Retail Price:</td>
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Registered users will receive WriteNow 2.2 upgrade information in the mail. Nonregistered users should call or write for details.

T/Maker Company
1390 Villa Street
Mountain View, CA 94041

Tel: (415) 962-0195 Fax: (415) 962-0201

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Prodigy is the Mac version of the IBM/Sears on-line service. It's cheap, but it looks and behaves like a PC product. Its on-line shopping and information services may be valuable for some users, but it's slow, and you won't be able to use MultiFinder or any of your DAs.

of a speed improvement without a total software redesign — an unlikely occurrence, given the developers. So far, I've terminated every Prodigy session before I was done through shear frustration at the sluggish speed. And that was using a 2,400-bps modem. You shouldn't even consider Prodigy if you have only a 1,200-bps modem.

The best thing about Prodigy is that it's cheap. You need to buy the software, but it often comes with enough free service to make it essentially free, and thereafter it costs $9.95 a month for all the time you, and up to five members of your household, spend connected. The reason the cost is so low is that the bottom quarter of the screen is devoted to horizontally scrolling ads. At any time, you can see more details about the advertised items and even buy them.

That's what Prodigy really is good at: on-line shopping. A wide variety of goods and services is available, and finding items, information, and prices is far easier than getting other kinds of data.

As for more traditional on-line items, the offerings are more limited. There is a Mac bulletin board with threaded messages, but reading them is tedious because the screen shows very little information (about 12 lines per screen) and new screens take too long to appear. There are no downloadable files, nor does there appear to be any mechanism for providing them. Simply finding the Mac bulletin board is not straightforward. The fairly extensive documents are aimed at noncomputer users and casual shoppers.

Logging on is a pain. There's no automated log-on, and you must remember not only your password but also your ID number. This is 1983 technology. Navigation is difficult — no menus, DAs, or cut-and-paste function — and there are four selection techniques, one of which you must find for each instance (because only one or two of the techniques work in any given place).

Performance, as noted, is abysmal. If you use the shopping features or play the on-line games, you'll get some value for your money. But if you want to see what the Mac can do on-line, try any of the other services and avoid Prodigy.

—Steven Bohrer

**America Online**

**List Price:** Starter kits, free; basic charge, $5.95 per month (includes one off-peak hour). Additional on-line charges: $5 per hour (off-peak); $10 per peak hour.

**Published by:** America Online, 8619 Westwood Center Drive, Vienna, VA 22182; (800) 227-6304.

**Version:** 1.0.

**Requires:** Any Mac with at least 1 megabyte of RAM and Hayes-compatible modem.

**Application Size:** 222K.

**Compatibility:** Mac Plus or later.

**Prodigy**

**List Price:** $49.95 (includes software and first three months’ service); $219.95 (includes software, 2,400-bps Hayes modem, and first three months’ service); flat rate, $9.95 per month.

**Published by:** Prodigy, 445 Hamilton Ave., White Plains, NY 10601; (800) 822-6922, ext. 205.

**Version:** 1.0.

**Requires:** Hayes-compatible modem, System 5.0 or later.

**Application Size:** 109K.

**Compatibility:** Mac Plus or later. Not MultiFinder compatible.

---

**THINK C**

Symantec's upgraded C compiler is the object-oriented C of choice.

Apple has stated that object-oriented programming (OOP) is the methodology of the future. One of the most popular development environments today, Symantec's THINK C, has just had a major upgrade to version 4.0. This revision endows THINK C with objects.

Object-oriented programming has been around since the days of the Lisa: Clasical was a precursor to today's Object Pascal, which was used to write Apple's MacApp class library. But today a large proportion of programmers prefer C to Pascal, and a large number of these C programmers use THINK C.

**WHAT IS THINK C 4.0**

Object-C, an extension to standard C that provides the same degree of functionality that the Object Pascal extensions do to standard Pascal. These relatively minimal extensions are sufficient for most object-oriented applications. Object-C is not C++, the object-oriented language developed at AT&T that's based on C and is much more complex and feature-laden. Object-C can be considered a subset of C++ and should be compilable by a C++ compiler without much alteration.

Object-C itself is a good starting point for developers interested in object-oriented-software development on the Mac. But Symantec didn't leave it at that. Included in THINK C 4.0's package is a complete object-oriented-application framework called the THINK C Class Library (TCL).

The TCL is written entirely in Object-C and is supplied in source form. It's nowhere near as large and intricate as Apple's own MacApp, but for beginners, this is a distinct benefit. Because it is provided in source form, you can explore the TCL and get to understand it much better than by only poring through the documentation. The TCL provides the necessary code to construct a complete Mac application, relieving you of reinventing the wheel for each new application you write; all you do is add the...
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specific functionality of your application. You can let the TCL provide the elements of your application’s user interface, printing, and most of the other mundane parts of a Mac program.

A further object-oriented programming aid, apart from the TCL, is the framework provided for writing cdevs (Control Panel devices). Until now, the cdev-programming interface has been somewhat complex, but the cdev “template” that comes with THINK C 4.0 makes cdev development about as easy as it will ever get.

THINK C 4.0 also has noobject-oriented enhancements. The syntax of the language has been updated to reflect standard ANSI C. THINK C 4.0’s ANSI compatibility is reflected most prominently by the completely rewritten libraries and by the ANSI-style function declarations that are now permitted.

The in-line assembler has long been a favorite feature of THINK C programmers. THINK C 4.0 now accepts 68020 and 68881 instructions but not instructions specific to the 68030 and 68851 chips. Nonetheless, THINK C 4.0’s code will run on Macintoshes that have these processors.

Another significant feature addition is the ability to develop multisegment code resources with THINK C 4.0; this was not possible with any previous version.

Finally, there are numerous small-detail enhancements in THINK C 4.0’s environment that reflect reactions from users of earlier versions. For example, until version 4.0, the THINK C editor was the bane of many programmers’ existence, because it wouldn’t backspace over the beginning of a line — the 4.0 editor will.

The THINK C 4.0 documentation comes in two softbound volumes: The smaller book is the standard library reference for the ANSI libraries, and the larger tome is the user’s manual. Within the latter’s more than 500 pages, the environment’s components are introduced; roughly half of the manual is dedicated to a description of the TCL and Object-C.

HOW IT WORKS

While THINK C 4.0 is one of the best C development packages around, there are still a few blemishes.

The documentation does not provide a walk-through of how to build an application with the TCL (although Thom Hogan and Kuni Matthies’ new monthly Power Programming column can help with that).

Looking at the many examples that are provided is generally sufficient for experienced programmers, but a novice will be daunted by the TCL without some step-by-step instruction. The otherwise helpful source-level debugger in the environment still can’t save the contents of its data window; for programmers who are iterative in their edit-compile-debug cycle, the lack of this feature is extremely frustrating. Finally, there is no class browser. Although this is not necessarily a glaring omission, a class browser makes object-oriented development much easier by letting programmers look at their object-hierarchies graphically.

THINK C 4.0 is a line product that’s more than worth its list price of $249 (and a steal at $69 for the upgrade from any earlier version of the product). Even though Object-C is not C++, and the TCL is not compatible with MacApp, THINK C 4.0 is a powerful object-oriented development tool.

— Stephan Somogyi

Get Info

THINK C 4.0

List Price: $249.
Published by: Symantec, 10201 Torre Ave., Cupertino, CA 95014; (408) 253-9600.
Version: 4.0.
Requires: System 6.0 or later; MultiFinder, 2 megabytes, and hard-disk drive strongly recommended.
Application Size: 263K; Debugger, 61K.
Compatibility: Mac Plus or later.

The flowers are starting to bloom in some parts of the country, the groundhog has made her predictions about how long winter is going to last, and Apple has come up with a whole new set of code names. Some that have already leaked are Sahara, Gobi, and Mojave for CPUs; The Hulk, Spider-Man, and Sluggo for add-in boards such as the graphics and sound accelerators; Joyce for a new cursor-control device; and Disneyland, Monopoly, and clue for local-drives.

The news from Microsoft, where the code names are more or less fewer and saner and the applications larger, is exciting. Aside from the usual round of “semi-compatible” upgrades (Word 5.0, Excel 3.4, etc.), three entirely new Macintosh products are under development.

The first is a killer of a low-level word processor that will replace the unfortunate and not particularly lamented Write. It’s modestly code-named Shakespeare, and you should have seen it around Christmas. (What? You didn’t?)

The folks at Microsoft wistfully recall the success of the DOS version of Flight Simulator and don’t see why they can’t have equal success in the Macintosh game market. All that we’ve been able to find out is that the code name is Super Bowl, it is not a football or even a sports game, it’s most definitely not another flight simulator, its target price is $39.95, and it must ship (so say the memos) by the Boston Expo in August.

Then there’s the much discussed relational database. Given the overall weakness of such beasts in the Mac arena, why Microsoft is proceeding with this project is beyond the Rumor Manager. Given our druthers, we’d call it Turkey, but the good people in Redmond and Sunnyvale (where the graphics portion is being developed) variously call it Galaxy and Time Machine.

The final product needs a 68020 or better Mac and is a full-color knockout.

Our U.S. Mail address is Rumor Manager, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404. Our electronic addresses are MacUser (on MCI Mail), 70411,204 (on CompuServe), and MacUser.Editor (on AppleLink). No calls, please.
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  - TopDown 1.2
  - MediaGenic/TenPoint
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  - Stmedia Stores
  - Prototyper 2.1

- BEST RECREATION PROGRAM
  - Broderbund
  - Where in Europe is C. Sandiego?
  - Where in USA is C. Sandiego?

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  - Adobe Type Manager

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  - Kennecy Drive 2.4

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<table>
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<td>1.5 MB</td>
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To upgrade an 8-socket Mac II, Ix, ilx, or SE30 to this amount of memory

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<th>Capacity (MB)</th>
<th>Cutting Edge</th>
<th>CMS, MacStack</th>
<th>Dolphin, Integra</th>
<th>PLI, Infinity Turbo</th>
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<td>20+</td>
<td>359</td>
<td>459</td>
<td>429</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>30+</td>
<td>479</td>
<td>499</td>
<td>479</td>
<td>569</td>
<td>-</td>
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<td>40+</td>
<td>525</td>
<td>599</td>
<td>549</td>
<td>619</td>
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<td>609</td>
<td>649</td>
<td>615</td>
<td>619</td>
<td>499</td>
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<tr>
<td>80+</td>
<td>699</td>
<td>769</td>
<td>695</td>
<td>829</td>
<td>-</td>
</tr>
<tr>
<td>100+</td>
<td>829</td>
<td>839</td>
<td>879</td>
<td>1098</td>
<td>-</td>
</tr>
</tbody>
</table>

### OVERNIGHT DELIVERY

Overnight delivery is just $3, anywhere in the Continental United States.

### CALL TO ACTION

Call toll-free
Twenty-four hours a day, seven days a week.
Inquiries 1-201-367-0440
Fax 1-201-905-9279

### MacWarehouse 30-Day Money Back Guarantee

Many of our drives come with the MacWarehouse 30-Day Money Back Guarantee. If, for any reason, you're not completely satisfied, call us within thirty days of receipt for a return authorization number and full refund of the purchase price.
MacSnap 4S (Dove)
The 4S is a 4 Meg memory expansion kit that allows you to get the maximum amount of memory in the Plus and SE or a 4 meg upgrade for the Mac SE/30. IIx or Icx. The 4S uses state-of-the-art 1mb, surface mount CMOS SIMMs and guarantees that today’s memory investment will continue to work and grow with you.

Dove offers a toll-free number for service and support. (memory) $409.

ACCESSORIES
Apple
Toner Cartridges LaserWriter........... 115.
Avery Labels (full line available) Color Coded 3.5 Diskettes .... 4.
Laser 3.5 Diskettes .................. 29.
Laser Transparency .................. 22.
Basic Needs, Inc.
HandTop Keyboard Covers ........... 15.
HandTop ImageWriter Covers ........ 17.
Keyboard Flip .................. 4.
Dust Covers - Grey Nyon Feptop ImageWriter or LaserWriter ........ 12.
Mac Plus and keyboard ........... 11.
Mac SE & extd. or reg. keyboard ..... 11.

I/O Designs
ImageWare II Carrying Case ........... 49.
MacWare Ix Carrying Case ........... 85.
MacWare II Carrying Case ........... 99.
MacWare Plus Carrying Case ....... 54.
MacWare SE Carrying Case ......... 75.
MonitorWare Apple RGB Case ....... 79.
The Ultimate SE Carrying Case .... 79.
Kaimet
Rolltop Toak disk holder 45 ....... 14.
Rolltop Teak disk holder 90 ...... 21.
Kensington
Anti-Glare Filter ........... 33.
Apple Security Kit .................. 34.
Mac II Stand and w/Cable Kit ...... 64.
MasterPiece Mac II ........... 105.

Macintosh SE/Plus w/Extended Keyboard Carrying Case (Targus)

HandOff (Software Innovations)
HandOff eliminates the “Application Not Found” message from your Mac. HandOff lets you open any document from the Finder even if its application is missing. Simply choose a compatible substitute based on the document’s creator or file name extension. HandOff will automatically launch the substitute application and open your documents! Ideal for the networked office - no need to standardize on a single application. (utilities) $32.

PowerBacker 360 UPS Line .......... 269.
PowerBacker 800 UPS Line ....... 749.
PowerBacker 1200 UPS Line ..... 949.
Sirius Products .................. 63.
MobjiProducts
Fanny Mac QT .......... 59.
SE/30 800 ............... 35.
Polaroid
Circular Polarizing Filter ......... 35.
ReadWrite
CompuDuster ........... 29.
Kleen & Dry CRT Pads ........... 5.
Computer Care Kit .......... 45.
Smack-a-Mac
Smack-a-Mac .................. 9.
SightSound
FastKeys 2.0 ........... 35.
Targus, Ltd.
Deluxe Plus/SE-XKB Case (black) .... 49.
ImageWriter II Case (black) ...... 45.
Mac Plus/SE Case (black) ...... 55.

ACCOUNTING & PERSONAL FINANCES
Atrix
Checkwriter .................. 37.
Payroll 3.5 ........... 109.
Payroll PLUS ........... 149.
TymeMolder ........... 175.
Bedford (Computer Associates)
Simply Accounting ........... 219.
Brown-Wag Publishing ........... 75.
MacLedgers .................. 159.
Service Industry Accounting ...... 269.
Dat-Easy Light ........... 42.
Intuit
Quick 1.5 .................. 36.
Layered, Inc.
at Check ........... 269.
MEGA
Managing Your Money ......... 124.
Monogram
Business Sense ........... 269.
Dollars and Sense ........... 81.

LapLink Mac III (Traveling Software)
Get everything you need for fast, simple Mac to Mac or Mac to PC file transfers, including file translators. The LapLink Mac Connectivity Pac includes a cable and software for linking two Macs or a PC and a Mac. The LapLink Mac Network Pac lets you link up to five Macs on an AppleTalk network for simple Mac to Mac file transfers. Both versions include hard disk password security, modem connections, simple split screen design, and much more. (communications) Connectivity Pac (2 users) $119.
Network Pac (5 users) $189.
It’s here at last. It has all the attributes of your own machine, plus awesome new screen technology, (fifty percent larger than the SE screen), 6-12 hour rechargeable batteries and a built in optional 40MB hard disk. Imagine all the power and convenience of your Mac in a 15.7 pound portable package.

And you can win the new Macintosh Portable by entering the MacWarehouse PORTABLE COMPUTER GIVEAWAY.

FREE CATALOG!
We carry more than 1200 Macintosh products, including all the latest releases and new versions. We pride ourselves on getting new products first. If you can’t find what you need, call us for a free copy of our latest catalog.

Aperture Visual Information Manager
(Aperture Technology)
Aperture moves Macintosh graphics into a new dimension by integrating a precision drawing system with a powerful database manager. Aperture allows you to create detailed drawings, attach data to objects in your drawings, produce reports, link drawings together, and display data on your drawings to form complete applications. Whether you are an architect, engineer, designer, space planner, facilities manager, or someone who needs to communicate complex ideas and information, Aperture will become your program of choice. (graphics) $729.

SuperPaint 2.0 (Silicon Beach)
SuperPaint gives you the freedom of paint and the precision of Draw in one easy-to-use program! Features powerful AutoTrace to automatically convert bitmapped Paint graphics into high resolution Draw objects, an adjustable Airbrush, and a Freehand tool to quickly sketch editableBezier curves. You can mix fonts, styles and sizes within text blocks, and freely rotate, scale, or slant text and graphics without sacrificing high-resolution output. Oversized documents automatically "tile" over multiple pages, in either "Portrait" or "Landscape" orientation. (graphics) $125.

MacinTax Federal 89-1040 (Softview)
MacinTax Federal 89-1040 guides you through the process of preparing your Federal Taxes (eight state tax modules also available at $56 each). Just type in the requested numbers, and MacinTax does the rest. When finished, print the completed return on the LaserWriter or the ImageWriter. If you used MacinTax last year, it reads those files and brings forward relevant items, saving time and reducing errors. Its tax planner shows the effects of various tax strategies. (finance) $65.

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Managing Your Money
A fully integrated software program addressing every aspect of personal and small business finance. Write and print checks, set up a personal budget, estimate your finances and more. (finance) $124.

Panorama 1.5
Panorama combines the speed and simplicity of a spreadsheet with a forms generator, an outline, and business graphics. Think of it as a database manager that looks like a spreadsheet. Its macro recorder simplifies common operations. It can turn any ordinary database into an outline with up to seven levels. Panorama also creates personalized letter forms (and mailing labels) without a separate word processor. Winner of 1988 MacUser Eddy Award. (database) $357.

MicroTrench
A responsive spaceflight and docking simulator designed for all who would wonder at the stars, at the motions of objects in orbit, and about what it would be like to fly a spacecraft in orbit. (entertainment) $25.

DESK ACCESSORIES
Casady & Greene
QuickDEX ........................................ 31.
JAD Set ........................................ 26.
Smart Alarms & Appt. Diary ........... 49.
Smart Alarms (1-4 users) ................ 99.
Smart Alarms (5-8 users) ............. 149.
Smart Alarms (9-16 users) ......... 199.
Preferred Publishers
DAI ........................................ 69.
Vantage .................................... 54.
Solutions
SmartClip & The Clipper 2.0 ...... 45.

EQUIPMENT
StrataVISION 3d (Strata)
Create scenes with props, depth, shadows, textures and reflections. Adjust three different types of lighting (directional, spotlight, and point source), move camera, and rotate objects to set up the perfect rendering of your concept. Mapping allows any 2D image to be wrapped around an object. Import, manipulate, and render data from other 3D formats (Super 3D, MiniCAD, DFX, IGES), and 2D formats (PICT, EPS). StrataVISION 2d takes full advantage of the 32 bit Color QuickDraw. It prints PostScript printers, film recorders, and video recorders. (graphics) $775.

DESKTOP PUBLISHING
App SYS
MicrOTV .................................. 289.
Aldus
PageMaker 3.02 ......................... 385.
PageMaker Color Extension ....... 135.
Brodertouch
DTP Advisor ................................ 47.
Data Translation
PhotoMac .................................. 609.
Emerald City Software
Smart Art II, III, or IV .............. ea. 85.
Icom Simulations
MacKen .................................. 119.
LetterPerfect
Calligraphy Studio .................... ea. 125.
LetterPerfect III ....................... ea. 125.
Olduvair
Plus Plus 1 ................................ 115.
ReadIt 2.1 (OCR) ..................... 248.
ReadIt Personal 2.0 ................. 125.
ReadIt TS (ThumderScan) ....... 79.
Quark
QuarkXpress ......................... 459.
QuarkXpress/Spinnaker
Spinnaker/Spinnakerboard........ 109.
TimeWarp
Publish II ............................... 225.

DISK DRIVES/BOARDS
Aristotle Industries, Inc.
HardMac Mac 20 Meg .............. 489.
HardMac Mac 40 Meg .............. 749.
HardMac Mac 80 Meg ............. 1089.
HardMac Mac 105 Meg .......... 1229.
CMS
MacStack 20 Meg ................... 459.
MacStack 30 Meg ................... 499.
MacStack 45 Meg ................... 599.
MacStack 60 Meg ................... 649.
MacStack 60 Meg ................... 759.
MacStack 44 Meg Removable ..... 839.

MiniCAD 2.0 (Graphsoft)
This new professional level 2D/CAD program has it all at an unbelievable price. Layers, Linns, DFX, constraint palettes, high precision, auto-dimensioning, hatching, symbol library, encapsulated postscript plus more. (graphics) $340.

Cutting Edge
800K External Floppy Drive .... 149.
SyQuest Removable 45 Meg .... 829.
Under the Mac 20 Meg ........... 359.
Under the Mac 30 Meg .......... 479.
Under the Mac 45 Meg .......... 529.
Under the Mac 60 Meg .......... 669.
Under the Mac 80 Meg .......... 699.
Dayna Communications
Dayna File Single 360K (5 1/4) ...... 529.
Dayna File Dual 360K & 1.44M 729.
Dolphin Systems Technology
Integra 20 Meg ........................... 429.
Integra 30 Meg ......................... 479.
Integra 40 Meg ......................... 549.
Integra 60 Meg ......................... 615.
Integra 80 Meg ......................... 699.
Flipper 44 Meg ......................... 879.
Fujitsu
800K Disk Drive ....................... 150.
Kenect Technology
Drive 2.4 .................................... 339.
Support
Peripheral Land, Inc.
Infinity Turbo 40 Meg ............. 1099.
Quantum
Quantum 40 MB Raw Drive .... 829.
Quantum 80 MB Raw Drive .... 859.
RaiserOps
RaiserOps Colorboard 264 .... 760.

The "ULTIMATE" SE Carrying Case
This unique case offers internal, padded compartments for everything from disks to umbrellas. It features 2 additional external pockets for your Mac (accessories). (electronics) $79.

EDUCATIONAL/PERSONAL
Beacon Technology
GEMS of the Word .................. 25.
BrightStar
Alphabet Blocks ................. 30.
Talking Titles ...................... 27.
Bookware Software
ResumeWriter Pro ............... 58.
Davidson
Math Blaster ....................... 27.
Speed Reader II .................... 27.
First Byte
The Dinosaur Discovery Kit ...... 27.
The Puzzle Storybook ............ 27.
The Rhyming Notebook .......... 27.
Fair Time Technologies
NaviGate/mono .................. 199.
Help Software, Inc.
Desktop Help for Excel .......... 50.
Learning Company
Math Rabbit ......................... 31.
Reader Rabbit ....................... 31.
MicroTech
Elementary Signer ................. 49.
Finger Speller ....................... 28.
The Software Toolworks
Mavis Beacon Teaches Typing .... 32.
Visionary Software
Synchronicity ....................... 39.
Voice & Video instruction Videos
The Flipper or Pagemaker 3.0 ... ea. 35.
Word 4.0 Video Tape 35.

FROM MacWAREHOUSE
RoadRacer (X.O.R. Corp.)
Drive a high-performance 1965 Corvette through 5 environments from super high-speed desert flats to twisting mountain roads. Uses digitized sounds, with spectacular scenery, obstacles, and wild crashes. Fly over hills and around curves at up to 200 mph. Score points for fast, skillful driving by steering and accelerating with your mouse and using your keyboard to accelerate and shift. Each level is tougher than the last. Has the most sophisticated high-speed graphics ever achieved on a personal computer. For those who want it. Great for desktop and portable use on the Macintosh II, Mac Plus & SE. Requires Macintosh SE/30, II, IIc, IIIc or IIci. (utilities) $265.

QuadLynx Trackball
The QuadLynx Trackball uses Honeywell aerospace technology to give precise fingertip control over cursor movement. This device offers unmatched precision in cursor placement. Just spin the trackball and the cursor flies across the screen, quickly and accurately to where you want it. Great for desktop publishing, CAD/CAM, graphics and arcade games. (input) $65.

Computer Eyes/Pro
Full-color video digitizer, captures 8-bit or 24-bit color images from any standard video source for professional quality imaging. Includes image manipulation routines, (TIGF, PICT, MacPaint). Images are compatible with virtually all graphics applications. (graphics) Color $349. Also available in B&W $209.

DOSMounter
DOS Mounter is a utility that lets you use the Apple FHDD SuperDrive in the new Macintosh computers. Access MS-DOS disks from the desktop, instead of through Apple File Exchange. With DOS Mounter in the system folder, MS-DOS disks appear on the desktop and behavior just like Macintosh disks. (utilities) $55.
Access Software, Inc.
World Class Leader Board

Artwox
Bridge 6.0
Daily Double Horse Racing
GrafQuest
Broderbund
Ancient Art of War at Sea
Shufflepuck Cafe
Where in the World is Carmen

The Hunt for Red October
Imageware Entertainment

MacEnvelope – Envelope/Label Printing

MacEnvelope Plus

FastLabel (Vertical Solutions)
End label hassles with FastLabel - the revolutionary way to print labels on the ImageWriter and LaserWriter. Pre-formatting instantly creates labels. One step text loading from any commercial database. Save hours of your valuable time! (business) $49.

Metro ImageBase Electronic Art (Metro ImageBase)
High quality 300 dpi electronic art from one of the world's leading publishers of ready to use art. Enhance brochures, menus, reports, newsletters and presentations. One large image per file - 100 per package. Packages available: Newsletter Maker, Business Graphics, Computer & Technology, ReportMaker, Borders & Boxes and 9 others. (graphics) $76.

XOR/PCI
Lunar Rune or MacGolf 2.0

MacGolf Classic
Road Racer
NFL Challenge

FONTS

Adobe
Adobe Type Manager

ATM Plus Pack

Fonts (full line available)

Call
Forms and Schedules

Newsletters
Presenations

Textures, Fills, and Patterns

Altsys
Fantastic Plus 2.0

Metamorphosis

The Art Importer 2.0

Emerald City Software

Type Align

Letraset

LetterFonts (various)

Tactile Software

ArtFonts Vol. 1 or 2

Orange Micro

Alphabets

FastLabel (Vertical Solutions)
End label hassles with FastLabel - the revolutionary way to print labels on the ImageWriter and LaserWriter. Pre-formatting instantly creates labels. One step text loading from any commercial database. Save hours of your valuable time! (business) $49.

MacEnvelope 4.1

and MacEnvelope Plus (Syenx)

Envelope and Label Printing in
one package! MacEnvelope 4.1 combines all of the features of envelope and label printing in one easy-to-use package. Import up to 1000 addresses per file. Unique Postal Bar Coding speeds delivery and saves money on postage (bulk mailers). Over fifty preformatted ready-to-use label and envelope styles. Create/save layouts, print graphics, messages, fonts and color. $79.

MacEnvelope Plus saves up to 100,000 addresses per file. Provides list management features such as comments, flags, multi-level sorting and print range. (business) $149.

GRAPHICS & DESIGN

3G Graphics
Images w/impact

Graphics & Symbols 1

Business 1

Accents & Borders 1

Adobe
Illustrator 88 1.9.3

Photoshop

Call

Streamline

Aldus
Freehand 2.0

Apture Technology

Aperture Visual Information Mgr.

Broderbund

Drawing Table

TypeStyler

Casady & Greene

Vivid Impressions Vol. 1

Chaparral

Denso

Canvas 2.0

Ultra Paint

Digital Vision

Computer Eyes B&W

Computer Eyes Pro Color

Dream Maker

Clipures, Business Images

MacGallery

Studio 1

Studio 1 & MacRecorder

Studio 8

Graphsoft

Blueprint

Innovative Data Design

Dreams

MacroMind

MacroMind Accelerator

MacroMind Director

VideoWorks II

Stock Images

Deneba

Illustrator 88 1.9.3

Photoshop

Freehand 2.0

MacDraw II

MacPaint 2.0

Index

Cricket Color Paint

Clips, Business Images

MacDraw II

MacPaint 2.0

Cricket (Computer Associates)

TypeStyler

Art Deco or ReportMaker

Broderbund

Card access is fully supported by Omni 5. Included is Omni 5 Express which allows the beginner to outline requirements of an application and build their first applications. (database) $32 ea.

3G Graphics
Images w/impact

Graphics & Symbols 1

Business 1

Accents & Borders 1

Adobe
Illustrator 88 1.9.3

Photoshop

Call

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Computer Eyes B&W

Computer Eyes Pro Color

Dream Maker

Clipures, Business Images

MacGallery

Studio 1

Studio 1 & MacRecorder

Studio 8

Graphsoft

Blueprint

Innovative Data Design

Dreams

MacroMind

MacroMind Accelerator

MacroMind Director

VideoWorks II

Stock Images

Deneba

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Photoshop

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Dust Covers

Basic Needs dust covers lock great! Machine stitched and custom fitted. The covers are made from washable rip-stop nylon and won't crack, yellow, or fade like similarly priced vinyl. (accessories) Starting at $11.

CanOpener

Information retrieval utility for the Mac. CanOpener will search anywhere, and let you retrieve just about anything, including text, pictures and sounds. Contains text inside pictures, and gives you the whole picture! Any file you retrieve with CanOpener can be stored in its library, so the next time you need it, it's just a click away! (utilities) $65.
Mac-101 Keyboards (DataDesk International)

Features 101 keys including a numeric keypad, a separate T-shaped cursor keypad, Cancel Key, Option and Command keys at both ends, definable function keys, plus scrolling, page control, and zooming keys. Manufacturer's two year warranty. (input/output) $139. International Versions also available.

Select Micro Systems
MapMaker 4.0 ........................................ 245.
Silicon Beach
Digital Darkroom .................................. 249.
Super 3D 2.0 ........................................ 315.
SuperPaint 2.0 ....................................... 125.
Strata
StrataVISION 3d ................................... 375.
SuperMac
PixelPaint 2.0 ....................................... 225.
PixelPaint Professional .......................... 355.
Tactic Software
Art Clips Vol. 1 ..................................... 51.
Art Clips Vol. 2 ..................................... 65.
SoundChips Vol. 1 or 2 ............................. ea 45.
Zedcor
Deskpaint 2.0 ....................................... 65.

White Knight 11.0 (FreeSoft)
White Knight is Scott Watson's successor to the legendary Red Ryder telecommunications program. It's more than just a new version - the added new features list alone is more than 20 pages long! The 270+ page manual has plenty of step by step tips to help beginners communicate like the pro's in no time. White Knight comes bundled with Okto, a revolutionary Mac-to-Mac file transfer program. A free subscription to the Genie network is also provided. (communications) $89.

HARDWARE & PERIPHERALS

Cutting Edge
Two Page Monochrome Monitor ............. 999.

TEST
Best PC Scan Plus ......................... SPECIAL 699.

General Computing Company
WriteMove Ink Jet Printer ................... 575.

Magmavox
Color Monitor 14" ................................ 535.

Microtek
Microtek MSF-300GS Scanner .............. 1589.

Mobius
Multiscreen Video Card w/ Princeton 15" monitor .................. 529.

Qume
Crystal Print Publisher ...................... 2900.
SeikoShiba America ......................... 235.
SeikoShiba Printer (dot-matrix) ........... 235.

Sharp
The Wizard ....................................... 249.

ThunderWare
LightningScan .................................. 369.
Lightning 5.0 ..................................... 187.

HYPERWARE

Activation
Focal Point II .................................... 117.

Reports for HyperCard ....................... 69.

Bantam

Bacon
HyperCheat International ................... 175.

HyperBible International Version ........... 175.

HyperBible King James Version ............ 145.

HyperPower
ArchText ......................................... 199.

Casino Master (Centron)
Become a Master of Casino Gambling! Five separate casino games include Blackjack Ace, CrapsMaster, Roulette Master, PokerMaster, and Baccarat Master. Exact table simulation, mouse controlled betting, selectable bankroll, stored win/lose statistics and complete manual included. Now available in dazzling color in the Mac II version! Recommended and used by professional gamblers! (entertainment) Buy individual games for $27, each or get the 5 game Casino Master Package for $49, or the Deluxe Mac II color version for $55.

Bright Star Technology
HyperCharger I.5.1 .............................. 99.

HyperDesk International .................... 229.

ICOM Simulations
HyperTMON ...................................... 59.

MicroMaps
HyperAtlas ...................................... 59.

Power Up
HyperTutor ....................................... 29.

Silicon Beach
SuperCard ........................................ 125.

SoftStream International
HyperHit .......................................... 125.

Springboard
Family Matters .................................. 28.

Symmetry
HyperDA 1.2 ...................................... 49.

TimeWorks
HyperWorks Organizer ....................... 57.

INPUT/OUTPUT

Altra
Felix .............................................. 127.

Asher Engineering
QuadLYNX Trackball .......................... 65.

CE-105 ADB Keyboard ......................... 125.

DataDesk Intl.
Mac 101 Keyboards ......................... 139.

International versions ...................... Call.

Kensington

Kiola
MacVision 2.0 ................................... 219.

Kraft
Adjoystick Premium III (SE&II) .......... 49.

QuickStick ................................. 39.

Kurta
IS/ADB Tablet 8 1/2 x 11 ..................... 255.

Mobilux
Cordless Mouse ................................. 99.

Moto Systems
A- Mouse (SE&II) .............................. 79.

A- Mouse (6/Plus) ......................... 63.

Omnigrafix Solutions
The Cordless Mouse ......................... 99.

MouseMaster ...................................... 57.

Summographics
Bit Pad Plus ................................... 325.

LANGUAGES

Digitalik, Inc.
Smalltalk/V MAC .................................. 129.

Microsoft
QuickBasic ...................................... 65.

Shana Corporation
Inside Out ....................................... 369.

Smethers Barnes
Protocol ................................. 189.

Symantec
THINK'S C 4.0 .................................. 169.

THINK'S Lightspeed Pascal ............. 105.

Zedcor
ZBASIC 5.0 ...................................... 89.

MEMORY UPGRADES/ACCELERATORS

1 MEG SIMMS

Dove (full line available)
MaraThon 030 Accelerator ................. 969.
MaraThon 030X .................................. 969.
MaraThon Racer ................................ 149.

MacSnap 2S ........................................ 209.

MacSnap 4S ........................................ 409.

MacSnap 8S ......................................... 818.

MacSnap S24E ................................. 187.

MacSnap S24F .................................. 239.

MacSnap S48S .................................. 499.

HyperDialer (DataDesk International)
Now you can connect your Macintosh to your existing business or office telephone for automatic dialing with Apple's HyperCard. DataDesk's HyperDialer is designed specifically for HyperCard's touch-tone dialing capabilities and works with line business phones without requiring a modem or dedicated phone line for automatic dialing. Automatically dials HyperCard's SideKick, Focal Point, C.A.T. SuperCard and QuickDex phone numbers. It connects to Mac speaker port - not a previous serial port. (hardware) $29.

FileGuard Extended Edition
Protect your hard drives from unauthorized access, copying and erasure. Protect applications and files from unauthorized access, deletion, and/or illegal copying. Protect desktop including system folder and alterations by unauthorized users. (supplied) Single Pack $129. Office Pack 5 $309. Office Pack 10 $559. FileGuard 1.04 - File Protection Only $125.
At Once! (Layered)
Take the worry out of bookkeeping. This fast, fully integrated accounting package includes a General Ledger, Accounts Receivable and Payable, plus Payroll. The list of indispensable features include an extensive HyperCard tutorial and context-sensitive on-line help. Reports are fully customizable and a built-in print queue lets you batch reports for unattended printing. For most businesses, this is everything you need, all in one place. (Finance) $289.

SECURITY & VIRUS PROTECTION

BackMatic (Magic Software) BackMatic automatically backs up your files each time you shut down your Mac. Ideal for 5.25" drives. (Utilities) $50.

AutoSave II The AutoSave feature allows you to set a periodic Save Command to the running application. You can set the interval between saves from one to 99 minutes. (Utilities) $29.

ATOOLS

CanOpener (Abbott Systems) CanOpener accesses the 3.5" drive of 1.2 meg on high density 3.5" standards. Plus 1.44 meg on low density drives. (Utilities) $30.

MacSpin 2.0 ......... ............ .............. 189.

Odesta Data Desk Professional .............. .... ... ............. 219.

Wolfram Research Mathematica (SE) .............. .... ... ............. 435.

UTILITIES

BackMatic (Magic Software) BackMatic automatically backs up your files each time you shut down your Mac. Install this handy INIT in your system Folder, and you'll never need to remember to make a backup again. You can configure it to back up your files every time you change them, or all your most important files. (Utilities) $50.

AutoSave II The AutoSave feature allows you to set a periodic Save Command to the running application. You can set the interval between saves from one to 99 minutes. (Utilities) $29.

DREAMS

(IDD, creators of MacDraft, offers a powerful precision drawing tool for professional scaled drawings, illustrations, presentations and general purpose graphics. Dreams offers zoom, rotation, layers, dimensioning, symbol libraries and a vast array of drawing tools, as well as many advanced illustration features. You can merge shapes together, cut edges of objects using other objects as templates...even lines and curves to form unique shapes to be filled with colors or patterns. (Graphics) $325.

STRESS

Biofeedback (BioMedics, Inc.) Biofeedback allows you to monitor your body's stress levels and help you relax. (Medical) $149.

BrainPower BrainPower offers a stress management program that helps you relax and improve your concentration. (Education) $149.

DIXY

Dixy-Postal (Dixy-Postal Systems, Inc.) Dixy-Postal automatically backs up your files each time you shut down your Mac. Ideal for 5.25" drives. (Utilities) $50.

AutoSave II The AutoSave feature allows you to set a periodic Save Command to the running application. You can set the interval between saves from one to 99 minutes. (Utilities) $29.

BackMatic (Magic Software) BackMatic automatically backs up your files each time you shut down your Mac. Install this handy INIT in your system Folder, and you'll never need to remember to make a backup again. You can configure it to back up your files every time you change them, or all your most important files. (Utilities) $50.

AutoSave II The AutoSave feature allows you to set a periodic Save Command to the running application. You can set the interval between saves from one to 99 minutes. (Utilities) $29.
### DiskFit 1.5 (SuperMac)

A handy utility for backing up your hard disk on a series of floppies. It saves time because it backs up only those files which have changed since the last backup. DiskFit can verify each floppy after copying files onto it, so you know that your files are safe. DiskFit also discards old versions of files so your backup set doesn’t keep growing. Version 1.5 supports a variety of cartridge tape drives, including the Apple tape backup system. (utilities) $58.

**Dayna Communications**
- DOS Mounter ............... 55.
- Emerald City Software ................ 149.
- Fifth Generation .................. 107.
- FastBack 2.5 ..................... 34.
- Pyro ...................... 44.
- Suitcase II ...................... 48.

**ICM Simulations**
- On Cue .................... 35.
- Insight Development ................. 35.
- MacPrint .................... 95.
- Magic Software ................. 88.
- AutoSave II ................... 29.
- BackMate ...................... 50.
- POWERemotions or POWERemotions ea. 29.
- Mainstay ...................... 49.

**Microlytics**
- GOfer ...................... 45.
- Oldervai ...................... 139.
- ClipShare ...................... 50.
- MultiClip ...................... 50.

**On Technology**
- On Location ..................... 75.

**TypeAlign**

TypeAlign (Emerald City Software)

Exclusively for AT&T owners, gives your type a change of face with TypeAlign. Rotate, wrap, skew and kern type, then add special effects like outlines and see it all on screen instantly. Print it on any AT&T-supported printer including ImageWriters, DeskWriters and LaserWriters. Works with major word processing, desktop publishing and presentation programs and Adobe PostScript fonts. Also supports over 16 million colors. (fonts) $63.

### WORD PROCESSORS & OUTLINERS

**DeltaPoint, Inc.**
- MindWrite 2.1 ................ 58.

**Ashton-Tate**
- FullWrite Professional ........... 259.
- Claris ...................... 179.
- MindWrite II .................. 249.
- Microsoft ..................... 65.

**New Horizons Software**
- WordMaker ..................... 65.
- Niles & Associates ................. 75.
- End Note ...................... 75.
- Symmetry ...................... 65.
- Acta Advantage w/DA .............. 65.
- T-Maker ...................... 229.
- WordPerfect Corp. ................ 229.
- WordPerfect ...................... 75.

**Working Software**
- QuickLetter ...................... 75.

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**CONTEST RULES**

1. Entries must be received on or before 4/30/90. 2. Winners selected in random drawing by attorney for MacWAREHOUSE Inc. (MWH), whose decisions are final. 3. MacPortable Computer purchased to be delivered by MWH. MWH reserves the right to substitute a Macintosh SE with similar features. 4. Winners responsible for taxes. 5. Odds of winning depend on number of entries. 6. Prizes: A MacPortable Computer w/40MB hard disk and 150 software applications.

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Circle 38 on reader service card
The year 1989 saw the introduction and maturation of some exciting products and technologies. The appearance of the Macintosh Portable, along with a new line of faster Macs, would be exciting enough in a duller year to raise anyone's heart rate, but we also saw the announcement of System 7, the rollout of revolutionary products such as Adobe Type Manager (ATM) and Freedom of Press, intelligent interfaces and voice recognition, sophisticated calibration techniques, 32-bit QuickDraw, higher standards for DTP, continuous-tone thermal printing — and the list goes on and on. With all these introductions and changes, how do you decide which products are the very best?

Every year, the entire editorial staff of MacUser goes through a grueling but exciting process: We survey the expanding Macintosh universe (no mean feat), come up with a long list of nominees in 40 categories, hold them up against a year's worth of lab tests, and vote for the top products of the year. The result is the select group of products that are known as Eddy Award winners.

We also honor the best new technology of the year, the most-significant hardware and software products (trendsetters that set the stage for the future), and the best overall hardware and software products of the year.

The Eddies help you assess the Mac universe, but you don't get great products without great people. This is why we're introducing two new categories this year, the John J. Anderson Distinguished Achievement Award and the Derek Van Alstyne Rising Star Award, named in honor of the two MacUser editors who died tragically during the California earthquake of October 17, 1989. With these awards, we honor the human face in the interface, which is, after all, the prime engine that moves the Macintosh world.

By the Editors of MacUser
**Awards**

**Best Database**
4th Dimension

This year’s Eddy goes to ACIUS’ 4th Dimension 2.0, for its increased power and performance. ACIUS revised 4D’s manuals from stem to stern and made marked advances in 4D’s speed. These improvements, coupled with automatic button scripting, multipage layouts, superior relational strategies, streamlined data management, and easier-to-use procedures, make 4D 2.0 the most powerful database on the Mac.

**Honorable Mentions**

Honorable mention goes to Omnibis 5 from Blythe, for its extensive growth in interface design and graphics support and its ease of porting to MS-DOS platforms. An honorable mention also goes to Double Helix II 3.0 from Odessa, for power improvements to an old user-friendly favorite.

**Best Spreadsheet**
Wingz

Wingz 1.1 from Informix advanced the spreadsheet environment with 3-D graphics and graphic tools; a full scripting language that’s powerful enough to modify the interface of the program; a wide selection of control devices such as buttons, sliders, and pop-up menus; and comprehensive number crunching that ranges from hyperbolic to matrix mathematics. Wingz is not just a powerful spreadsheet; it’s a sophisticated development environment for customized applications.

**Honorable Mentions**

Ashton-Tate’s Full Impact 1.1 is a front-runner in the spreadsheet arena, with its scripting language and virtual memory. Microsoft improved upon its best-selling spreadsheet in Excel 2.2 by enhancing its interface, which adds interapplication communication with its sister product Microsoft Mail.

**Best Word Processor**
Microsoft Word

Microsoft listened to its users before producing Word 4.0. Not only did it eliminate nearly every problem of the infamous Word 3.0, but it also added some genuinely innovative features, such as an integrated table maker, completely customizable menus, and dynamic data links, while vastly improving the interface. Word 4.0 is an exceptionally powerful word processor, with an amazing array of features, but without the speed and memory penalties you might expect.

**Honorable Mentions**

MacWrite II 1.1 from Claris packs a terrific interface and an impressive set of features—including an open architecture that supports extensive file translation. Nisus 2.03 is Word’s fast high-end competitor from Paragon Concepts, with superb editing features, unlimited undo, a powerful search capability, macros, and an integrated, object-oriented graphics environment.

**Best Accounting Package**

atOnce!

atOnce! 1.01 is the superb integrated general-ledger, accounts-receivable, accounts-payable, and payroll system for small businesses from LevelFour, the publisher of Insight. Its automatic posting routines are the secret to its integration — an entry in one module ripples through the others. Its password security; lists of accounts, customers, and bills; custom report writer; and flexible payroll system — coupled with an excellent interface — set the pace for small-business accounting.

**Honorable Mentions**

Arguably the best business deal on the Mac, M.Y.O.B. 1.02 from Teleware offers an integrated accounting system that’s ideal for companies computerizing their books, with step-by-step on-line setup instructions, at an incredibly low price. Computerized Classic Bookkeeping 2.2 from Absolute Solutions is the first spreadsheet-based accounting system for the Mac that really works, bringing all the number-crunching power of Excel with only a few of its limitations.

**Best Personal-Finance Package**

MacInTax

MacInTax from SoftView is the most popular tax package for the Macintosh, and with good reason. It not only offers high-quality on-screen representations of IRS forms, but also numerous worksheets and tools, such as a converter for last year’s MacInTax federal forms and an itemization tool that automatically sums individual items and provides a printable list for justifying deductions. SoftView offers an electronic filing service for fax and disk submissions, and in late ’90, you’ll be able to file by modem.

**Honorable Mentions**

Quicken 1.5 from Intuit is an improved version of last year’s Eddy winner, the best one-write, check-ledger-based accounting system for the Mac and a great companion for MacInTax, providing detailed linking reports for tax deductions and sources of income for various IRS schedules. CheckWriter II 2.05 from Aatrix places your checkbook at the center of your financial universe, giving you automatic recurring payments, check reminders, and a powerful search feature for locating related transactions.

**Best Communication Product**

InterFax 24/96

Aberon’s InterFax 24/96 is as versatile and useful a modem as you can find anywhere: It...
incorporates a 2,400-bps data modem with Level 5 MNP and a 9,600-bps Group 3 fax modem. Its fax software is easy to use and produces excellent output (especially when used with Adobe's AT3: it can also send and receive in the background, even without MultiFinder. And whenever you’re not telecommunicating with the InterFax’s data port, the InterFax 24/96 is ready to send or receive a fax.

Honorable Mentions

We were impressed with the marketing savvy of Parallon for its Portable Pac, a useful collection of network connectors, wires, and software for the road, but it was edged out by two other maturing products. Microphone II 3.0 incorporates support for the highly efficient ZMODEM protocol and lets you create a complete custom front end, replete with color icons, dialogues, and access to HyperCard XCMs. Microsoft Mail 2.0 is a straightforward E-mail package meant for use at large sites, with automatically propagating directories and interapplication communication with Word and Excel.

Best Page-Design Program

QuarkXPress

Electronic publishing has taken an obvious turn toward the high end, incorporating essential features such as color separation and comprehensive design tools. QuarkXPress 2.12 leads the way with prepress links, on-screen type scaling, process-color separations, and easy expandability via its XTensions add-on modules. These features, combined with its sophisticated graphic and typographic tools, make it a winning package.

Honorable Mentions

Let set’s high-end DesignStudio offers 24-bit color and a rich set of graphic and typographic controls, plus such niceties as a pasteboard metaphor, object grouping and rotation, editable thumbnails, and add-on modules. TimesLators’ low-end Publish LT is an inexpensive, well-rounded package for users who’ve been left behind by the giants.

Best Presentation Product

DeltaGraph

When a small company produces a product that’s not only the best in its class but a terrific value as well, it deserves recognition. DeltaPoint’s DeltaGraph 1.0 is currently the best Mac charting and graphing application. It’s powerful, flexible, and a bargain. DeltaGraph combines 2-D and 3-D color charting with object-oriented graphics and maintains compatibility with spreadsheets such as Excel and Tabula and true graphics applications such as Illustrator 88.

Honorable Mentions

Aldus Persuasion 2.0 now leads the field in conventional slide-making presentation tools.

The John J. Anderson Distinguished Achievement Award

The Original Macintosh Development Team

The John J. Anderson Distinguished Achievement Award recognizes more than mere technical excellence. John was a champion of good user-interface design, of using computers to enhance human creativity, and of pushing the envelope.

John recognized immediately that the original Mac embodied these virtues. Hence, it is the spirit and enduring achievement of the original Mac team — a group of nearly 40 individuals — that we recognize this year. It was their vision of the Macintosh, introduced in January 1984, that really changed the way we think about computers. Over the next six years, the promises of the little Mac were realized, one by one, until we reached the Mac of today, vastly more capable and yet undeniably the same machine.

Some of the members of that original team have remained in the limelight. Bill Atkinson invented HyperCard. Andy Hertzfeld continued to look out for the Mac user even after leaving Apple. And Chris Espinosa is familiar to longtime readers of this magazine. These are just three members of an extraordinary team.
Awards

with a full-featured outliner and auto-templates for faster slide design. And MacroMind Director 1.0.1 has almost single-handedly made Mac animation a pervasive element in presentations.

**Best Typographic Product**

*TypeAlign*

Sophisticated typography is finally coming of age on the Mac, thanks in part to ATM and its first top-notch add-on product, *TypeAlign 1.0*, by Emerald City. This simple, elegant DA lets you type text directly onto lines, arcs, and free-form curves. The text can be kerned, colored, rotated, or distorted and then pasted directly into an application or saved as PICT or EPSF files. If you have ATM and want to do typographic special effects, *TypeAlign* is a must.

**Honorable Mentions**

Adobe Type Manager is the first product to provide WYSIWYG display of Adobe PostScript fonts, and it also improves the appearance of large type sizes on non-PostScript printers. Broderbund's *TypeStyler 1.0* lets you create sophisticated special effects with thousands of third-party PostScript fonts.

**Best OCR Product**

*OmniPage*

Caere's *OmniPage* was the first automatic OCR package for the Mac and one of the easiest to use. It was also the first with page-recognition capabilities that enabled it to recognize page-layout formats and text styles. Version 2.0 added landscape-oriented scanning and recognition; ten European character sets; more file formats for saving; better format retention for tabs, indentation, justification, and bold and italic text; and more scanner support.

**Honorable Mentions**

Accutext 1.0 from Xerox Imaging Systems is the chief challenger to *OmniPage* in the world of automatic OCR, with its sophisticated context intelligence and scanner and recognition controls. In the sphere of trainable packages, *ReadStar II Plus 1.0* from Innovac leads the way for its speed and accuracy, followed by *TextPert 3.0* from CTA for its support of many languages and alphabets.

**Best Graphics Program**

*Canvas*

Of the fine programs that were introduced or matured in '89, *Canvas 2.1* from Deneba stands out. It has evolved into a multipurpose drawing and painting application with 24-bit color, unlimited layers, Bezier curves, precision tools, bit-mapped editing at high resolutions, a spelling checker, and full color separation. A bundled DA version adds considerably to its value.

**Honorable Mentions**

*PixelPaint Professional 1.0*, from Super-

Mac, delivers virtually limitless colors, sophisticated effects, and a comfortable interface for creating, editing, and color-separating full-color images. Studio/1 1.0 from Electronic Arts is arguably the best black-and-white painting program for the Mac, and its tools are a joy to use. It's also a capable animation program.

**Best 3-D Graphics Program**

*Swivel 3D*

The Mac's graphics frontier has taken great strides into the third dimension. *Swivel 3D 1.1* from Paracomp advances Macintosh 3-D modeling on several fronts: speed of drawing, an object-handling interface, realism, sophisticated animation, and mechanical linking of objects. Its exportation skills let you place 3-D...
renderings into still and animated presentations.

**Honorables Mentions**

Strata Vision 3D 1.0 from Strata combines a friendly interface with mainframe-grade photo-realistic 3-D rendering. Its effects include ray tracing, refraction, shadows, smoothing, and anti-aliasing. Super 3D 2.0 from Silicon Beach has a very Mac-like interface, powerful cloning and shaping abilities, and animation. It’s an excellent general-purpose 3-D tool.

**Best Animation Program**

**MacroMind Director**

MacroMind Director is a large, complex, powerful program that’s easily the best graphics-animation package for the Mac. If you can draw it, digitize it, or electronically sculpt it, Director can import, combine, animate, synchronize, and title it and play back the finished product. It’s the key software for multimedia productions on the Mac.

**Honorables Mentions**

Studio/1 from Electronic Arts combines an excellent black-and-white painting program with frame-by-frame animation, sound, and sophisticated motion effects, even into the third dimension. SuperCard, Silicon Beach’s hyperauthoring software can create and script-animate its objects, record motion, play PICS files, and synchronize the action with sound.

**Best CAD Package**

**Vellum**

In the expanding universe of Macintosh CAD (there are currently almost 50 products), it’s tough to weigh feature against feature and come up with a winner. Ashlar’s Vellum, a 2-D (and soon-to-be 3-D) CAD package, wins this year’s Eddy not so much as a feature powerhouse but because of its breakthrough intelligent interface. Vellum’s drawing assistant anticipates likely acts in the process of drawing, helping you sketch out your draft. Coupled with Vellum’s integrated parametrics, it’s a first for Macintosh CAD.

**Honorables Mentions**

Claris CAD, the most popular package for the Mac, was a serious contender here, but it was edged out by two key products. Powerhouse MicroStation Mac from Intergraph is a multi-user CAD package that uses reference drawings (overlays) for work-group projects over a network, as well as a multiprison file format. And In-CAD from Infinite Graphics is the first package to bring true 3-D solids modeling and stereo lithography to the Mac.

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**The Derek Van Alstyne Rising Star Award**

Raymond Lau

If the John J. Anderson Distinguished Achievement Award takes a long look backward to recognize enduring contributions, the Derek Van Alstyne Rising Star Award is an attempt to predict the future. Derek was a rising star—a brilliant, dedicated programmer with a vision of the bright future that personal computers can bring. This year’s recipient, Raymond Lau, also embodies these characteristics.

Ray Lau is a programmer in the Derek Van Alstyne mold: tireless and brilliant, with vision and the courage to try his wings. Many Mac users have downloaded files from an information service such as CompuServe and encountered Ray Lau’s brilliance. Ray is the sole author of StuffIt.

**StuffIt**, a data-compression program that can be used to speed data transmission over phone lines or to squeeze more data onto a floppy disk, would be an impressive program if it had been a commercial product developed by a team of professional developers with years of programming experience. It was, in fact, a shareware program written by a 15-year-old. With StuffIt, Ray did something that many major software vendors have failed to do: He single-handedly established a standard data format for an application area. This fall, Ray’s accomplishment began to pay off as Aladdin Systems started distributing a commercial version of StuffIt.

Raymond Lau; a rising star in the Macintosh firmament.
Awards

Best Backup Software

Retrospect

Retrospect 1.1 by Danz Software can quickly store data on almost every backup medium. It also offers flexible, comprehensive options to make selecting a specific group of files easy. Although originally touted as software for archiving, it also makes backup chores as painless as possible.

Honorable Mentions

Fifth Generation Systems’ Fastback II 2.0 can also back up to numerous different devices with unparalleled speed in backing up to floppy disks. Redux 1.6 from Microseeds Publishing is another superb backup program, with incremental backup to any Finder-mountable drive.

Best Information-Management Software

KeyPlan

Project-management software is often a trade-off between power and ease of use, and even midrange products can be daunting to use. KeyPlan 1.0, the graphically oriented product from Symmetry, is designed to change all that. It offers both CPM and Gantt project analysis but starts you out in its Acta-compatible outline, a bow to the way people really begin planning.

Honorable Mentions

Kaetron’s TopDown 1.1a is a flowcharting application with intelligent symbol connections and excellent document-navigation and reporting skills. Focal Point II from TenPointO, the top HyperCard-based information organizer, integrates a Rolodex and calendar with time, project, and financial-management tools.

Best Connectivity/Networking Software

MacLinkPlus/PC

MacLinkPlus/PC 4.0 has secured its place as the dominant file-translation program between different hardware platforms. It now includes more than 150 translators for programs in the Mac, DOS, NeXT, and Sun operating systems. It works from inside MacWrite II, TOPS, and DaynaFile, and transfers files over networks, modems, and serial links.

Honorable Mentions

Apple’s CL/1 server for VAX/VMS is a landmark step toward automatic access to databases on host minicomputers and mainframes. Farallon’s Timbuktu Remote 1.0.1 allows you to control another Mac and pass files to and from it through a modem connection.

Best Connectivity/Networking Hardware

DirectServe

The winner is Jasmine’s DirectServe, an affordable AppleShare-compatible server drive that doesn’t require a dedicated Mac. The list price of the DirectServe is $800 less than that of a Mac Plus with AppleShare server software. Just format as many SCSI hard disks as you need with the DirectServe, and you’re up and running.

Honorable Mentions

Shiva’s EtherGate is a versatile new AppleTalk router with two serial ports and an Ethernet connection that can be used as an Ethernet-to-LocalTalk router. Photonics’ innovative PhotoLink provides wireless infrared LocalTalk connections.

Best Math/Statistics Program

Theorist

Theorist 1.01 from Prescience is an equation-solving and -graphing package that surpasses the highly rated Mathematica, last year’s

Most Significant Hardware Product

Voice Navigator

When we first saw a prerelease version of Articulate Systems’ speech-recognition system, Voice Navigator, we expected it to be a crude and buggy experiment. We were amazed. Even then, it ran smoothly and effectively. As we watched it evolve, one thing became clear: Speech recognition is a vitally important computer technology. Voice Navigator’s expansion of the interface beyond the keyboard, mouse, and screen is a major step toward computing with a human face.

Honorable Mentions

Color accuracy is a major concern in electronic publishing, and the Barco Calibrator monitor (also marketed by RasterOps as the ColorBoard 724 Calibrator System) provides superior results. Honorable mention also goes to the Mitsubishi S340-10 dye thermal-transfer printer, the first to bring continuous-tone color images to the Mac desktop.
Go beyond New York, Venice and Geneva
for only $99.

Now that Adobe Type Manager™ is opening up a whole new world of type to every Macintosh® user, it’s time to venture beyond the standard fonts—like New York, Venice and Geneva.

Introducing the Adobe Type Set™ font packages. Each sells for just $99 and includes seven carefully chosen fonts worth hundreds of dollars if we sold them separately. So your dollar goes further than ever.

Adobe Type Set 1:

VAG Rounded Bold  TRAJAN™
Freestyle Script  Bodoni Poster
Hobo  Linotext*  Cottonwood™

Adobe Type Set 2:

Franklin Gothic® No. 2 Roman
Peignot® Demi  Juniper™
Cooper Black  LITHOS® BOLD
COPPERPLATE GOTHIC

But the really far-reaching news is what happens when you combine ATM™ with the Adobe Type Sets. For starters, you’ll get printed text that more closely matches your screen image—even from a low resolution, dot matrix printer like the ImageWriter. If you’re an Apple LaserWriter or other Adobe PostScript® printer owner, you’ll be amazed at how your screen type can be scaled to virtually any size, on the fly, and still look smooth and legible.

So if you’ve been tempted to explore the wonderful world of fonts, this is your chance to travel first class. With a select group from the Adobe® Type Library.

Adobe Systems Incorporated

Adobe, the Adobe logo, PostScript and the PostScript logo are registered trademarks and Adobe Type Set, Adobe Type Manager, ATM, Cottonwood, Juniper, Lithos and Trajan are trademarks of Adobe Systems Incorporated in the U.S.A. Apple LaserWriter, ImageWriter and Macintosh are registered trademarks of Apple Computer, Inc. "Linotype, Peignot and Present are trademarks of Linotype AG and its subsidiaries. Franklin Gothic is a registered trademark of Kingsley ATF Type Corp. ©1990 Adobe Systems Incorporated. All rights reserved.
Eddy winner, in interface and execution. Equations can be solved numerically or algebraically, or plotted as interactive 3-D graphs that can be animated, all without the user's having to learn any programming or syntaxes.

Honorable Mentions
Data Desk 3.0 from Odesta and JMP 1.0 from SAS Institute are excellent packages for advanced statistical analysis, featuring graphical interfaces that let you point at plotted data to get information or perform further analysis.

Best Acquisition/Analysis Product
SuperANOVA
Data comes in a variety of forms, and the three packages considered for this category are all very different. SuperANOVA 1.0 from Abacus Concepts edged out the others because of its broad-based appeal, presenting general linear modeling for the common man. A complete drawing environment is included in addition to its long list of analysis features.

Honorable Mentions
Strawberry Tree's Analog Connection Workbench 3.0 enables users to create a data-acquisition, monitoring, and control environment in a few hours, using simple flowchart icons. And if your data takes the form of X-rays or micrographs, Image Analyst 7.1 from Automatix combines measurement, enhancement, and analysis in a complete scientific image-processing system.

Best Word-Processing Utility
Acta Advantage
Word processors are becoming increasingly powerful, but they—are and we—still need extra help. Acta Advantage 2.01 from Symmetry Software is an outliner and an organizer of text and graphics. It comes as both an application and a solid DA, giving you the freedom to jot down ideas, brainstorm, or flesh out a concept at any time. It's excellent for research, planning, and producing sorted lists and graphic catalogs.

Honorable Mentions
GOfer 2.0 from Microlytics can quickly browse through the text in hundreds of pages in hundreds of documents. Thunder II from Electronic Arts is a well-designed interactive and batch spelling checker and glossary for programs and DAs.

Best Graphics/Publishing Utility
Freedom of Press
Graphics and publishing disciplines both rely on quality output. Freedom of Press 2.1a software, from Custom Applications International, makes sophisticated PostScript effects available on scores of non-PostScript printers and imaging devices. This puts page proofing and high-resolution final output within the capabilities of many excellent but previously incompatible peripherals.

Honorable Mentions
A crowded field of excellent utilities—including DeskPaint and DeskDraw from Zedcor and Adobe Separator—made the decision difficult, but two products stood out as honorable mentions. SmartArt, from Emerald City, delivers a collection of graphic PostScript effects that can be customized and pasted into other documents. SnapJet 2.0 from Wildflower Software places captured screen areas into floating windows for referencing, copying, or saving.

Best File-Management Utility
CanOpener
Until CanOpener, even so-called universal file openers required you to save a document in
the file opener’s unique format first, but thanks to Abbott Systems, that interim step is a thing of the past. CanOpener 1.1 not only opens any type of paint, PICT, EPSF, or text file without conversion, but it can also search for text strings — even within a graphic — and recover data from files with corrupted proprietary formatting. It can also display suppressed text in documents from word processors with multiple levels of undo.

HONORABLE MENTIONS
Complete Undelete 1.02 from 1stAid Software can recover deliberately trashed files as well as partially overwritten and previous versions of files that have been copied over. DiskTop 4.0 from CE Software is the best Finder alternative around, now bundled with Microlytics’ GOfer, a text-search program.

BEST GENERAL UTILITY
Virtual
Connectix’s Virtual 2.0 wins in this category. Although Apple promises virtual memory as part of System 7 for 68030 and 68020 systems (the latter with PMMUs), Virtual provides the same functionality now. Version 2.0 provides 9 megabytes of address space plus an additional megabyte per free NuBus slot. SE/30 owners have six virtual slots, giving them a total of 15 megabytes, while IIX owners have three virtual slots in addition to the three you can actually put cards into.

HONORABLE MENTIONS
Aladdin System’s ShortCut 1.0.1, written by Raymond Lau, is an INIT/cdev that lets you find files (even within StuffIt archives), unstuff them, jump directly to folders, and select specific files directly, all from the keyboard. Boomergang 2.0B9 is a freeware INIT that remembers the last 15 to 30 folders and files you’ve accessed and presents them in a pop-up menu every time you select Open or Save from the File menu.

BEST PROGRAMMING TOOL
Prograph
Prograph 1.2 from TGS Systems is a revolutionary new way of programming. Unlike text-based programming languages, Prograph’s object-oriented language is totally pictorial. For many programmers, using Prograph will require a major mind shift, but for nonprogrammers, this is one of the first programming systems that does not require the comprehension of Byzantine command and character combinations.

HONORABLE MENTIONS
THINK C 4.0 is important because it introduced object-oriented programming into the well-known THINK C development environment. SmathersBarnes’ Prototyper 2 deserves mention because it clearly shows the direction that CASE interface tools should be taking on the Mac.
Usually, the technology available to computer users just plods along—with competing products repeating one another's so-called improvements.

But once in a blue moon there's a great leap of innovation. Something new appears that's so well thought out, so smart, that the way you work may never be the same again. WIZ™ by CalComp, for example.

WIZ is an exciting new productivity tool. Combining the easy-to-use features of a mouse with the power of an "intelligent" graphics pad to enhance every pointing, tracing and drawing function you do. WIZ meets the needs of virtually every Macintosh and PC user—from novice to advanced. Because WIZ gives you the convenience and flexibility of six programmable buttons, a cross-hair pointer and 1000 dpi for pinpoint accuracy, along with
a user-definable mouse area. What's more, WIZ unleashes the full power and speed of your software. Optional templates for most major programs eliminate tedious pull-down or bar menus. Because WIZ templates put the commands you use most at your fingertips for instant access. And for the artist in you, WIZ offers an optional pen for drawing. There's no rolling ball or moving parts. Nothing to clean. And WIZ has a five year warranty backed by CalComp, a world leader in computer graphics for over 30 years.

But the most amazing thing about WIZ is that you get it all for an introductory price under $200.

See WIZ at your local dealer or call 800-CALCOMP.

WIZ by CalComp. Everything else is just a mouse.

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from Digitsdesign for the Mac II family is changing all that. For less than $1,000, your Mac can be a plug-and-play, CD-quality direct-to-hard-disk recording studio equipped with a host of editing tools; the final mix is easily spliced into HyperCard, SuperCard, or Director productions.

**Honorable Mentions**

Three sequencers (MOTU's Performer 3, Passport's Pro4, and Opcode's new Vision) and three notation programs (Passport's Encore and Coda's Finale 2.0 and MusicProse) all raised Mac-based production standards. But two educational products stood out: Hip Software's Harmony Grid, a visual-based alternative to audio-based music-theory lessons, and Voyager's HyperCard annotations to Beethoven's 9th Symphony, which uses a CD-ROM player to synchronize music and commentary.

**Best Education/Exploration Program**

Interactive Physics

Mac educational software finally matured in 1989. Interactive Physics 1.0 from Knowledge Revolution is a perfect example of educational software that's powerful, adult, full-featured — and fun. In a MacDraw-like environment, you create experiments by playing "what if" with the Newtonian world.

**Honorable Mentions**

Honorable mention goes to another favorite, Voyager 1.2, the extraordinarily comprehensive planetarium-on-a-disk from Carina Software. Math Rabbit 1.0 from The Learning Company deserves mention for its lively batch of number and logic games for younger users.

**Best Recreation Program**

SimCity

Maxis' SimCity 1.1 is a new breed of game — an interactive simulation that puts you in charge of an urban area. As you struggle to build houses, industries, and roads, the simulator uses real-world data to create the consequences of your actions: pollution, traffic jams, and urban blight, with a few disasters (floods, earthquakes, Godzilla) thrown in for good measure. A separate Terrain Editor lets you custom-design the landscape, and there's a snazzy 16-color version for the Mac II.

**Honorable Mentions**

Cosmic Osmo is the surreal interactive HyperCard space adventure from Activision. Where in Europe Is Carmen Sandiego? from Broderbund is the third in a series of excellent educational games that teach geography through a detective motif.

---

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Thanks to powerful new driver software, Sharp's JX-730 Color Ink-Jet Printer now supports 32-bit QuickDraw, prints 16.7 million colors, and uses scaleable outline fonts (35 LaserWriter Plus™ fonts included). It offers a choice of 7 dithering patterns to maximize smoothness and create effects. Sharp's superior ink-jet technology delivers vivid color, without "banding", on plain paper or transparencies — up to tabloid size. Call 1-800-BE-SHARP for more about the perfect color printer for your Mac.
A. Best Display Product

Apple Portrait Display

There are many full-page displays for the Mac, and the Apple Portrait Display stands out above the rest. The time and attention to detail that went into making the product has paid off. It simply offers a sharper, squarer, flatter, and brighter image than its competitors.

HONORABLE MENTIONS

Tektronix’s TekColor color-picking system was a serious contender for bringing us closer to true color WYSIWYG. Nonetheless, it was edged out by two superb monitors. Barco is the first monitor manufacturer to incorporate sophisticated calibration technology into its Barco Calibrator monitor, marketed also as a complete system with the ColorBoard 724 video card by RasterOps. And the PCPC Shad-owgraph was our hands-down price/performance winner in the October '89 Labs Report on gray-scale monitors.

B. Best Video Board

SuperMac Spectrum/24 Series III

Value and performance are the goals of new display cards. The SuperMac Spectrum/24 Series III fared best, with widely desirable engineering achievement, squeezing a 100-percent Mac into a briefcase-sized package assembled like a jigsaw puzzle, without screws.

HONORABLE MENTIONS

The Microtek MSF-300Z is an affordable high-resolution full-color and gray-scale scanner that’s bundled with some of the best photo-retouching software for the Mac. The SuperMac ColorCard/24 sports hardware panning and zoom, a virtual desktop in lower-bit modes, and accelerator-readiness.

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features such as an integrated 32-bit-QuickDraw accelerator, hardware pan and zoom, a high refresh rate, a virtual desktop, easy configuration, and support for a wide range of monitors.

Honorable Mentions
The Mass Micro ColorSpace II combines video genlocking capability with three NTSC video inputs to provide simultaneous display of Mac graphics and an NTSC signal. When it's combined with the ColorSpace FX board, special effects such as shrinking or rotating live video and displaying live video in a Mac window are also available. The Radius QuickCAD Graphics Engine is an excellent speed enhancer for a Radius 24-bit-color system.

Best Digitizer
Microtek MSF-300Z
For this category, we considered products from several families. The Microtek MSF-300Z color/gray-scale scanner is a breakthrough product in price, image quality, and value. It puts full-color, high-resolution scanning within the reach of a broader community. Its bundled software includes Digital Darkroom, PhotoMac Edit, and SuperPaint, which admirably complete the package. Microtek has set a clear standard for affordable, quality color scanning.

Honorable Mentions
The HP ScanJet Plus gray-scale scanner from Hewlett-Packard has a winning combination of quiet operation and superb interface software. Wacom's SD50C Digitizing Tablet combines a cordless, batteryless pressure-sensitive stylus with an ultrathin tablet that's an artist's delight.

Best Monochrome Output Device
Personal LaserPrinter II
GCC has broken the QuickDraw laser-printing price barrier with its QuickDraw-based Personal LaserPrinter II, which offers all the capability of more expensive machines, including Bitstream fonts; edge-to-edge printing; ATM compatibility; print spooling; and automated envelope printing with QuickEnvelope, a DA.

Honorable Mentions
Hewlett-Packard now offers two low-cost printing solutions that provide quiet 300-dpi printing. The DeskWriter is a complete ink-jet solution for the Macintosh that ships with a Chooser driver and fonts. The LaserJet HP is an excellent low-cost addition to the LaserJet family.
Awards

Best Color-Output Device

QMS ColorScript 100 Model 10

The QMS ColorScript 100 Model 10 is the clear leader in the Macintosh color-printing market in terms of performance and price. The Colorscript is true PostScript and one of the fastest printers on the market. The image quality is very good, and the printer is easy to set up and use — a standard by which to judge other color printers.

Honorables Mentions

Using ink-jet technology, the Tektronix ColorQuick provides some of the most brilliant color output of a color printer to date, and as an added bonus, it ships with TekColor, Tektronix' color-table technology for monitors. And the Hewlett-Packard PaintJet XL provides color ink-jet output that rivals that of color printers costing more than twice its price.

Best Storage System

MakinStor Erasable Optical

With a 35-millisecond access time, Storage Dimensions' MacinStor drive makes space the final frontier. It's the fastest of the newest class of mass-storage devices, erasable optical drives. Data is stored on either 650-megabyte or 1-gigabyte removable discs.

Honorables Mentions

The Kenneck Drive 2.4 and Rapport are an extraordinary duo. The Rapport serves as the interface to the high-density Kenneck Drive 2.4, and together they can cram 2.4 megabytes' worth of data onto high-density and double-density drives respectively, while also being able to read MS-DOS and Macintosh disks. The UltraDrive S Series hard drives from GCC feature fast mechanisms from Seagate and Quantum and a terrific package of software utilities that include QuickSpool and SUM II.

Eddies Watch: 1990 Contenders

As the deadlines drew near, some promising products didn't make it under the wire. Keep your eyes peeled for: Oscar (Apple), HyperCard 2.0 (Apple), A.C.E. (Casady & Greene), Aldus PrePrint, FontStudios (LetterSet), FoxGraph (Fox Software), Kodak XL 7700 digital continuous-tone printer, LabVIEW 2.0 (National Instruments), PageMaker 4.0 (Aldus), Personal Press (Silicon Beach), PhotoShop (Adobe), RagTime 3.0 (Unicorn), Studio/32 (Electronic Arts), StuffIt Classic (Aladdin), THINK Pascal 3.0 (Symantec), and TopScan (Calera).

To The Point.

Introducing the UnMouse

Quit mousing around and get to the point with The UnMouse from MicroTouch. It does everything a mouse can—only faster and in less space. To move the cursor, simply touch the glass. To make a selection, merely press.

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Plus The UnMouse offers features a mouse can't touch. It has a Power KeyPad that gives you up to 60 function keys and macros per application. And with its drawing stylus, it even serves as a small, but powerful graphics tablet. For more information and nearest dealer, call 1-800-UNMOUSE. (Int'l: 508-694-9900).

MicroTouch

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<table>
<thead>
<tr>
<th>15&quot; Portrait Display</th>
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<thead>
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<th>Size</th>
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<tr>
<td>80Mb</td>
<td>$697</td>
<td>$777</td>
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<tr>
<th>Size</th>
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RM600 Erasable Optical $3497
If you're saving huge files (like 24 bit images, scans, or large data-bases), the RM600 is the right solution for you! Our RM600 erasable optical delivers disk storage at the lowest cost per Mb. We've incorporated second generation technology to bring you the greatest speed and industry-wide compatibility. Full ISO/ANSI compliance. The RM600 incorporates our international power supply, SCSI switching, and whisper quiet cooling fan. Two year warranty.

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FREE OCR Software!

MirrorImage Printer $2997
Look familiar? It's based around the popular Eddy Award winning Qume design. 39 built-in fonts, 8 page/minute RISC technology and a 300dpi liquid crystal shutter, it can out perform Apple's best printers. At this price, why would you buy from anyone else? $1500 less, and they didn't try to sell me a bunch of extra fonts I'll never use!!

---Doug Clapp, Author

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This offer expires April 30, 1990. So think it over. But think fast. We're sure you'll make a businesslike decision.

**FEATURE COMPARISON**

<table>
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<th>Dollars and Sense</th>
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You may upgrade to Dollars and Sense 5.0 from any commercially available financial management program. Simply send the cover of your manual along with $59.95 (and any applicable sales tax) plus $6 shipping and handling to Monogram at the address at right. Offer expires April 30, 1990. Registered users of any version of Dollars and Sense for the Macintosh may upgrade to version 5.0 for $34.95 plus applicable tax, and $6 shipping and handling.
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First, be aware that the Mac Finder generates apocryphal warnings at the slightest disk disturbance, making it impossible to tell a minor problem from a hard crash. To make matters worse, it then offers to reinitialize the disk and destroy all its data. The chances are very good that your disk data is damaged beyond recovery, disk and destroy all its data. The data is still safe and sound and that generates apocryphal warnings at the slightest disk disturbance, making it even more difficult to repair it, the system can inadvertently further corrupt vital recovery information. You can try to repair the disk after you've safely recovered its data. The major cause of loss of data in disk crashes is panic. If you start to reinitialize the disk by accident, shut off the drive’s power switch. This is bad for the disk, and it goes against all your instincts, but it still beats losing all your data.

Opening a Damaged Disk
If the Mac is unable to mount a damaged disk from the Finder, it may issue an error message and/or refuse to display the disk’s icon, making it unreachable by ordinary means. You may, however, be able to access that disk with 1stAid HFS or SUM II. If the damaged disk is your System disk, you’ll need to re-start the system with another System disk or the 1stAid HFS or SUM distribution floppy. Always remember to lock the master floppy or, better yet, use a working copy of it.

Problems with Floppies
If you have a damaged floppy, immediately eject and lock it to prevent accidental erasure or further corruption during file recovery. Try inserting the floppy into the drive several times. Often this is enough to correct the problem. Then try inserting the floppy into a different drive or a different Mac. Sometimes the slight difference in head alignment between drives is enough to make the floppy readable. If there are fingerprints or dirt on the medium, the heads may actually scrape it clean during repeated read attempts. Even waiting for better weather might help. I once had a disk that seemed particularly sensitive to humidity levels: If it

**Easy Fixes, Hard Disks**

**External Disks**
Choose Shut Down from the Special menu, and then turn off the Mac and the drive. Check to ensure that the SCSI addresses on all your devices are unique. Be especially careful to check the address of any internal hard disks. No two SCSI devices can have the same address (0 through 6), so assign each a different number. Check SCSI cables for proper seating at both ends. Never disconnect or connect a SCSI cable when the Mac or any SCSI peripheral is powered up.

**Electronic Noise**
An improperly terminated SCSI chain can make the Mac think a disk has failed. Check the hardware documentation, and make sure that the hard-disk drive has a SCSI terminator if it needs one. If the disk is the last device in the SCSI chain, it should be terminated. When you've checked these particulars, turn on the drive, wait a minute, and then start your Mac. If your attempts don't solve the problem, turn everything off again and physically disconnect any other SCSI devices from the chain. Power up and hope for the best. If you have a spare compatible SCSI cable, now’s the time to try it. With any hard-disk drive, try turning the Mac off and on again. You may need to do this several times.

**Dirty Desktops and Bad Drivers**
Corruption of either the desktop file or the SCSI-disk-driver software can look like a disk failure. If the desktop file gets damaged, the Finder may not even display the disk's icon, instead displaying the message “This disk needs minor repairs.” You can rebuild the desktop by using the Minor Repairs application, which comes with 1stAid HFS, or by holding down the Command and Option keys at startup and clicking OK at the offer to rebuild the desktop of the problem disk.

The SCSI disk driver is the software on your hard disk that loads into the Mac at startup and handles Mac-disk communications. A driver gone bad looks like a hard-disk crash. The driver for Apple hard disks is installed with the Update option by the Apple HD SC Setup utility on the Macintosh Utilities Disk #1. The drivers for other hard disks should come on an included floppy. If you have any questions about installing a specific driver, you should call the disk’s vendor.

Because of leeway in Apple's SCSI implementation, your current SCSI driver may not be compatible with a new release of the Mac's System. If you've just updated your system software and you start to have problems for no obvious reason, consider going back to your trusty old System setup. If that cures the problem, you should report the problem to the disk's manufacturer and ask if there is an updated version of the driver available.

Norman Fong of FWB Software, which develops SCSI drivers, notes that the new Mac Portable and the Mac IIci use a checksum feature that has been part of the SCSI spec but that Apple has not enforced up to now. As a result, disk-driver combinations that work on the Mac II, IIcx, and SE may not work on the Portable or Iici series.

**Call the Drive Vendor**
If you're still having trouble with a hard-disk drive, call the disk vendor’s customer-support line. Support people often hear of obscure disk problems that may baffle your dealer.
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  • MultiFinder software
  • All necessary cables and manuals
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  • Mouse pad
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System Price $3549
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Macintosh IIcx 80/4 System
Ideal for the graphic designer and those who have the need for color presentations, this IIcx system includes Apple's 80 megabyte hard drive, one 1.44 FDHD disk drive, 4 megabytes of memory, Apple's Extended Keyboard, Apple's High Resolution Color Monitor with 8 bit video card and all of the listed items*.

System Price $6695
Pkg #9020 (delivery $142)

Macintosh IIcx 105/5 System
More for less. This system is structured to be competitively priced while including all of the components of a more powerful IIcx system. It includes a Quantum 105 megabyte hard drive (2 yr. warranty), one 1.44 FDHD disk drive, 5 megabytes of memory, Keytronics Mac Pro 105 keyboard (3 yr. warranty), Tempo II keyboard software, NEC MacSync 14" High Resolution RGB monitor with tilt and swivel stand (2 yr. warranty) and all of the listed items*.

System Price $6049
Pkg #9021 (delivery $142)

Macintosh IIci 80/4 Deluxe System
The Macintosh IIci features the 25 Mhz fast 68030 processor and a built-in 8 bit Video Card. This IIci system includes Apple's 80 megabyte internal hard drive, 4 megabytes of memory, 1.44 FDHD disk drive, Apple's High Resolution Color Monitor, Apple's Extended Keyboard and the all of the listed items*.

System Price $7495
Pkg #9002 (delivery $142)

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**ACCOUNTING**

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**SPREADSHEETS & DATABASES**

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**DESKTOP PUBLISHING PRESENTATION GRAPHICS**

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**DRAWING/GRAPHICS**

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**Music for your Mac**

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To the Rescue

rained for a few days, the disk would flake out; after a few days of dry weather, it would mount perfectly.

If your initial efforts still give you the "This disk is unreadable" message, eject the disk and run a floppy-disk-recovery program. 1stAid HFS is the easiest and most reliable floppy-disk-recovery software. You can even try to make a sector copy of the disk, but not with the reluctant Finder. You can use a sector-copy program such as FastCopy, which comes with PC Tools Deluxe, or SUM's QuickCopy utility. Such programs can repair certain types of directory damage so that the disk can at least be recognized by the Finder.

Whatever the cause or cure, once your disk has been recognized and its icon appears, copy its contents to another disk and try to use the rescued data. Once you're satisfied that it's all there, make a second copy, using the new disk as a master, and give the damaged disk a nice burial.

Recover Your Files First

If disk-revival steps fail, you'll have to recover individual files, although there may be some data you can't recover. What you get and what you don't get depend on the extent of the damage and the built-in wits of your recovery software. Don't create any new files on the problem disk or attempt to print until you have safely recovered your data. The more you exercise the disk, the greater the danger of damaging the data or medium. If you are able to, seek out your most valuable files and rescue them first.

Several software tool kits can recover files from most crashed hard disks and damaged floppies. I tested five such packages — 1stAid HFS, Complete Undelete, and Sector Collector, all from 1stAid Software; SUM II, from Symantec; and PC Tools Deluxe, from Central Point Software. 1stAid HFS is unequaled in floppy-disk recovery. SUM II has the unique ability to scan a badly damaged disk and scavenge for recoverable data, even if the directory has been destroyed. It can sometimes recover data from an accidentally initialized disk too. PC Tools Deluxe is the weakest of the packages, and its current release is not the best choice for disk recovery.

Another disk-recovery package, Norton Utilities for the Mac, from Peter Norton Computing, is still in development and may be available by the time you read this (see the "BetaWatch" sidebar).

Recovering Deleted Files

When you delete a file, the system doesn't actually erase the data in sectors occupied by the deleted file — it merely erases that file's name from the disk directory and frees up its sectors for use by new files. Because no data is lost, it is frequently possible to recover it, but the longer you wait after deleting a file, the greater the probability of overwriting its sectors with new data. If you accidentally delete a file, you must recover it immediately.

Complete Undelete, PC Tools Deluxe, and SUM II provide simple directory-based methods for recovering deleted files. Complete Undelete and PC Tools Deluxe can recover only files deleted after the programs' deleted-file tracking system was installed. SUM II, on the other hand, is the only software that can recover files that were deleted before a deleted-file tracking system was installed.
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Capsule Reviews

1stAid HFS

1stAid HFS combines meaningful disk diagnostics with an excellent file-recovery facility and a general-purpose troubleshooting guide for the Mac. It lacks a scavenging capability for hard disks, so it cannot recover disks whose directories are destroyed. However, through its detailed reports about recovered files, you know the quality of what it does recover. Unfortunately, 1stAid HFS also lacks a facility for maintaining a duplicate copy of the disk directory, which removes a strong line of defense against crashes. Its recovery capabilities for floppy disks are excellent, however. Even if you use it only to recover flaky floppies, no Mac should be without 1stAid HFS.

1stAid HFS has a Diagnose & Recover feature that can check your disk's integrity, and its Quick Cure option is a good first step if you suspect a disk problem.

Complete Undelete

Complete Undelete from 1stAid Software is a powerful and easy-to-use utility, accessed through the Control Panel, for listing and recovering deleted files. It can recover what's left of deleted files, some of whose segments have been reassigned to new files. You have the Complete Undelete is customized through the Control Panel. You can examine the current list of deleted files and choose the amount of disk space to set aside for the program's bookkeeping and recovery information.

1stAid HFS

The software comes with a wealth of detailed documentation. In fact, it is often too detailed. It took a call to customer support before it became obvious that the lists containing cross-referenced error messages, keywords, and descriptions of abnormal behaviors are crucial recovery tools. These lists are hidden in the middle of the manual. When you get an error message, the Error Message List references the page on which you can find the appropriate solution. It would significantly improve the manual if this key feature were presented up front.

Floppy-Disk Recovery. 1stAid HFS' ability to recover files from damaged floppies is no less than spectacular. It repeatedly recovered more data from damaged floppies than did SUM. It has several modes of floppy recovery and a Quick Cure option. Diagnose and Recover is the same directory-based recovery technique that 1stAid HFS uses to analyze and recover hard disks. The Quick Cure option scans the directory, generates a diagnosis of the disk, and offers recovery options.

You can select some or all of the files to be recovered. As 1stAid HFS proceeds, it warns you about files with bad sectors that it had to replace with empty ones. In my experience, especially with floppies, sectors that are unreadable in one attempt may be readable on the next try. If you make repeated attempts to recover a file containing bad sectors, you can eventually recover the entire file.

Salvage Files by Tags is a sector-by-sector scan-and-salvage recovery technique that may be able recover some data from floppies too damaged for any other technique to work. It uses sector tags, which are short data fields at the beginning of each in-use sector that contain the identity of the file that owns them. Using tags as a guide, this utility can recover data even if the floppy's directory has been destroyed. Mac hard disks, unfortunately, lack sector tags.

Copy Diskette is the easiest but least effective method for recovering floppy disks. It attempts to copy the files from one floppy to another, sector by sector, summarizing how many bad sectors had to be replaced with zeroed-out placeholder sectors.

1stAid HFS can also view and extract the text in files. I found this especially useful for recovering text from Word 4.0 Temp files, which contain the latest state of your Word document and remain on-disk after a crash.

Complete Undelete's informative Deleted Files list lets you know valuable date and time information and indicates the present state of each deleted file.

Complete Undelete’s text-preview option lets you examine the text in a deleted file to quickly verify that it's the file you expected.
options of replacing the missing sectors or of extracting any available text. Complete Undelete can undelete only files that have been deleted after you have installed the utility into your System Folder. It was able to recover and render openable deleted and partly reassigned files that SUM II and PC Tools Deluxe could not recover. SUM II and PC Tools Deluxe, on the other hand, were able to recover some files that were deleted before any deleted-file protection was installed.

Complete Undelete provides a summary of all deleted files, showing which ones can be recovered intact. You can view deleted files by date of deletion, alphabetically by name, or by creator, which is handy if you want to recover a specific file.

When you select a file for recovery, the program shows the number of sectors in each deleted file, the number of missing sectors, and the percentage of the file that can be recovered. As a safety feature, Complete Undelete doesn’t try to recover partially overwritten applications. A convenient preview section lets you look at deleted files before they are recovered and even extract any available text.

Sector Collector

Sector Collector is a handy diagnosis-and-repair utility for detecting and isolating bad sectors on hard disks and floppies. Although it can be used by itself, Sector Collector was designed to be used with 1stAid HFS. It can recover files by collecting their good sectors and replacing their bad ones.

It verifies the disk and generates a detailed report, but it does not automatically lock out bad sectors, which would permanently prevent their reuse. Instead, it has a unique option for assigning unused bad sectors to an invisible file; this approach takes bad sectors out of circulation so they don’t get assigned to your good files. Sector Collector also has a recovery option for recovering files that are partially composed of bad sectors.

The separation of the sector-validation and collection functions is important because certain types of SCSI-bus or system problems can make it look as though you have many bad sectors on a good disk. If the verification detects more than a couple of bad sectors, you can repeat the verification several times and then take corrective action.

SUM II

SUM II is a set of utilities that includes data-recovery and data-loss-prevention tools. SUM II is the only recovery application that can recover data from disks whose directories have been damaged and for which no preventive measures have been previously taken. Unfortunately, SUM II doesn’t tell you when it can’t read a bad disk sector, so you don’t know if a file has been successfully recovered until you try to use it. Running incompletely recovered applications can cause serious problems.

After the Crash. SUM II can search a disk for recoverable files and can also locate and undelete files, even if you’ve never loaded it on your system before. It can take hours to scan a large disk, but considering the alternative, it’s worth the wait. SUM II doesn’t generate its found-file report until the scan has finished, so if you interrupt a search, the time invested up to that point is wasted. Once it has listed the files, it can sort them by name, type, and date.

SUM’s Floppy Recover option can help extract floppy-based data, but in my attempts, the recovered files proved unusable. According to Symantec, Floppy Recover is the least effective recovery method and should be used only if the Volume Scan option fails to recover all the known files.

Before the Crash. SUM Shield is a preventive utility that creates a copy of your disk’s directory in a Volume Restore Record and keeps a record of deleted files in a Deleted File Record. You can keep both records or copy them onto another disk and update them whenever you update the original, which gives you an extra measure of protection. If your disk’s own directory is damaged, SUM can use its Volume Restore Record to locate files quickly. If the disk suffers a hardware crash, this can make the difference between recovery and loss.

You can update the Volume Restore Record at specified intervals with a keyboard command or have it done automatically at specified intervals or when you shut down. If you use your Mac intensively, you will want to specify frequent updates. Unfortunately, even under MultiFinder, the directory-backup process temporarily interrupts the current application, which some fax utilities and communications applications may not tolerate. Using a timed backup can be a godsend, but it has potential dangers because you may have files open or in transitional states.

Undeleting Files. If you discover that you’ve accidentally deleted an important file and you don’t have a recent backup or a deleted-file-recovery package installed, SUM II is your only hope. Although its scan method isn’t foolproof, it gives you a fighting chance. SUM II’s recovery based on the preinstalled Deleted File Record provides a more reliable and painless revival in most cases. As with its other file-

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SUM II has two ways to recover deleted files. One method is highly reliable as it keeps track of deleted files through a preinstalled utility.

recovery methods, SUM II doesn’t report bad-sector problems with recovered files.

SUM II’s disk-repair side includes SUM Tune-up, which can detect and automatically lock out bad sectors, as long as the sectors are not already assigned to a file. Unfortunately, SUM II lacks a scan-only diagnostic mode. The automatic sector lockout could be dangerous if some problem in your disk cable or connector falsely indicated bad blocks, and it could cause loss of a great deal of disk space by having good blocks rendered inaccessible.
To the Rescue

PC Tools Deluxe

The PC Tools Deluxe package is not a viable disk-recovery system, because it fails to provide any hard-disk file-recovery capability. It does include a floppy-disk-recovery application, which uses sector tags, and two-tiered deleted-file recovery for hard disks and floppies. In my tests, however, neither method worked very well with files that were partly overwritten. PC Tools Deluxe’s file-undeletion system, CPS Delete Tracking, is unable to install on the same system as SAM (Symantec’s virus detector) or 1stAid Kit’s Anti-Virus.

The only hard-disk-recovery feature it includes is an application called Mirror that stores a duplicate directory on the same or another drive. A companion application called Rebuild can restore the directory from the duplicate. The Mirror directory is updated only on system shutdown, so the Rebuild application loses any new data files created since the system was turned on. This approach can easily overwrite directory information that SUM II or 1stAid HFS can use to recover your disk.

The manual’s cover promises “Disk Recovery: Recover data from magnetically damaged diskettes and hard disks.” However, the system does not have a single feature that can recover data from magnetically damaged hard disks, unless only the directory is damaged. The package claims to have “the best undelete available. Instead of guessing, it recovers data even from fragmented files.” When I tried using either of its recovery schemes, I was unable to recover and open files in which some sectors had been overwritten.

When I used PC Tools Deluxe’s dedicated function, PC Backup, to back up one hard disk to another, I couldn’t recover the backup, because the restore process presumed that I had backed up to floppies, even though it let me back up to a hard-disk volume. When I ran the Verify Disk function, the cursor remained an arrow, leaving me only hoping that the verification was running. Although it does not fix bad sectors, it reports each error and its sector number, stopping each time to wait for your acknowledgment. It doesn’t produce a final report, nor does it tell you what file the bad blocks belong to.

PC Tools Deluxe may be a handy set of techy utilities, but for disk recovery, it falls somewhat short. It looks as though it was brought to market too soon. Central Point Software says it will fix all these problems and introduce real recovery features in the next release.

How Deleted-File Recovery Was Tested

I deleted several files, including a long MacWrite file, from an Apple 80-megabyte hard disk. I also wrote other files to the disk to deliberately overwrite some of the deleted files’ sectors. I then tried to recover these files with SUM II, PC Tools Deluxe, and Complete Undelete.

Complete Undelete

This tool gave me a comprehensive list of deleted files. When I selected my MacWrite file, it told me 49 of the original 147 sectors were missing. The Preview feature showed that a large block of text could be recovered. I then recovered the file twice — once by extracting the text and once by zeroing out the reallocated sectors, and replacing them with empty ones. Both Word and MacWrite were able to read and work with the resulting versions of the file. Complete Undelete was the only software that consistently recovered deleted files, whether they were intact or partially overwritten. Consider this as a mandatory feature.

PC Tools Deluxe

This application’s MacTools utility provides two methods for recovering deleted files on hard disks: CPS Delete Tracking and the Resource Forks Method. The Resource Forks Method failed to locate many deleted files, perhaps because the files lacked resource forks. With CPS Delete Tracking, I tried to recover several files that PC Tools Deluxe listed as being complete and recoverable, but I was unable to open the recovered files.

SUM II

I tested deleted-file recovery by using the Scan and Deleted File Record options. The Deleted File Record recovery of my partially overwritten MacWrite file generated a recovered file I could not open with MacWrite or Microsoft Word 4.0. I did finally manage to view the text using 1stAid Kit. The search with Scan failed to find several deleted files, including the long MacWrite file I wanted to recover.
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To the Rescue

The Bottom Line

Right now, no single product provides all the features you need for hard-disk diagnosis and recovery. 1stAid Kit is easy to use, provides meaningful reports, and is great for floppy disks, but it can't recover the contents of a hard disk if the directory is badly damaged. SUM II can recover disks with damaged or destroyed directories, but it doesn't warn you about any bad sectors in the recovered files, so you can never quite trust the quality of the recovery.

Complete Undelete, with its partial-recovery and text-extraction features, provides the best deleted-file recovery, as long as you have preinstalled the software.

PC Tools Deluxe has a hard-disk file-recovery capability that produces acceptable recoveries only if just the directory is damaged. It also offers a deleted-file-recovery system that requires preinstallation. With files that have been partly overwritten, however, its recovery methods fail to produce recovered files that their creating application can read. By all means, install a file-and-disk-watchdog utility before you find that you need one. SUM has the widest set of capabilities for a single package, but a combination of SUM II and 1stAid HFS makes a far safer and more complete kit for diagnosis, recovery, and repair. If you can afford it, buy SUM II, 1stAid HFS, Complete Undelete, and Sector Collector, as they can each prove vital for some aspect of recovery.

Complete Undelete 1.02

Pros: Provides a summary of each deleted file's quality. Deleted files can be viewed and sorted in several ways. Can recover and render openable deleted and partly reassigned files.
Cons: Can undelete only files that have been deleted after you installed the utility into your System Folder.
Requires: Mac 512KE or later.
List Price: $49.95.
1stAid Software, 42 Radnor Road, Boston, MA 02135; (617) 783-7118.

1stAid HFS 2.8

1stAid HFS combines disk diagnostics and general-purpose troubleshooting with an excellent file-recovery facility. It can generate a summary of a disk's condition and suggest recovery options. Also available is a package called 1stAid Kit Deluxe that contains 1stAid HFS, Complete Undelete, and Sector Collector.
Pros: You know in advance the quality of what's recovered. Ability to recover files from damaged floppies is excellent.
Cons: Recovery system depends on the prior installation of its protective utility. Can't recover files from hard disks that have destroyed directories. Lacks a facility for maintaining a duplicate copy of the disk directory.

PC Tools Deluxe

Pros: Does deleted-file recovery for hard disks and floppies and includes a floppy-disk-recovery application that uses sector tags. Other utilities let you do encryption, disk backup, and optimization. Good documentation that's not for the faint-hearted.
Cons: Duplicate directory for hard-disk recovery is updated only on system shutdown. Lacks an easy-to-use hard-disk file-recovery capability if you have not preinstalled its protective utility. PC Backup backs up one hard disk to another but presumes that you've backed up to floppies, even though it lets you back up to a hard disk.
Requires: Mac 512KE or later with 800K internal drive.
List Price: $79.95.
Central Point Software, 15220 N. Greenbrier Parkway, Beaverton, OR 97006; (503) 690-8090.

SUM II 2.0

SUM II can work wonders in recovering deleted files or data from a crashed disk. Once SUM II is installed, its recovery methods are based on the Volume Restore Record, which can be updated at specified intervals, and the Deleted File Record.
Pros: Recovers and undeletes data from disks with damaged directories, even when no preventive measures have been previously taken.
Cons: No warning when a disk sector in a recovered file can't be read. SUM Tune-up's method of reassigning bad blocks on detection should be one option rather than a no-choice event.
Requires: Mac Plus or later, System 4.2 or later, and Finder 6.0 or later.
List Price: $149.95.
Symaneic Corp., 10201 Torre Ave., Cupertino, CA 95014; (408) 253-9600.

Sector Collector 1.0

Pros: Provides a summary of each deleted file's quality. Deleted files can be viewed and sorted in several ways. Can recover and render openable deleted and partly reassigned files.
Cons: Can undelete only files that have been deleted after you installed the utility into your System Folder.
Requires: Mac 512KE or later.
List Price: $49.95.
1stAid Software, 42 Radnor Road, Boston, MA 02135; (617) 783-7118.
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New products and tips for all — from beginners through pros

Tax Reformers

By Scott Beamer

fall or most of your taxable income appears on your W-2 form, the best package to use for your tax return may be the one Uncle Sam sends you. Just sharpen your pencil, and get to work. It shouldn’t take you long.

If your taxes are less straightforward, you may want to use Macintosh software. Many people, myself included, have done so and have been pleased with the results.

To decide whether to do your taxes on your Mac, ask yourself: Are you uncertain about itemizing deductions? Do you have investments in the stock market or elsewhere? Do you have an office at home? Have
you started a small business? Are you thinking of buying or selling a home? Are you getting married (or divorced)? If you answer yes to any of the above, your tax situation may be complex enough to warrant software help.

If you use a software tax package, I strongly recommend that you have a professional tax preparer check your returns. The program can ensure that you don’t make any arithmetical mistakes, but you need an expert to make sure you don’t make any strategic ones.

**Which Package?**

Mac tax software is available for all, from beginners through professional preparers. You fill out on-screen representations of various IRS forms, print them, sign them, and send them in to the IRS. Here’s a quick run-through of what’s currently available: Personal Tax Templates from Heizer Software, Bottomline Personal Edition from comu- CRAFT, TaxSmith from Island Computer Services, Tax Pro from Chesapeake Software, and MacIn- Tax Federal from SoftView.

A tax template is a spreadsheet data file with graphics and formatting entered to make it look like a tax return. It calculates taxes based on your entries and transfers appropriate data from previous pages or other forms, thereby relieving you of much of the work of filling out a tax return. Spreadsheet jockeys usually prefer to do their taxes with a template package because it’s inexpensive and lets them link in their own worksheets and customize forms and worksheets when appropriate.

Currently, only Microsoft Excel and Works tax templates exist for the Mac. If you have a different spreadsheet program, you’re out of luck. Perhaps next year, Full Impact will be able to import Excel templates too. (Just before this article went to press, Informix announced that a version of Wingz will be available that can import Excel 2.2 files with formulas, linking, and formatting intact. This means that Wingz owners may be
Tax Reformers

able to use tax-template packages from compuCRAFT and Island Computer Services.

The oldest and best-selling template package for the Mac is Personal Tax Templates. The 1989 package includes about 35 forms; a worksheet for all types of depreciation; and CheDiT, a check register that helps summarize your records. All forms are appropriately linked, and a startup macro lets you open the combination of forms you wish to work with. The documentation is skimpy, but at $35, the package is an excellent value.

State tax forms are available for California, New York, and Minnesota. Other templates print W-2s and calculate IRA deductions. Most templates work with Works. Heizer's templates are popular with professional preparers, and the Business disk now includes forms 1120, 11120S, and 1065, as well as some of the less common individual-return forms.

Heizer offers technical support by phone and tax advice on disk in the 1990 HyperTax Guide (1989).

With Bottomline Personal Edition, compuCRAFT offers many IRS forms on a single disk, with business and estate forms on separate disks. A disk containing just the short form (1040A) is also available. This year's forms work only with Excel 2.2, because the current version's superior text- and graphics-handling abilities render IRS forms more precisely. At press time, compuCRAFT had not decided whether to include state forms.

Apparently adopting the philosophy that less is better, Island Computer offers a variety of modest Excel packages, all versions of its TaxSmith software. The basic TaxSmith Quick provides a 1040 form with schedules A and B. TaxSmith Full includes 17 A version for professional tax preparers is also available. All these versions include linking, macros, dialog boxes, custom menus, and a

A New Ball Game — Professional Packages

Although professional preparers have used Mac tax packages for years, they have had to make do with the same packages you and I use. Now there are some packages specifically aimed at professionals — TaxSmith.Pro from Island Computer, TaxView Professional Edition from SoftView, Bottomline Professional Tax Solutions from compuCRAFT, and possibly Tax-Magic Pro from Datas. (None were available for review at press time.)

TaxSmith.Pro, the smallest template package, makes no attempt to provide a complete set of forms. Instead, it aims at tax practitioners whose clients generally file simple returns. The disk has the three individual packages (Quick, Family, and Full) plus some other common combinations of the same forms.

Those looking for the most complete package will inevitably be drawn to TaxView Professional Edition. Not only does it have a fairly complete set of business forms, including payroll returns and expense forms, but it also offers the only electronic filing service for the Mac this season.

TaxView Professional Edition offers forms 1040, 1065, 1120, and 1120S, either separately or in one package. The professional version has many of the same features as MacinTax but does add functions sure to please professionals, such as the ability to override any automatically calculated entry.

A Client Status report shows how each return is progressing, and a batch-export feature allows selected information from each client's return to be exported as text to a spreadsheet or to a word processor for mail-merge. Of course, TaxiView supports batch printing.

Some tax preparers prefer to use templates because they are easy to link to existing client worksheets and they give preparers control over how depreciation and other entries are calculated.

Bottomline Professional Tax Solutions provides a HyperCard front end to Excel tax templates. The two programs work interactively — a click on a button automatically takes you from HyperCard to Excel, with the forms already open. The Client Services Manager stack keeps vital statistics for each client, which it can enter on tax forms automatically. A summary statement of work activity is kept linked to each client document. The Billing Manager can base invoicing on an hourly rate, a flat rate, expenses, or a combination of these. It does payment tracking, a billing summary, and in-office reports. Bottomline's individual tax templates — including Individual, Estate, and Business — all work with the Professional Tax Solutions package.
Introducing MacTools Deluxe— the most comprehensive, powerful collection ever assembled for the Macintosh.

It lets you find misplaced files, recover crashed disks, undelete trashed files, backup your data, optimize volumes, secure files and folders, quickly copy floppies, organize folders, and even partition your hard disk.

Not only do you get the broadest range of utilities available, but each function sets new standards for performance. For instance, let’s say you want to undelete a trashed file. Using a selective search, MacTools locates likely candidates and lets you view their contents prior to recovery—so you don’t waste time or retrieve unwanted files. No other utility even comes close.

So why settle for some, when you can have it all?

MacTools Deluxe... from the leading developer of Macintosh utilities since 1984.
tax reformers. The TaxSmith packages will be shipped as Excel 2.2 templates, but those people who are still using Excel 1.5 can get a compatible version.

Despite its name, Tax Pro 1989 is not so much for professional preparers as for average users. Compatible with Excel, Tax Pro has 13 IRS forms plus some worksheets. No state forms are available. Although some people will prefer to buy another package with more forms for the same or less money, many will find that Tax Pro has all the forms they need.

A Stand-Alone Tax Package
SoftView's MacInTax is by far the most popular tax package for the Mac. It contains all the forms most of us need, as well as complete instructions from the government 1040 booklet and numerous worksheets and special tools. The package's popularity comes from its high-quality on-screen representations of IRS forms. MacInTax does the arithmetic, enters as much information automatically as it possibly can, and provides worksheets to simplify complex calculations or give you more space. It even has a list showing which forms you've used, which are complete (with all the necessary blanks filled in), and which still need work.

MacInTax provides several state tax forms — for California, Connecticut (with New York nonresident), Illinois, Massachusetts, New Jersey (with New York nonresident), New York, Ohio, and Virginia. A converter included in the package automatically fills out as much of the state forms as possible from the information on your federal return. The same converter can give the people who used MacInTax last year a head start on filling out this year's tax return.

My favorite tool in MacInTax is the Itemization window. Double-click on any line on the form in which you can enter data, and a small window pops up that allows you to enter additional information. The program sums the data automatically, and the total appears on the form. You can use Itemization windows to note how or why you did things a particular way, and you can print the notes for

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Figure 2: Bottomline Personal Edition from compuCRAFT uses a HyperCard stack to start things off on the right foot before you shift to tax templates in Excel.

Figure 3: TaxSmith's Conscience macro tries to relieve some of the tedium of filling out tax returns with a random assortment of humorous warnings.
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Tax Reformers

yourself or as supporting documentation for the IRS.

Softview has reduced the price of the standard MacInTax package by $20 this year and has added a first-class manual. Some of the other tax packages have manuals, but none are more than a few pages long.

Individuals are allowed to file their returns electronically with the IRS, but SoftView offers an electronic filing service called InstaRefund. For $29.95, the service accepts MacInTax returns and files them for you. This service is available only if you expect a refund. This year, you must send your return to InstaRefund by fax or on a disk by mail. If you want your money as soon as possible — say, within three to five days — InstaRefund offers a Refund Anticipation Loan of up to $3,000 at a cost of $69.95, which includes the basic InstaRefund fee.

Conclusion

SoftView plans to release MacInTax in two phases, and by the time you read this, only the first phase may be available. The second phase will add some less frequently used forms to the package. In late 1990, SoftView hopes to add a modem service to InstaRefund.

Next year’s packages will probably include state forms for businesses and direct links to software for personal-finance management so you can keep up-to-date versions of your tax returns all year long. It’s too soon to say which, if any, of the tax-software publishers will be involved, though.

A future player in the tax-software game may be Datax of Moline, Illinois. Datax recently acquired EZWare, which has offered Excel tax templates for both the Mac and the PC. Datax plans to enter the Mac market with three products — Tax-Magic, Tax-Magic Plus, and Tax-Magic Pro. These are totally new packages, not updates of the EZWare templates, and were not available for review at press time.

This is Scott Beamer’s fifth year of writing about preparing tax returns with a Mac. You would think by now he’d have found something more interesting to write about. He is also on the BMUG (Berkeley Macintosh User Group) board of directors.

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For those people who don’t have Excel, MacInTax is the obvious choice. This is one of the most universally respected packages for the Mac and is a frequent award winner. SoftView lowered the price this year, and now MacInTax costs little more than the competition, particularly since it is available at a discount from most retail stores.

Users of Microsoft Excel or Works may prefer a cheap and customizable template package. The 1989 Personal Tax Templates from Heizer Software are perennial favorites, offering the most forms for the lowest price. Demo disks, phone tech support, and several related templates are available.

Bottomline Personal Edition is the only template package this year to take advantage of Excel 2.2’s new features, so those without the latest version of Excel will have to get their templates elsewhere.

For the lowest price in tax templates, you can’t beat TaxSmith. In fact, Island Computer’s Quick and Family packages are the lowest-priced templates available for the Mac. The Full and Pro packages don’t offer as many forms for the same price as the competition does, though.

Based on the number of forms offered, Tax Pro is clearly overpriced. Other programs offer twice as many forms for less money.
Report Cards

**Bottomline Personal Edition**

This package offers templates for many IRS forms, including business, estate, and 1040A short forms. Requires Mac Plus or later, Excel 2.2, and System 6.02 or later.

**Pros:** Excel 2.2 compatibility lets Bottomline take advantage of superior graphics capability to produce sharp IRS forms.

**Cons:** Does not work with earlier versions of Excel.

**List Price:** $49.95

compuCRAFT, 9034 Arrow Grass Way, Highlands Ranch, CO 80126; (303) 791-2077.

---

**1989 Personal Tax Templates**

The package contains 35 forms with a worksheet for calculating depreciation and a check register for record summary. Most of the templates are compatible with Microsoft Works. Requires Mac 512KE or later and System 3.2 and Finder 5.3 or later.

**Pros:** Excellent value for the price. Demo disk available for $2. Phone technical support available.

**Cons:** Has skimpy documentation. Does not have the range of state forms that MaclinTax does.

**List Price:** $35

SoftView, Inc., 1941 Oak Park Blvd., Suite 30, Pleasant Hill, CA 94523; (800) 888-7667.

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**MaclinTax Federal 1989**

Containing practically all the forms most people need, as well as worksheets, special tools, and the complete 1040 instruction booklet, MaclinTax keeps track of which forms have all necessary lines filled in and which still need work. An itemization window lets users fill in supporting documentation for the IRS. Requires Mac 512KE or later, two floppy-disk drives, and System 4.2 or later.

**Pros:** Clear and crisp IRS forms, both on-screen and printed. Has eight state forms, which can link to the federal form. Manual is more complete than those of other packages. SoftView provides an electronic filing service, InstaRefund, for those expecting refunds.

**Cons:** InstaRefund accepts returns only by fax or mail-in disk, although a modem service is expected in time for next year’s returns.

**List Price:** $99

SoftView, Inc., 4820 Adohr Lane, Suite F, Camarillo, CA 93010; (805) 385-5000.

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**Tax Pro 1989**

This package comes with Excel 1.5 templates for 13 IRS forms and some worksheets. Requires Mac 512K or later and System 2.0 and Finder 4.1 or later.

**Pros:** Those with relatively simple returns may find Tax Pro provides all the forms they need.

**Cons:** Has fewer forms than other packages and offers no state forms. Other packages offer more forms for the same money or less.

**List Price:** $49.95

Chesapeake Software, 303 Seventh St. N.E., Washington, DC 20002; (202) 546-9479.

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**TaxSmith Full**

The Full package includes 17 forms. Family and Quick versions have fewer forms. Excel 2.2 version requires Mac Plus or later and System 6.02 or later; Excel 1.5 version requires Mac 512KE or later and System 3.2 or later.

**Pros:** Available as Excel 2.2 or 1.5 templates.

**Cons:** Has fewer forms than other packages and offers no state forms.

**List Price:** $50

Island Computer Services, 3501 E. Yacht Drive, Long Beach, NC 28465; (800) 826-7146.
CD-ROM Drives
first saw one on a "Star Trek" episode: a shiny, rugged, coaster-sized disc that contained vast quantities of information. Fifteen years later, I was at a computer show looking at an entire encyclopedia on an equally small, nearly indestructible disc. The disc was a CD-ROM (compact disc—read-only memory), the computer cousin of the familiar audio compact disc.

Like audio CDs, these discs are read by a laser-equipped player, known in the computer world as a CD-ROM drive. A CD-ROM disc (optical) is not used for personal data storage as is a hard disk (magnetic). CD-ROM involves a read-only technology. You can't write anything onto a CD-ROM disc, nor can you change what's imprinted on it. A disc is like a book: You buy it, and you read it—you don't change it.

CD-ROM's strong suit is its extraordinary capacity. A single disc can contain up to 650 megabytes of text, sound, and graphics. Current data-compression schemes can squeeze more than 230,000 pages of text onto one easily transportable disc. Despite this potential, until recently CD-ROMs have been as accessible to Mac users as the disc Spock used.

Until early last year, CD-ROM was a "chicken or egg, which comes first?" standoff between drive manufacturers and disc publishers. The problem isn't hardware—the technology is rock solid. CD-ROM drives and audio CD players use similar optical mechanisms. In fact, a CD-ROM drive is essentially an audio CD player with a computer interface tacked on. Mac-compatible hardware has been available since 1988, when Apple introduced its CD-ROM drive, the AppleCD SC. And Apple wasn't a reckless pioneer—CD-ROM drives had debuted three years earlier in the PC market.

Although the hardware has been available for a while, only recently have enough general-interest discs become available to make buying a drive worthwhile. But don't blame the software publishers. There haven't been enough drives on users' desks to make publishing Mac CD-ROMs worthwhile. Around 3 million Macs have been shipped, but fewer than 20,000 are attached to a CD-ROM drive. Last year, however, the Mac CD-ROM drought finally began showing signs

By John Rizzo and the MacUser Labs staff
CD-ROM Drives

How It Works: CD-ROM Drive

The data imprinted on the underside of a CD-ROM disc is evenly spaced and is read at a fixed number of bits per second. The drive motor must spin the disc faster as the head moves toward the center, where there is less data per revolution.

As in most CD-ROM drives, the optical head of the AppleCD SC is mounted on a sled that is moved back and forth along the radius of the disc by a linear motor. Compared with the tiny read-write head of a magnetic drive, the CD-ROM drive's optical head is a bulky collection of hardware. The head's optical components focus the laser light onto the disc, and a photoelectric detector measures the strength of the reflection.
of abating. Publishers took a risk and began releasing discs that combine CD-ROM's enormous size with the Mac's unique graphics and sound capabilities. Interest shot up throughout the industry. If predictions by such boosters as the Optical Publishing Association are anywhere near correct, the current trickle of Mac CD-ROM discs could become a flood in the '90s. (Look for a roundup of the best discs in next month's issue.)

New drives have also appeared. Until recently, you had only one choice — Apple's. The lack of competition kept prices high and innovation low. Now, however, new drives have arrived to challenge Apple's monopoly. These units have attractive prices (as low as $895) and innovative features that make them worthy competitors. When we began testing, there were five challengers: the CD Technology Porta-Drive, Denon DRD-253, NEC CDR-77, OM1 ProCDP, and Toshiba XM-320 I A I M AC.

When we began testing, there were five challengers: the CD Technology Porta-Drive, Denon DRD-253, NEC CDR-77, OM1 ProCDP, and Toshiba XM-320 I A I M AC.

MacUser Labs ran a suite of real-world and specialized technical tests to see how the five newcomers stand up against the AppleCD SC. We measured how each drive behaved during normal use by launching a CD-ROM-based application, opening files, and copying files from the CD-ROM onto a hard disk. We then thrashed each drive for a few hours with sophisticated test equipment to discover the reasons behind their real-world performance. We also ran preliminary tests on two beta products, the NEC CDR-35 portable and the Optical Access CM 231 (see the “On the Horizon” sidebar). Our conclusion: Competition has indeed created better drives and increased the value of your CD-ROM dollar — although some drives have taken a step or two backward from Apple's.

But we also learned that if CD-ROM technology is to reach even half the potential its boosters claim, any new disc that enters the market must be attractive enough to make users forget CD-ROM's most annoying attribute: its slowness.

The Great Distributor

All CD-ROM drives are slow (see Figure 1). And we mean s-l-o-w. Or, better yet, s — 1 — o — w. In fact, our tests show that in most cases, CD-ROM drives are even slower than floppy-disk drives. And because of inherent limitations in CD-ROM standards, they're not going to get much faster.

CD-ROM is a locked technology, frozen in place by aging standards. By defining such elements as disc capacity and data-transfer rate, the Sony-Philips Red Book, developed in the late '70s, defined the performance limits of audio CDs. The Yellow Book upgrade, which appeared in the early '80s, extended these limits to CD-ROM. Any manufacturer could ignore these standards and create a faster optical-disc system that held more data. The new technology might be better, but it wouldn't be CD-ROM. It's risky business to establish a new standard — especially when the existing one is well accepted and full of promise.

On the Horizon

The Mac CD-ROM market is expanding rapidly. Since we began testing, several interesting new drives have appeared. For example, NEC is now shipping a CD-ROM drive that doubles as a stand-alone audio CD player. The NEC CDR-35 ($698) detaches from its SCSI interface dock and becomes a self-contained audio CD player with a display for the track number and controls for moving between tracks. The CDR-35 can run on an optional $79 battery pack or on the included power supply.

The drive fits in the Mac Portable case, weighing in at three pounds with the battery pack. Taking a cue from the power-management system of the Portable, the CDR-35 stops spinning after five minutes of inactivity to prolong battery life; any access request brings it back up to speed again. Our experience with the drive is that it is slower than most, but its versatility and low price make it an attractive choice. NEC Technologies USA, 1255 Michael Drive, Wood Dale, IL 60191; (800) 366-3632 or (312) 860-9500.

Procom Technology has released a low-cost CD-ROM drive, the HiPerformance ($799). Lucky buyers of early models are assured a Toshiba mechanism at a very good price, but Procom won't guarantee that this mechanism will remain its inards of choice. Procom Technology, 200 McCormick Ave., Costa Mesa, CA 92626; (714) 549-9449.

Another new drive, the CM 231 ($1,130) from Optical Access International, contains an LMSI mechanism in a zero-footprint case that fits under any compact Mac. Instead of a linear head configuration (see the “How It Works” sidebar), this drive employs the radial-arm mechanism often used in hard drives. Its average access time is fast as CD-ROM drives go, and the beta unit we saw worked very well. Optical Access International (formerly Massachusetts Micro Data Systems), 36 Commerce Way, Woburn, MA 01801; (800) 523-2679 or (617) 935-2679.

This spring, Pioneer is expected to ship the DRM-Minichanger, a CD-ROM drive that makes six discs available at once. The discs are placed into a plastic frame, which is inserted into a magazine that pops into the front of the drive. All six discs can then be accessed without the need to remove and reinsert. The drive should sell for around $1,295. Pioneer Communications of America, 300 E. Crescent Ave., Upper Saddle River, NJ 07458; (201) 327-6400.

One enormous step above the Minichanger is the Kubik CDM 240, an OEM jukebox device that holds 240 discs — that's more than 150 gigabytes (billions of bytes) of on-line storage. Discs are placed in a carousel that surrounds a CD-ROM drive. At 17 x 16.5 x 8.5 inches, the CDM 240 is surprisingly small for the number of discs it holds. The unit did not have a retail outlet at press time, but Kubik will assemble customized systems for about $13,500 for a single unit or $5,000 a unit for quantities of 100 or more. Kubik, 18873 Allendale Ave., Saratoga, CA 95070; (408) 687-7969.

The NEC CDR-35 leads a dual life. In addition to serving as a CD-ROM drive, the drive mechanism can be separated from the SCSI dock and metamorphose into a portable, compact audio-disc player.
CD-ROM Drives

Despite its limitations, CD-ROM serves a purpose not met by any other mass-storage device. The name of the game is distribution. Like audio CDs, CD-ROMs can deliver huge amounts of information in a compact form — but that’s where the similarity ends. Audio CDs are limited to music, but CD-ROMs can deliver clip art, encyclopedias, interactive multimedia presentations, the complete works of Shakespeare, and music. Anything your Mac can display or play can be distributed cheaply and reliably.

Publishers can also use the massive capacity of CD-ROMs to increase the value of their products. Microsoft, for example, uses less than 1 percent of its Microsoft Office disc to distribute Excel, PowerPoint, Mail, and Word. It then fills the next 15 percent of the disk with a manual for each of these applications, an extensive tutorial, a HyperCard-based help system, 383 screen fonts from Adobe, clip art from Genigraphics, and two dozen other third-party applications and utilities. All this extra software comes on one disc, with plenty of room to spare — enough for 200,000 pages of text.

Although it makes sense to leave the manuals on the Microsoft Office disc, you’d want to download the applications and utilities onto your hard-disk drive, because a CD-ROM is just too slow for acceptable performance. In fact, if CD-ROMs catch on in a big way, one of the beneficiaries will be manufacturers of large hard disks. Enormous multimedia presentations, for example, as well as scientific simulations and interactive training applications, can be distributed safely and inexpensively on cheap, durable CD-ROMs — but the software will need large hard disks to perform at its best. And if an interactive training course requires students to enter information, CD-ROM’s read-only nature makes a hard disk a necessity.

Major corporations (as well as the U.S. government) are exploring CD-ROM technology as a way of distributing information to employees across the country or around the world. Corporations can create their own CD-ROMs for about $30 per disc — or less than 5 cents per megabyte. At $2.50 per megabyte, floppy just can’t compete. Even cartridges for tape drives, the only mass-storage media slower than CD-ROMs, cost about 25 cents per megabyte when full. CD-ROM costs are getting even lower as production equipment drops in price and more

Capsule Reviews

**AppleCD SC**

This is the drive that started it all for Mac CD-ROM. Though expensive, it’s well built and offers good — but not great — speed. Audio features include RCA stereo jacks, a convenient thumb-wheel volume control, and CD Remote, the best audio-control software.

**Pros:** Pushpin SCSI identification. Automatic adjustment to U.S. or European power. Excellent audio software.

**Cons:** Expensive. 90-day warranty. No AC fuse.

**CD Technology Porta-Drive**

At the Porta-Drive’s heart is a Toshiba 3201-8 mechanism, the fastest available for the Mac. Its separate power supply can be placed on the floor or replaced by an optional four-pound battery pack.

Until June 1990, this compact package is an unbeatable value because CD Technology is offering Microsoft Office and Image Club’s LetterPress TypeVendor for only $300 extra.

**Pros:** Tied for fastest performance. Least expensive, smallest, and lightest. Can be set for either U.S. or European power. Battery-pack option.

**Cons:** No preamp audio output. Three-position volume control. No power indicator or AC fuse. No audio software.

**Denon DRD-253**

The ponderous performance of this drive lags far behind that of most of the other drives. The built-in speaker is good for working with audio, but its presence doesn’t explain the box’s large size. You can operate it as a stand-alone audio CD player, but only after you disconnect it from the Mac and set a bank of DIP switches.

**Pros:** Internal speaker. Preamp and headphone audio output. Access and power indicators. Internal AC fuse.

**Cons:** Very slow. Only one 50-pin SCSI connector. Internal SCSI termination. No audio software.

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**Notes:**

- Some text may be formatted slightly differently or omitted due to the nature of the conversion process.
- Capsule Reviews section includes detailed evaluations of the drives mentioned.
NEC CDR-77

This sluggish drive is far behind the mainstream in speed. Its CD caddy is not compatible with those of the other drives reviewed. Although the CDR-77 includes software that allows the Mac to control audio functions, the Mac can’t be used for anything else during play.

Pros: Audio software (though limited). Internal AC fuse.
Cons: Very slow. Essential Mac-interface kit is an expensive “option.”

OMI ProCDP

Not for average users, this 19-inch rack-mountable drive features professional audio-output jacks for use in studio environments. It’s relatively fast and extremely well built. Headphone and stereo outputs are provided by quarter-inch phone jacks. An enhanced model, the Combo ProCDP ($2,495), comes with a built-in RS-422 interface to control musical keyboard functions. An upgrade to the Combo unit is available for $695.

Cons: Slow access times. Most expensive, largest, and heaviest. No audio software.

Toshiba XM-3201 A1 MAC

Toshiba is the name of the game in CD-ROM performance right now. This very solidly built unit uses the same mechanism as does the CD Technology Porta-Drive but incorporates its power supply into a slightly larger case.

Cons: No preamp audio output. Three-position volume control. No power indicator. No audio software.

CD-ROM is also an inexpensive alternative to wide-area networks and satellite links. An MIS director can drop a CD-ROM into an envelope and mail a 650-megabyte corporate database for 70 cents. Compare that to transmitting the same data by modem — it would take 23 days at 2,400 bits per second. And because the read-only, nonmagnetic character of CD-ROM ensures a fairly permanent, tamperproof medium, CD-ROM is also ideal for archiving information.

Getting Started

For many users, poky performance is a fair trade-off for the immense capacity of this rugged, inexpensive medium. If you or your company agree, CD-ROM is for you. As you make your choice among the drives that we tested, you’ll be happy to know that all of them are a snap to hook up and use. Five of the six manufacturers are also kind enough to supply all the appropriate cables; NEC charges an additional $199 for its SCSI Interface Kit, which contains a SCSI cable and essential software.

All the CD-ROM drives are SCSI devices and require attention to two SCSI issues: identification and termination. The SCSI protocol lets you daisy-chain up to seven devices, each with a unique identification number from 0 to 6. All but one of the drives use DIP (dual in-line package) switches to change the preset ID. The lone exception, the pioneering AppleCD SC, makes the chore easier with a pushpin selector that displays the ID number rather than requiring you to interpret the brain-boggling binary DIP-switch positions.

After setting the appropriate SCSI ID, you must make sure that the first and last devices on your SCSI chain are properly
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terminated. This dull but important responsibility ensures that all electrical signals fall within an appropriate voltage range. On five of our CD-ROM drives, you accomplish termination by inserting a supplied plug into the drive’s second SCSI connector. The Denon DRD-253, however, doesn’t have a second SCSI connector. This omission forces you to place the DRD-253 at the end of your SCSI daisy chain or spend a few bucks on a special T-connector.

Each drive also includes software that you must place in your System Folder before the Mac can recognize the discs you insert. After you restart the Mac, you’ll notice that no icon appears. Don’t worry; nothing’s wrong. As with a floppy drive, you must insert a disc (or in the case of a floppy, a disk) before anything shows up on the desktop.

Only one manufacturer, CD Technology, offers CD-ROMs with its drive. From January through June of this year, an extra $300 gets you both Microsoft Office (list $949) and a 240-megabyte collection of fonts and clip art from Image Club (list $199). The latter disc, LetterPress TypeVendor, contains a PostScript starter set of 10 fonts and 145 images. Your credit card and a phone call to Image Club can unlock 613 more fonts ($25 each) and 2,200 images (in 15 volumes at $99 each).

Whatever CD-ROM drive you select, make sure that the CD-ROM discs you buy can be recognized by the Mac. Sad to say, most can’t be.

Double-Duty Discs

CD-ROMs come in two flavors: PC and Mac. About one-tenth of all personal computers are Macs, and a similar fraction of all CD-ROM discs can be read only by Macs. Mac-only discs, such as those with a HyperCard interface, use Apple’s HFS (Hierarchical File System) to tell the System the location of each file on the disc. Discs designed for MS-DOS can be read by a Mac only if you use a software MS-DOS emulator such as SoftPC or a hardware add-on such as Mac286 from Orange Micro.

Fortunately, two CD-ROM standards have emerged that let Macs and PCs recognize files from the same discs. However, just recognizing a file — even reading it onto a hard disk — doesn’t mean that you can actually use it. An application must exist — either on the CD-ROM or on a hard-disk drive — that gives your Mac access to the information in the file. And until more CD-ROM drives infiltrate the Mac world, disc publishers aren’t going to spend much time developing Mac interfaces for their discs. Again, the chicken or the egg.

In any case, new standards make double-duty discs possible and some adventurous publishers are taking advantage of them. The first standard is High Sierra, named for a hotel in the California ski country north of Lake Tahoe where the standardization meetings were held. The second standard, ISO 9660, is a slightly modified version of High Sierra that was established by the International Standards Organization. Both standards offer publishers, who now need to produce only one disc for Macs and PCs. Each disc contains two interface applications, one for each computer, and both computers are smart enough to know which application to use. Users on both sides of the blue line benefit because more discs can be made available to all.

To enable your Mac to read High Sierra or ISO 9660 discs, you simply drop a set of files called High Sierra Access, ISO 9660 Access, and Foreign File Access into the System Folder (Foreign File Access determines whether the disc is High Sierra or ISO 9660). All three files were written by Apple and are supplied free with five of the drives we tested. NEC includes the access files in its $199 SCSI Interface Kit. If you use discs designed solely for the Mac, you don’t need the access files. An HFS-encoded CD-ROM looks just like an enormous floppy disk to the Mac.

A Snail’s Race

After you have inserted your first disc into the protective caddy supplied with each drive and slipped the caddy into your new CD-ROM drive, it’s time to experience for yourself what we’ve warned you about all along: CD-ROM drives are slow. Because they are so slow, performance is even more of a buying consideration than it is for a relatively fast device such as a hard drive. A fast hard drive can save you seconds of time, but a fast CD-ROM drive can save you minutes.

Although there are fairly large performance differences among drives from different manufacturers, there’s a maximum limit to a CD-ROM drive’s data-transfer speed. The culprit is the hardware standard that Philips and Sony agreed
In this far from perfect world, not every surge-suppressing device gives you the protection you need from electrical power line distortions. The surges and "spikes" that can destroy or shorten the life of your high-tech equipment. That's why an AT&T Surge Suppressor is a low-cost investment in complete protection. Because only AT&T gives you solid-state architecture, AT&T Bell Laboratories engineering, UL-approved circuitry, and a thermal cut-off feature to disconnect power before it becomes hazardous. Plus the reliability assurance of the company with a century of experience in AC and telephone line protection. For the location of your nearest AT&T dealer, just call 1 800 638-7978.
CD-ROM Drives

Speed is the critical issue when choosing a CD-ROM drive. We tested the six drives as users would — by reading data from commercial discs. As a reference, we ran the same tests on a Quantum Pro80, the hard drive that ships in high-end Macs. We launched a HyperCard stack from Broderbund’s Electronic Whole Earth Catalog, an HFS disc. We opened nine MacPaint files from the Berkeley Macintosch Users Group’s public-domain disc and copied one 9-megabyte data file from Food Analyst, a High Sierra disc. The Toshiba-based drives (from CD Technology and Toshiba) are the fastest, with the NEC and Denon drives far behind.

### Figure 1: Less Is More

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<td>HyperCard stack</td>
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<td>Denon DRD-253</td>
<td></td>
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<tr>
<td>NEC CDR-77</td>
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<td>OMI ProCDP</td>
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<td>Toshiba XM-3201 A1 MAC</td>
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**Launch Time in seconds:**

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<th>Time in seconds</th>
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<th>CD Technology Porta-Drive</th>
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**Open many small files Time in seconds:**

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**Copy one 9-megabyte file Time in seconds:**

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Quantum Pro80 hard-disk drive
599 Ways To Avoid Helvetica

600 Typefaces
They just won't fit onto one page. This is the Image Club PostScript Typeface Library. It contains 600 licensed "second-name" typefaces, available on floppy diskettes and in separate families as illustrated here or on the entire library of 600 fonts focused on our new Letterpress CD ROM, available for $199 including 10 fonts.

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CD-ROM Drives

on when they first developed audio CD technology back in the '70s. Remember, CD-ROM is an offshoot of audio CD, a technology that doesn’t need swift access times or high throughput rates. An audio CD player rarely needs to reposition its bulky laser-equipped optical read head, and audio requirements are easily satisfied by the CD throughput standard of 153K per second. As long as CD-ROM rides audio CD’s coattails, it will remain slow — but benefits such as compatibility and low disc cost because of shared manufacturing plants make sluggish performance a bit more tolerable.

Right now, the best way to achieve acceptable CD-ROM speed is to buy the right drive. To help you choose, we ran a suite of real-world tests on each of our six candidates. To provide a reference point, we also ran the same tests on the Quantum Pro80, the hard drive that Apple puts into its high-end Macs. To see how quickly each drive launches an application that uses a large data file, we opened a HyperCard stack from Broderbund’s Electronic Whole Earth Catalog CD-ROM. Because the system overhead required to open multiple files slows any type of drive, we opened a group of MacPaint files from the Berkeley Macintosh Users Group’s PD-ROM. And finally, to test raw throughput, we copied a 9-megabyte file from a High Sierra disk called Food Analyst onto a fast hard disk.

The CD Technology and Toshiba drives, both of which are based on a Toshiba 3201-B mechanism, won the race. followed closely by the OMI drive (see Figure 1). Apple’s drive follows OMI’s, and then there’s a longer wait for Denon’s and NEC’s. These last two drives showed similarly poor performance in the HyperCard and MacPaint tests, but when copying the 9-megabyte file, Denon’s limped in a distant last.

To uncover the reasons behind these wide differences in performance, we tested the inner workings of each drive. Using sophisticated test software called SCSI Bench and a comprehensive test disc from Sony, we ran each drive through an exhaustive set of gymnastics. We wanted to determine how quickly each optical head could get to the data it wanted (access time) and — once it got there — how quickly the data could be sent back

**Figure 2: Access Times**

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<td>NEC CDR-77</td>
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<td>OMI ProCDP</td>
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</table>

Access time is the deciding factor in a CD-ROM drive’s performance. The quicker a drive’s optical head can get to the data, the faster you can get on with your work. We measured each drive’s access time in three tests. The maximum test was a worst-case challenge, with data alternately placed on the rim and center of the disc. The average test used data scattered randomly over the disc, accurately measuring real-world performance. Finally, the single test showed how quickly the head could dash to one spot. Again, the Toshiba-based drives led the pack.
Replace your Mac's keyboard with the MAC-101 by DataDesk. It includes a full numeric keypad, 15 function keys, 6 page control keys, a T-style cursor pad, and 101 keys desk accessory software, a powerful macro utility allowing full usage of function keys. Available in ADB and non-ADB versions. Mac 101 Keyboard by DataDesk ($136.00).

Utility Software
Abbott Systems, Inc. CanOpener ... 65.
Affinity Microsystems Tempo II. ... 75.
System Design Stepping Out II. 50.
Bortand Sidekick 2.0. 68.
Casady Virtual VM 1. 199.
Virtual VM2. 125.
Dantz Software Development Retrospect v1.1 149.
Dayna Communications DosMou - vter 55.
Oubi-Click Station 34.
HJC Virex 55.
lcom Simulations On Cue 25.
Virex 55.
Icon Simulations On Cue 35.
Insight Development MacPrint 27.
Special 57.
Kent Marsh QuickLock 59.
QuickLock 2.0 29.
Magic Software AutoSave II 87.
PowerCons... 39.
PowerGamma ... 50.
Back-Matic ... 59.
MainStay Capture AntiToxin or ClickPaste 45.
Mac Flow 3.0 55.
Mac Schedule v2.0 127.
Microlytics, Inc. GOfiler v2.0 45.
Microce... 27.
ScreenGems 39.
Redux 51.
Olduval Software MultClip 50.
Chp Share 105.
Peripheral Land Turbo Optimizer 39.
Turbo Back 51.
TurboCard 69.
TurboSPOOL 69.
Solutions, International SmartScript & The Chipmunk V.2.0 45.
Super Glue II v.01 61.
SuperMac Software SuperSpool 5.0 58.
SuperLaserSpool 2.0 87.
DiskIt 5 58.
Sentinel 2.2 87.
Symantec Symantec Utilities for Mac (SUM II) 95.
Symantec AntiVirus for Mac (S.A.M. I) 63.
Synex Mac PhoneBook v2.0 45.
Mac Envelope Plus v1.0 147.
TempoNPO Opener 49.
Williams & Macias DiskFinder 25.
myDiskManager w/Color 28.
myDiskLabeler w/LaserWriter Option 33.
StickyBusiness 89.

HyperMedia & Languages
Apple Computer HyperCard 42.
Borland Turbo Pascal 68.
Borderbound Whole Earth Catalogue (CD ROM) 89.
CalInfo Macintosh 68000 Development System 57.
Machintosh 68020/030 Development System 99.
DigiTalk, Inc. SmallTalk/Transmac 126.
Hyper Press Icon Factory 29.
HyperMonitor Script Expert 65.
Intelligent Developer 229.
Icon Simulations HyperTMON 59.
TMON 88.
Microsoft Quick Basic 65.
Millenium Software HyperCard 65.
Silicon Beach Special 125.
Smathers, Barnes Prototyper 187.
SoftStream Authenticaw w/Mouse 85.
HyperCard v.2.0 123.

Disk Drives/ Hard Disks/ Upgrades/ Keyboards

Macdraft has precise, fast and easy-to-use drawing tools; ideal for creating custom graphics, business charts, forms, illustrations, technical drawings and schematic designs. One can draw geometric and freehand shapes, then rotate, zoom, scale, fill with custom patterns, dimension or even calculate the area of those shapes. An excellent tool for drafting, drafting and design. Macdraft by Innovative Design ($169.00).

Modems

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Apple Computer
HyperCard 42.
Borland Turbo Pascal 68.
Borderbound Whole Earth Catalogue (CD ROM) 89.
CalInfo Macintosh 68000 Development System 57.
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Microsoft Quick Basic 65.
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Practical Modem 2400SA
Prometheus
Prontom 24000E Int. (MACKNOWLEDGE & DA) 209.
Prometheus
Prontom 24000E Int. (MACKNOWLEDGE & DA) 209.
DD's Dreams offers a precision drawing tool for scaled drawings, illustrations, presentations and graphics. Dreams offers zoom, rotation, layers, dimensioning, symbol libraries and a vast array of drawing and illustration tools. Merge shapes together, cut edges of objects using other objects as templates...glue lines and curves together to form unique shapes to be filled with colors or patterns. Dreams by Innovative Data Design (5299.00)
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<td>Hyper Animator</td>
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**Introductory DateLink Express**

A fully Hayes compatible 2400 baud modem designed for the Mac. With comprehensive status light array, "line engage" indicator and upgradeable design (add send/fax capability and NNP error correction). Comes complete with a matched Mac-platinum case, serial port input, a DB-25 connector and communications software. Baoke by Applied Engineering ($159.00).
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CD-ROM Drives

to the Mac (throughput).

Access time turned out to be the deciding factor in a drive's performance (see Figure 2). The Toshiba-based drives showed the fastest access times as well as the best overall real-world performance. Denon's DRD-253 had the slowest average access time, much greater than the maximum time for most drives. The OMI ProCDP's times were surprisingly slow, considering how well it did in our real-world tests.

Throughput cannot be increased beyond 153K per second, the limit set by the Sony-Philips Red Book standard. Most drives achieved this rate, though Apple's and NEC's lagged a bit behind. Denon's again pulled in last: Its throughput chugged along at only 86K per second.

Slow Perfection

If a manufacturer decided to embark on a quest for the perfect CD-ROM drive — while still obeying the Red and Yellow Book standards — what's the best performance it could expect? If access time could be shrunk to zero, the drive would always operate at its maximum throughput rate — about 9.2 megabytes per minute. This hypothetical CD-ROM drive would be more than twice as fast as the fastest tape drives, which rumble along at 3.6 megabytes per minute. No CD-ROM drive will ever be a threat to the hard-drive industry, however. The Quantum Pro80 packed into each high-end Mac, for example, can reach speeds of more than 50 megabytes per minute. Even the perfect CD-ROM would be left floundering in its wake.

To approach the ideal CD-ROM speed, several things could be done. First, a manufacturer could improve access time by speeding up the rate at which the optical head moved back and forth while searching for a particular block of data (see the "How It Works" sidebar). Unlike a tiny hard-drive head, however, an optical head is a bulky device containing a semiconductor laser, a lens, a prism, and assorted electronics. The heavier the head, the more energy it takes to control it. Toshiba's drive overcomes the head's mass (and achieves its quick access time) by delivering more push-pull power — a bit like putting a bigger engine into your old Camaro. The same rapid access also could be achieved by decreasing the mass of the optical head — and someday a CD-ROM-drive designer should do both.

Another area for improvement is in the motor that spins the disc. Information is encoded on both audio CDs and CD-ROMs in a three-mile-long spiral of evenly spaced, infinitesimal pits (see the "It's the Pits" sidebar). To keep data flowing into the Mac at the proper rate, this spiral must pass under the read head at a constant speed. And because the outside of a rotating disc moves faster than the inside (remember the playground merry-go-round you rode as a child?), the disc must spin faster as the head moves toward the center and slower as the head moves outward. An improvement in the

---

**It's the Pits**

CD-ROMs store data as a series of pits (also called dimples) imprinted into the disc's underside. The pits themselves do not represent the 1s and 0s of digital communication; rather, the change from pit to disc and back provides the information.

The photoelectric detector in the optical head measures the strength of the laser's reflection. The disc's surface delivers a strong reflection, but a pit scatters the laser light and weakens the reflection. When a change — the beginning or end of a pit — is detected, the head registers a 1. No change represents a 0.
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Apple’s CD Remote DA lets you play an audio CD while running another application. When you type in the names of a disc and its tracks, CD Remote creates a System Folder document that remembers your entries. Each time you use the same disc, CD Remote lets you select and play tracks by title.

The drive’s ability to change speeds rapidly, coupled with quicker access times, would help approach the CD-ROM ideal.

The Sound of Music
The standardization that keeps CD-ROM slow also ensures that all CD-ROM drives can play audio CDs, which is handy for multimedia developers, music studios, and people who like to play music while they work. (We used a CD of the London Symphony playing Mahler’s Second for our highly subjective test of each drive’s audio capabilities.) Before you start stacking audio discs next to your Mac, there’s a slight catch.

Five of the six drives must be controlled by a Mac to function as audio CD players. Only the Denon DRD-253 can be used as a stand-alone player and that only after you’ve disconnected it from the Mac and reset a bank of DIP switches. Of the five that require Mac connection, only two — the AppleCD SC and NEC CDR-77 — provide the required software. The other drive manufacturers recommend that you cajole your Apple dealer into giving you a copy of CD Remote, Apple’s audio software. And even if you can score a copy, there’s no guarantee that the other drives will use all its features correctly.

CD Remote is a clever DA that looks and acts like a remote-control device for an audio CD player (see Figure 3). If you type in the disc’s name and track titles and save your list when you close the DA, it will create a file that remembers what you entered. The next time you insert the disc, CD Remote will display the titles and let you select what you wish to hear.

NEC’s less attractive audio controller, Music Box, is not a DA and lacks the track-labeling ability of Apple’s CD Remote. NEC also supplies two utilities, NccDPlay and NecCdStop, that start and stop audio play. Unfortunately, none of the NEC programs can run in the background, even under MultiFinder, while you’re using your Mac. Essentially, your Mac becomes the world’s most expensive CD player.

The best drive for music is OMl’s ProCDP. This 19-inch rack-mountable model is aimed at the professional music studio or CD-ROM developer’s lab and has quarter-inch stereo and headphone jacks. (If you’re really serious about audio
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CD-ROM Drives

CD, check out OMI’s stand-alone professional model, the Combo ProCDP for $2,495. It has built-in audio-control hardware and an RS-422 keyboard interface.

The Denon DRD-253 is the only drive with a built-in speaker. Granted, its tinny monaural sound won’t win any hi-fi awards (it makes the London Symphony sound as though it’s playing kazoos), but it is handy to hear the audio without headphones when you’re designing multimedia presentations.

Most of the other drives have a pair of RCA jacks for preamp stereo output and an eighth-inch minihedphone jack on the front. Unfortunately, the fast, inexpensive Toshiba-based drives (Toshiba XM-3201 A1 MAC and CD Technology Porta-Drive) are the least suited for audio. They have no stereo jacks to connect to an amplifier, only a minihedphone jack. In addition, the volume control on both models is a crude slide switch with three positions (soft, not-as-soft, and kind-of-loud).

If you own an audio CD player, you’ll be aware of one major difference between it and a CD-ROM drive: price. If the hardware is essentially the same, why are CD-ROM drives so much more expensive? CD-ROM drives do have a few things audio CD units don’t, such as a SCSI interface and the error-correction circuitry essential for flawless performance. No one except a sound engineer is going to complain if one oboe drops out for a millisecond in Mahler’s Second, but a misread bit in a database could have a negative effect on your career. The main reason for the price difference is simple: sales volume. The consumer-electronics industry can sell far more audio CD players in one year than the total number of Macs sold to date.

Conclusion

The past year saw two important developments for Mac CD-ROM. The first high-quality discs were released that show the technology’s true promise, and new drives appeared that are giving the AppleCD SC a run for its money. This competition has spurred innovation and lowered prices. Competition has also caused an increase in performance, but there are absolute limits that can’t be overcome as long as CD-ROM shares hardware standards with audio CD. Speed will improve in the next few years, but it will never approach that of hard drives or nonstandardized optical media.
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CD-ROM Drives

Not that long ago, an 8-inch floppy disk held 128K. Today 650 megabytes (thousands of kilobytes) of text, sound, and graphics fit snuggly on a rugged 4.75-inch CD-ROM disc. One thing hasn’t changed, however: CD-ROM drives are as slow as floppy-disk drives.

Performance is the top priority when choosing a CD-ROM drive. A slow CD-ROM drive can result in delays measured in fractions of seconds but in fractions of minutes. To cut down the wait, we recommend that you choose one of the two drives that use the Toshiba 3201-B mechanism, the fastest on the market.

Our favorite is CD Technology’s Porta-Drive ($895), a small unit that comes with a separate power supply or optional battery pack. Its performance is essentially equal to the other Toshiba-based drive, Toshiba’s own XM-3201 A1 MAC ($970), but the Porta-Drive is our best-buy recommendation. It’s less expensive, it’s portable, and CD Technology has a January-to-June offer of Microsoft Office and Image Club’s LetterPress TypeVendor for an additional charge of only $300. Even after this offer expires, the Porta-Drive will still be compact, fast, and versatile.

Table 1: Features of CD-ROM Drives

<table>
<thead>
<tr>
<th></th>
<th>Apple AppleCD SC</th>
<th>CD Technology Porta-Drive</th>
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</thead>
<tbody>
<tr>
<td>List price</td>
<td>$1,199</td>
<td>$955</td>
</tr>
<tr>
<td>OEM mechanism</td>
<td>Sony CDU 8001</td>
<td>Toshiba 3201-B</td>
</tr>
<tr>
<td>Drive orientation</td>
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<td>horizontal or vertical</td>
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<td>Warranty</td>
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<td>1 year</td>
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<td>three-position switch</td>
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<tr>
<td>Internal speaker</td>
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<td>no</td>
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<tr>
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<td>CD Remote</td>
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<td>Battery-pack option</td>
<td>no</td>
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<tr>
<td>Auto-configure</td>
<td>yes</td>
<td>no*</td>
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<tr>
<td>(110/220 volts, 60/50 Hz)</td>
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<td></td>
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<tr>
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<td>Indicators</td>
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<tr>
<td>Fan</td>
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<td>no</td>
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<tr>
<td>Size (L x W x H, inches)</td>
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<td>12 x 5 x 2</td>
</tr>
<tr>
<td>Weight (pounds)</td>
<td>9 lb</td>
<td>4 lb</td>
</tr>
</tbody>
</table>

*Works with European electricity but must be manually configured.
Toshiba’s XM-3201 A1 MAC is a close second. It’s fast, lightweight, very well built, and inexpensive. And although the power supply is built in, the drive is only slightly larger than the Porta-Drive. Unfortunately, both CD Technology’s and Toshiba’s drives lack good audio facilities.

If you’re a professional musician, the OMI ProCDP ($1,488) is for you. The price is quite a bit higher than those of the other CD-ROM drives, but you get output jacks common in the music industry and the convenience of 19-inch rack mounting. Although its access times were not among the best, its throughput was just slightly less than that of the Toshiba-based drives.

The AppleCD SC ($1,199) is the patriarch of CD-ROM drives. It’s slower than the leaders but manages to stay far ahead of two of its newer challengers. It’s solidly built and intelligently designed, but — as with some of Apple’s other peripherals — you pay a premium for the Apple logo.

We would pick Apple’s drive over the Denon DRD-253 ($990) and NEC CDR-77 ($999 for the drive, $199 for essential software and cable). Both use outdated drive mechanisms and turned in real-world performances that were agonizingly slow.

Predictions that a CD-ROM drive will be connected to every Mac are about as accurate as the predictions of flying cars at the 1939 New York World’s Fair. Not every user needs such a drive, just as not every user needs a laser printer. But if you can use CD-ROM right now, there’s no need to wait any longer to buy a drive. CD-ROM drives for the Mac are less expensive, faster, and more convenient than ever before.

John Rizzo is MacUser’s technical editor. He has covered the development of optical drives for more than two years, and he still thinks 650 megabytes is a lot of space.

Acknowledgments
MacUser Labs would like to thank the members of its advisory panel: David Bowman of Hub Associates and Kevin Countryman.
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SCSI Accelerators

MacUser Labs tested four NuBus boards that try to break the SCSI bottleneck. The results are surprising.

Icons make the Mac easy — even fun — to use, but there’s one icon we all dread: the little wristwatch. You can minimize the time the watch is on-screen by adding a CPU-accelerator board, installing a faster hard-disk drive, or buying a speedier Mac. However, any improvement eventually runs up against an insurmountable bottleneck: the rate at which data travels to and from the hard drive (see Figure I). Any improvement in this data flow is a welcome relief to users whose work is often interrupted while enormous files move slowly in and out of their Macs. If you can speed up practically everything else on a Mac, why not the hard-drive-to-Mac connection?

Over the past year, four manufacturers have introduced NuBus boards for the Mac II family that attempt to increase the speed of this data path. Can any of these SCSI accelerators be a valuable addition to the average Mac II user’s equipment arsenal? To find out, MacUser Labs tested Pronto from Golden Triangle, Maccellerate from National Semiconductor, Surfboard from Jets Cybernetics, and Super-SCSI from Eclipse Technology. After extensive real-world testing, the results were not at all what we expected.

The target of these boards’ effort is the Mac’s small computer system interface, better known as the SCSI (“scuzzy”) port. The SE and later models of the Mac have two of these ports: one inside to manage the internal hard drive and one on the back for a chain of up to seven external SCSI peripherals — hard drives, CD-ROM players, scanners, and/or other SCSI-equipped devices.

When it was first introduced on the Plus, the SCSI port’s top speed was 263 kilobits per second. Over the years, its performance has improved, and the SCSI port in the Mac II family now tops out at 1.4 megabytes per second.

By Tim Standing, Paul Yi, and the MacUser Labs staff

Figure 1: Mac II Hardware Bottlenecks

Although many factors influence the rate at which information can flow between a Mac and its peripherals or a network, no data can exceed the top speed of each path to the CPU. In most cases, real-world performance is well below these theoretical top speeds.
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Although SCSI speed has improved, hard-drive manufacturers have remained one step ahead. The first SCSI hard drive, the AppleHD 20SC, is considered slow today, but it's twice as fast as the Plus' SCSI port. Today, the MicroNet Wren SB-330 hard drive can provide bursts of speed or streaming output of the SiliconDisk (see "101 Hard Drives," February '90). at 6 megabytes per second, a 1.4-megabyte-per-second barrier.

Wren's performance.

When we ran the SCSI accelerators through simulations of normal, day-to-day activities, we began to understand why this caveat was necessary. In most cases, these purported "accelerators" were actually SCSI decelerators when compared with the SCSI port that comes standard on later-model Macs.

Sound incredible? Read on.

Get It In, Get It On

First we evaluated each board's installation procedures. All the boards slipped neatly into a NuBus slot, although the SurfBoard gave us a bit of trouble because it has a large capacitor jutting out from each corner — it is awkward to install another board in the adjacent slot.

The boards vary in how they connect to the Mac's internal hard drive and to external SCSI peripherals. The Pronto and SuperSCSI are the simplest, since they provide a new external SCSI port, accessible through one of the NuBus openings at the rear of the Mac II. The Maccellerate and SurfBoard are a bit more complicated. The SurfBoard provides no new external SCSI port, but it requires all SCSI devices to be in a loop,
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with one end of the loop connected to the Maccelerate’s port and the other end connected to the Mac’s existing SCSI port.

Since the Maccelerate and SurfBoard use the existing SCSI port, they won’t be able to take advantage of a planned enhancement in System 7 — the ability to recognize two seven-device chains of SCSI peripherals instead of the single chain System 6 permits. If National Semiconductor rewrites its driver software so that the Maccelerate doesn’t need to use both ports, it also could benefit from System 7.

After you’ve installed the hardware, three of the boards require that you also place files containing their driver software in your System Folder. The SuperSCSI keeps its software in an on-board EEPROM (electrically erasable, programmable read-only memory) chip, where it can easily be updated with utilities supplied by Eclipse Technology. The disadvantage of this method is that you can’t turn the SuperSCSI on and off from the Control Panel, as you can with the other accelerators.

Our first evidence that SCSI accelerators might not be appropriate for all users was when we discovered that the software supplied with the Maccelerate and SurfBoard replaces the driver software of any attached hard drive. Since some hard drives use unique driver software with special features such as partitioning and password protection, both the Maccelerate and SurfBoard may have trouble recognizing these special features — or even the entire hard drive. For example, we couldn’t get the Maccelerate to recognize partitions on a Jasmine hard drive.

The Pronto and SuperSCSI don’t interfere with hard-drive features because their software works at a deeper level of the system. These two boards should be compatible with a broader range of SCSI devices than the Maccelerate and SurfBoard are. But beware that SCSI in the Mac world is far from standardized. For example, none of the SCSI accelerators recognize executable media such as cartridge drives or certain optical discs.

(However, Pinnacle Micro, in collaboration with Golden Triangle, has added new firmware to the Pronto board to make it compatible with Pinnacle’s own REO optical drives.)

The Winner: Nobody

We tested each board’s performance with three SCSI peripherals: the RAM-
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SCSI Accelerators

in-a-box ATTO SiliconDisk, the very fast MicroNet Wren SB-330 hard-disk drive, and a Quantum Pro80 hard-disk drive identical to the one that Apple ships in all high-end Macs. The Quantum is the slowest of the three devices — but with a transfer rate of around 1.5 megabytes per second and a 19-millisecond access time, it’s no slouch. We disabled the Quantum’s DisCache feature to ensure that we measured only the performance of each SCSI accelerator board and not the speed of the Quantum’s caching scheme.

We first timed the duplication of two folders, one with 200 files of 10K each and the second with four files of 1.6 megabytes each. Duplicating numerous small files requires the computer to access many different areas of the hard-disk drive in rapid succession, which slows down the throughput rate. On the other hand, large files can be speedily written in large segments to a single part of the disk. Each test cycle consisted of a read, a write, and a second read to verify the write. We also ran the same set of tests on a Mac II without a SCSI accelerator installed, once with the system RAM cache set at 128K and once with no RAM cache.

The results were surprising (see Figure 2). In most cases, the SCSI accelerators reduced performance to below that of a standard Mac II using Apple’s RAM cache. There were exceptions: the MacAccelerate’s performance transferring 1.6-megabyte files to and from the Quantum and Wren hard-disk drives, and the performance of the SuperSCSI and SurfBoard on the SiliconDisk with the same large files. However, these anomalies can’t disguise the glaring fact that no SCSI accelerator consistently and significantly improved the Mac’s ability to move data to and from a hard drive. In most cases, the “accelerators” actually slowed down the transfer.

Try, Try Again

To give the accelerators another chance, we trotted out DiskBasher!, an exclusive MacUser Labs benchmark that is an excellent predictor of real-world hard-drive and SCSI performance. We limited our testing to the fastest SCSI peripheral, the ATTO SiliconDisk, because its raw speed gave the accelerators their best chance of success. After a day of testing, the news wasn’t good for the manufacturers of the MacAccelerate, Pronto, and SurfBoard — their boards were all outperformed by the Mac II even without the
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SCSI Accelerators

128K RAM cache enabled.

However, we did find our first significant improvement: The SuperSCSI board not only beat the Mac II, but it also completed the Disk.Basher! tests nearly twice as fast as did its competitors. To be honest, we couldn’t figure out why SuperSCSI did so well in this test and so poorly in others, so we gave it — and all the other boards — another chance.

We set up an Ethernet network using a Mac IIx as the server, the Wren as its hard-disk drive, and an SE as the client.

These purported ‘accelerators’ are actually SCSI decelerators.

We then read a 500K PageMaker file from and wrote it to the Wren. Since EtherTalk’s speed demands a high-performance server, we hoped this torture test would spread out the pack.

By this time, we weren’t surprised that three of the SCSI accelerators either had little effect or actually reduced performance. The SuperSCSI again led the pack when reading from the server — but with an almost meaningless 2-percent improvement over the Mac IIx. And each time we tried to write to the server, the SuperSCSI crashed the Mac IIx. The only way to recover was to restart the Mac — hardly an acceptable performance by the SuperSCSI, and the end of our hopes for SCSI accelerators as the answer to day-to-day wristwatch delay.

Why Pronto Isn’t

We were most surprised by the Pronto’s performance. It uses a SCSI chip that’s three times faster than the chip used in all Macs, plus it has a data-caching technology similar to the Mac II RAM cache that led most of our tests.

A data cache is a waiting room for data coming from a SCSI peripheral. As each byte arrives, it’s placed in the cache memory. (The Pronto is available with RAM configurations of 64K, 128K, and 256K; we tested the 128K model.) When all the bytes from the hard disk have arrived, the Pronto signals that they are ready to be copied into RAM by the Macintosh’s microprocessor. During this...
caching process, the Mac's microprocessor is free to work on other duties and can be interrupted at any time to handle inputs such as mouse movements.

The big advantage of this method is that the most recently accessed data remains in the cache memory, where it can be grabbed and copied into the Mac's memory almost instantaneously, without reaccessing the hard disk. Moving data from the NuBus board's memory to Mac memory is much faster than moving it off a hard disk, over a SCSI cable, through the Mac SCSI chip, and then into Mac memory. In addition, "smart" caching software — like that in the Pronto — also reads additional data from the same area of the hard disk into the cache, betting that the next request will include some or all of this extra data.

Pronto requires you to set cache-memory sizes for each device you have attached to its SCSI port, as well as for what Golden Triangle calls generic I/O (input/output), which is necessary for cache overflow and other activities. Currently this chore is done with a cdev, but Golden Triangle is working on software that will automatically configure your system for top performance. Until this software is shipped, you must experiment with different cache sizes yourself. We tried many different combinations with each SCSI device (the results we quote reflect only the best performances), and discovered that finding the right combination is not a simple matter.

What's worse — and it may be one reason for the Pronto's disappointing performance — is that the Pronto won't transfer any data into the Mac's memory until the cache area has been completely filled. If you set the cache too large and the Pronto is unsuccessful in filling the cache promptly with data that it bets you will soon need, you must wait until the Pronto tries again (and maybe again and again) before your Mac gets even the first byte it needs.

This isn't to say that the Pronto is a useless device. Golden Triangle acknowledges that the Pronto works best "in combination with products from cooperating third-party developers." DuPont,

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**Acknowledgments**

MacUser Labs would like to thank Charles McConathy of MicroNet and John T. Keller of ATTO for the loan of test equipment.

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for example, requires a Pronto in the Mac that drives its $75,000 4CAST color printer, and 68000, Inc., uses one in its high-end Dash 30 WORKSTATION. In both cases, however, very specialized software was written to make the Pronto effective — not something the average user should be asked to do.

**DMA Disappointment**

In addition to faster SCSI chips, the three remaining SCSI accelerators — the Macaccelerate, SuperSCSI, and SurfBoard — all use DMA (direct memory access) in their attempt to speed up the SCSI port. DMA boards relieve the Mac microprocessor from the job of moving data into memory, ostensibly freeing it to perform other tasks. However, while the DMA board is performing this chore, it takes over the NuBus and disrupts the Mac microprocessor’s access to memory. There’s not a lot left that the Mac can do.

In addition, Apple warns that the Mac doesn’t support DMA (see *Macintosh Technical Note* #221). When the Mac’s microprocessor is prevented from accessing its own memory, as it is when a DMA board takes over, it may have a problem responding to new inputs such as LocalTalk or EtherTalk messages or mouse movements. This is exactly what we found when we tested the SuperSCSI board on EtherTalk.

Though of little value to the average Mac II user, the three DMA boards should be of some benefit to A/UX users. This UNIX-like operating system from Apple offers true multitasking and thus allows DMA transfers while freeing the microprocessor to access memory and respond to new inputs.

Although both National Semiconductor and Jets Cybernetics emphasize the value of their boards in the A/UX environment, only the Macaccelerate ships with fully functional A/UX software. When we tested the Macaccelerate’s performance in a busy multitasking A/UX environment, it improved SCSI performance by a full 20 percent.

Jets Cybernetics does offer A/UX software, but — like Jets Cybernetics’ software for the standard Mac operating system — it’s only a beta version. (Unlike any commercial product we’ve ever seen, the SurfBoard ships with software clearly marked as beta — hardly a confidence-inducing practice.) Eclipse Technology is working on A/UX software for the SuperSCSI board, and Golden Triangle is doing the same for the Pronto.

**Too Little, Too Early**

If you want to speed up your Mac and you don’t use A/UX, we’ve got good news and bad news. The good news is that dedicated engineers are working hard to develop a new class of performance enhancements called SCSI accelerators. The bad news is that they can’t yet help you break the SCSI bottleneck — their devices offer little or no performance increase for the average Mac user.

Even though certain combinations of SCSI devices and tests show minor performance enhancements, none of the boards we tested offers an overall solution. If you want faster SCSI performance, wait for the Mac IIx, which should finally upgrade the old SCSI chip. Or just buy more SIMMs, since the Apple-supplied RAM cache in every Mac’s system seems to perform just as well or better than any current SCSI accelerator.

Tim Standing is a software engineer and the author of several articles about SCSI. Paul Yi is an associate project leader at MacUser Labs.

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**The Bottom Line**

Traditions are made to be broken. Each time MacUser Labs tests a group of products, we single out one or two as the best values and give the reasons for our recommendations. This time around, however, we can’t recommend any of the SCSI accelerators we tested. Some may have limited value in very specialized situations, but our tests — designed to simulate real-world situations — prove that they’re of little use to the average Mac user.

If you’re one of the rare Mac II users who uses the A/UX operating system, the Macaccelerate ($595) from National Semiconductor may be of some interest. With the standard Mac system, the Macaccelerate also provided some improvement in moving enormous files to and from the Quantum Pro80 hard-disk drive (standard on all high-end Macs). However, unless you spend most of your time working on immense graphics or sound files, you won’t notice any improvement.

When connected to the superspeed ATTO SiliconDisk, Eclipse Technology’s SuperSCSI ($989) performed decently in our DiskBasher! tests and also managed to improve the throughput of giant files. But its performance in most of our other tests was as mediocre as the rest of the boards’. In addition, the SuperSCSI repeatedly crashed the server when we used it on a network. There appears to be some promise here, but we suggest you wait for further refinements.

The board that puzzled us most was Golden Triangle’s Pronto ($745 to $1,195, depending on cache size). Since it uses a proven technology, RAM caching, we assumed that the Pronto would at least perform close to expectations. However, its clumsy cache-setting system and its poor data-handling techniques made it a disappointing performer — it was especially slow when connected to a network. There’s a chance the Pronto might improve when Golden Triangle releases smarter software to control its cache management, but we’re not holding our breath.

Even in a field as weak as this, one product must finish last. The SurfBoard ($1,295) by Jets Cybernetics earns that distinction among SCSI accelerators. Its performance was mediocre to poor on all tests except the duplication of enormous files, using the ATTO SiliconDisk. The SurfBoard is expensive, it’s shipped with beta software, and it doesn’t include the one potentially important feature offered by the other three SCSI accelerators — an extra SCSI port in anticipation of System 7. The people at Jets Cybernetics told us they were “more interested in facilitating the future than in saving the past.” If that’s the case, we recommend that you wait until you see what the future brings before purchasing a SurfBoard — it’s not ready for today’s marketplace.

Or is the marketplace not ready for it and the other SCSI accelerators? If future operating systems support DMA or if future peripherals can provide sustained high-speed data-transfer rates, SCSI accelerators may become popular and useful tools. When that day comes, MacUser Labs will retest, reevaluate, and rethink our conclusions. But until then, we recommend that you leave these boards alone.

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Most Mac applications open and save documents in the same way: When you choose Open from the File menu, you see a dialog box with a scrolling list of filenames below the name of their folder. When you choose Save As (or Save for the first time), a similar box is displayed, with a field for entering the new filename. These directory (or SF, for standard file) dialog boxes work pretty well, but they have some frustrating limitations. For

- Magnus Software's FileMagic adds features such as custom file and folder menus. Its hierarchical menu includes submenus that allow instant access to preferred files and folders. The INIT comes with modules that, when copied into your System Folder, provide a Find File clone; an enhanced Copy command; and a Finder-like implementation of Get Info that lets you change filenames, types, and creators.

Unfortunately, though, FileMagic's confining interface unnecessarily circumvents Apple's file-navigation method by replacing the standard folder menu. Other SF utilities avoid that conflict by putting their proprietary menus into an unused part of the SF dialog box so you can still access the old menu.

- Robert Churchill's Zephyr cdev is the sleeper of the commercial lot because it is published by an individual rather than a software company. You can download a functionally crippled demo from online services such as CompuServe. Those who order the package receive a full-featured product that can change, delete, and find files, and a HyperCard tutorial. It lacks navigation enhancement like that in the other utilities, however.

Zephyr is swift and refreshing enough to earn its moniker, but learning to use it may knock the wind out of you. Its unique interface substitutes mini-icons at the bottom of the SF dialog box for the pop-up menu other utilities use, providing more direct access to Zephyr's functions at the expense of their clarity of purpose. But its full support for the keyboard compensates greatly for these ambiguous, unfilled icons, and the cdev even includes a built-in editor for controlling the fonts, size, and layout of its own dialog boxes.

Planned enhancements to Zephyr include online help that better demonstrates its usefulness, and improvements to the sometimes perplexing interface. Zephyr could also benefit from some printed documentation to win fans from among the less technically oriented.
example, they display the contents of only one folder at a time. As folders branch down and away from the top (desktop-level) folder in the upside-down "tree" of the Mac's Hierarchical File System (HFS), you must climb up or down the branches to access remote folders. The desktop level of the tree is the level that displays the name of the device being searched—a floppy or hard drive, for example. As you delve deeper into folders within folders, you are moving "down" the tree.

If the file you need is in the currently open folder, you simply scroll to it and open it. But if it's somewhere else, you may have to select the pop-up folder menu to reach the desktop-level directory, only to scroll and double-click a few more times to laboriously wind your way back down a different branch. Here are some directory dialog box add-ons—some commercial, some freeware or shareware—that can tame the HFS beast.

By Ross Scott Rubin

Aladdin Systems' ShortCut had its humble beginnings in Raymond Lau's shareware SFVol INIT. ShortCut's menu, which pops up from the volume title, minimizes file-menu clutter by displaying only the names of the files that the current application can open. Invoking ShortCut while pressing the Option or Command key brings you directly to its file or folder menu. ShortCut can create and enter new folders; retrieve file information (including AppleShare access privileges); find, rename, and delete files; erase entire disks; and enlarge the SF dialog box to display more files at once. ShortCut can also locate, decompress, and open files within StuffIt archives.

ShortCut's ability to assign numeric keyboard command equivalents to up to ten mounted volumes—a boon to users of TOPS or partitioned drives—ends the drudgery of repeatedly pressing the Drive button or Tab key to arrive at a desired volume. Like Claris' MacWrite II, ShortCut boasts an outstanding, complete—but largely unnecessary—graphical hypertext on-line help system through which you may want to occasionally browse to review its advanced features. (All other features work perfectly without the easily removable Help file.)

ShortCut also has some shortcomings. The ability to copy and move files would be a welcome, but not critical, addition. Although ShortCut's unstuffing feature has a good interface, transparent on-the-fly decompression while opening documents would fully integrate ShortCut into Open dialog boxes.

DFaultD by Jon Gotow can associate a default folder with almost any application. For example, if all your Excel files are in a folder called Accounts, you can neatly have the files in that directory ready to open every time you choose Open in Excel. The directory will stay open to accept new files when you issue the Save command.

But what if you'd like Excel to default to New Accounts at the first of the month? You can link New Accounts to Excel in a different link set you choose at the month's beginning. DFaultD, a shareware steal, makes an excellent companion to the commercial offerings, because most folder hopping occurs when you first start up an application.
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<td>Lawrence Berkeley Lab 508-6208</td>
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<tr>
<td>Rebound</td>
<td>By Fred D. Reed</td>
<td>Freeware</td>
<td></td>
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<tr>
<td>DFaultD 2.0</td>
<td>By Jon Gotow</td>
<td>5508 Hobart St.</td>
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<td>Shareware, $15</td>
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<tr>
<td>DAzual</td>
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<td>DialogKeys</td>
<td>CE Software</td>
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<tr>
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## More File Finders

Some of the features of the commercial packages first appeared in freeware INITs such as Andy Hertzfeld’s SFSscroll and Fred Reed’s Rebound, which automatically highlight the last file accessed in a folder. Pete Helme’s shareware program Front and Center can center dialog boxes on the cursor.

DialogKeys, a commercial cdev included with CE Software’s QuicKeys, lets you highlight and select radio buttons and check boxes in dialog boxes without touching the mouse.

Once you’ve developed a taste for enhancing the world according to Apple, you may decide to swear off the Finder entirely and switch to more-efficient third-party programs such as Fifth Generation Systems’ PowerStation, CE Software’s DiskTop, or ICOM Simulations’ On Cue, which lets you preselect the files you use most often, keeping this directory of hot files readily accessible at all times. (See “Losing Your Finder,” September ’89, for details on how to go about it.)

As long as you’re still using the Finder, though, any of the utilities I’ve mentioned can make file navigation and management a simpler task, meaning you can stop wasting time looking for your work and start spending more time doing it.

## 3 Ways to Search the Directory Dialog Box

You’ve just selected Open from the File menu to find yourself staring at a folder with multitudes of files. How can you speed up your search for a file that’s in the middle or toward the bottom of the list?

1. **Scrolling or using the arrow keys lets you see every file in a folder, but these are also the slowest ways to search the directory dialog box.**

2. **No matter how you have your view set in the Finder windows, the directory dialog box always lists files in alphabetical/numerical order. Typing the beginning letter (or number) of the filename takes you right to the file or to a range close to it. If the file is near the bottom, try typing Z.**

3. **Typing the tilde (-) key takes you to the very bottom of the list. These techniques also work on windows in ResEdit, Symantec Tools, DiskTop, and DiskTools II, but they don’t work with all file editors. You might find other instances in which these work — drop us a line if you do.**

— Kristi Coate

If a souped-up directory still isn’t fast enough, maybe it’s time to abandon the Finder.
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Cache Consciousness

I have written here before (in January 1990, to be exact) of what I call the Clipboard mindset. The idea was to suggest a profitable way to approach working on the Macintosh, using tools such as the Clipboard with maximum efficiency. Some of you readers may have thought the idea was to think like the Mac Clipboard. Well, it was, kind of. When you’re out to beat the San Francisco 49ers, it doesn’t hurt to try to think like Joe Montana, and when you’re out to Beat the System, it doesn’t hurt to try to think like a system-software component.

This month I want to suggest a way of thinking that can speed up some of the most annoying delays in using the Mac. If you’ll forgive one more mecanomorphic neologism, it’s time for us to attain “cache consciousness.”

If I’ve set this up properly, you’ll correctly take cache consciousness to mean the intriguing notion “thinking like a cache” rather than the boring idea “thinking about the cache.” You won’t, I trust, think I’m referring to such passé 1980s topics as pinching pennies and maximizing profits, although thinking like a cache should positively impact the bottom line, as they used to say in the quaint language of the past decade.

So what exactly is a cache, and how does it think?

A cache (or RAM cache) is a portion of memory (RAM) set aside to hold information recently read into RAM from the disk. With the information still in RAM, the Mac may be able to move that information from one place to another in (fast) RAM the next time you need it, rather than having to read it into RAM again from the (slow) disk. You can’t use an application or a document unless it’s in RAM, and a cache causes code or data that might be used again to remain there.

Your system comes with a cache. If you pull down the Apple menu and select Control Panel, you should see a RAM cache among the adjustable features. You can turn it on or off and raise or lower the amount of memory assigned to it. The more memory it has, the more code and data it can keep in RAM.

There are many varieties of caches, most of which are of no interest or use to us here, including — unfortunately — the one that Apple put into your system. But the characteristic of a cache that is both interesting and useful is its habit of holding onto recently used stuff, keeping it handy in case it’s needed again. Data, program code, whole applications — it doesn’t matter so much what this cache is keeping as that the cache operates according to a sage rule of thumb: If you’ve used it recently, you are more likely to want to use it again soon, reasons the wise cache.

Now forget about real caches for a while, and just hold on to that bit of wisdom that caches have imparted to us. As you’ll see, it can take us quite a distance.

Mostly Adequate

Chances are, you find the performance of your Mac adequate most of the time. No, really. Those times when its performance is inadequate — when you’re moving through large documents, opening and closing files, starting up and shutting down, and starting and leaving applications, for example — have an annoyance level that goes beyond the length of the delay. They are annoying because they make you wait when you are ready to act. What all these operations have in common is this: They move things between disk and RAM. When you load an application or open a file, you cause it to be copied from disk to RAM. During this procedure, you wait.

By Michael Swaine
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Some waits are more annoying than others. Saving your work, which you should do frequently, also involves shuffling bits between RAM and disk, but it’s usually less annoying than the time spent opening a document. There is a good ergonomic reason for this: You can fit your saves into the rhythm of your work habits. That doesn’t apply to opening documents, though. When you are ready to open a document, you are ready to work on it, and whatever time elapses between starting to open and starting to work is time spent waiting for the machine. Annoying. Other operations can also cause annoying waits: Downloading fonts to a cache. 

These kinds of operations hold up progress because they move information between disk and RAM, so thinking like a cache can help you keep the delays to a minimum. Note that I’m not suggesting you use a cache — although that would be good advice if Apple had a good cache — but rather that you manage memory yourself, thinking like a cache. You can apply cache consciousness to managing documents, applications, and the system in general.

Regarding documents, the obvious rule of thumb is: Don’t close documents if you’re likely to need them again soon. Opened documents have at least one foot in RAM; closed documents don’t. Keep them open. Unfortunately, this obvious rule doesn’t work. It can have exactly the opposite effect of what’s desired.

The problem is that RAM is limited. If a file is too large to fit in the available RAM, the application will swap portions of it in and out of memory as needed. This is why scrolling through a large document is sometimes jerky. If keeping too many documents open interferes with efficient use of the current document, you should, of course, close some of them. Being cache-conscious regarding documents won’t lead you to any solutions but these basic ones, but this type of thinking will make you more sensitive to the problem, so that you deal with it when it first crops up rather than when it exceeds some annoyance threshold.

If you’re running into delays in using documents under MultiFinder, though, you may have another option. You can redefine the amount of memory allocated to an application, just as you can adjust the size of your RAM cache.

If you are finding yourself memory-crammed whenever you use a particular application under MultiFinder, select the application’s icon at the Finder level and select Get Info from the File menu. Here you can raise the amount of memory allocated to the application. Under Get Info you’ll see a suggested memory size too. It is often possible to run applications with less than the suggested memory allocation, but it’s not a very good idea to do so.

Running under MultiFinder brings up the challenge of managing multiple applications as well as multiple documents. Managing your use of memory when running under MultiFinder can mean the difference between being able to open an application when you need it and not being able to open it. The problem here is fragmentation. MultiFinder allocates only contiguous blocks of memory to applications. Thus, you can find yourself in the frustrating position of having enough memory to run an application without being able to open it, because that memory is in contiguous (fragmented) blocks. Unfortunately, MultiFinder isn’t sophisticated enough to do anything about memory fragmentation — to defragment it, you must close and re-open the applications involved, or restart your Macintosh.

But you can avoid most memory fragmentation by thinking like a cache. Which application are you going to want to have open for the longest amount of time? Open that application first. You can completely avoid the memory-fragmentation problem by not closing an application before closing a more recently opened application. And if you can just come close to this ideal by thinking ahead when you open more than one application, you will save yourself time and aggravation.

This strategy is not exactly what a cache

---

Eight Ways to Use The Option Key

Taking up a small amount of real estate on the keyboard, the Option key unlocks many doors for power users.

1. Pressing the Option key while launching an application from a floppy disk equipped with its own System Folder prevents switch-launching — that is, you can continue operating under the current System (as opposed to the floppy’s System). Note that System 5.0 (and later versions) won’t let you switch-launch from a hard-disk drive unless you hold down the Option key.

2. To bless or select a new active System Folder, hold down the Option and Command keys while double-clicking on the Finder icon in the desired System Folder.

3. If you’re in the Finder and want to use MultiFinder, hold down the Option and Command keys while double-clicking on the MultiFinder icon in your System Folder. Once you’ve switched over to MultiFinder, you can’t switch back to the Finder without restarting your Mac.

4. In the Finder, holding down the Option key while pulling down the File menu changes the Close menu item to Close All.

5. Use the Option key to generate special characters such as the tilde (~), Option-N, registered trademark (@, Option-R), and delta (~, Option-D).

6. Holding down the Option and Command keys when the Finder launches rebuilds a disk’s desktop. Rebuilding the desktop speeds up the process of launching applications.

7. With Font/DA Mover open to fonts, you can load fonts into applications or HyperCard stacks if you hold down the Option key while clicking on the Open button for the second window. This lets you access and open applications and stacks in the Font/DA Mover window.

8. Under MultiFinder, holding down the Option key and then selecting a DA loads the DA into the Finder’s application heap instead of loading it into the DA Handler.

— Kristi Coale
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*takes advantage of special connections built into MacWrite® II from Claris™

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The amount of RAM that data takes up is usually trivial, but it can sometimes be substantial. In those instances where it is significant, you can free up some needed RAM by clearing the Clipboard.

Here the trick is to think like a cache not in order to do a cache's job but rather to undo the Clipboard's automatic caching. If you're running short of memory, check to see if you've got something humongous in the Clipboard. If you do (and you don't need it), delete it: Select one character, type Command-C to copy it to the Clipboard, and type Command-C again to put it into the Undo buffer.

The principle behind cache consciousness is so obvious in the real world that it doesn't need mentioning, but in the abstract world of computing, where the things you work with daily are invisible patterns of bits shuffling invisibly between magnetic and electronic storage devices, it's easy to overlook the importance of keeping close at hand the things you will need the most.

**Users Are Winners**

I wanted to acknowledge earlier some solvers of the September puzzle, but I was short of space. The puzzle involved a window that filled the entire screen and its parent window sitting in front of it. The question was, how did the parent window get in front of the other window? (If folder A resides in folder B, then the parent window of the window corresponding to folder B is the window corresponding to folder A.)

As many readers pointed out, Jim Finn's Command-drag technique in that same issue could be used to solve the puzzle. Although I wouldn't call this an easy technique (it requires several moves and selections of windows), it was an easy solution to come up with, and there is something to be said for the first solution that comes to mind.

The solution that I had in mind (and that came first to many other readers' minds) requires clicking on the title bar of the large window, which causes the other window (its parent window) to be selected and brought forward. This solves the puzzle in one click. You can't get much easier than that.

That solution works, however, only if the Title Click feature of the Finder is active, as many of us think it ought to be. Title Click allows you to work your way back up the hierarchy of windows; clicking on the title bar of any window selects its parent window. Unfortunately, Apple doesn't ship the Finder with Title Click turned on, so you need to use a utility such as Layout or ResEdit to turn on this feature. I recommend doing so; it's quite useful.

A third legitimate solution required knowing that some actions affect a window in some way without actually selecting it. There were several variations on this theme, the most typical being to resize the window that's filling the screen so that you can get at the target window to close it, click in the resize box of the first window to make it fill the screen again, and then select Open from the File menu, which will reopen the second window in front of the first. Curiously, this was the solution sent by the three youngest puzzle solvers: Craig Woker, 14, Okawville, Illinois; Harald Nagel, 11, Scottsdale, Arizona; and Michael Saji, 9, West Hills, California.

Other approaches included using utilities or a second monitor, or taking it with screen dumps. Robert Greenlaw, Westerly, Connecticut, sent the most solutions (six). I believe those who said that a well-timed triple-click works, but I wasn't derisory enough to duplicate this solution.

Only two readers out of the hundreds who responded asked what I thought was an obvious question: Why, except to solve the puzzle, would anyone want to do this?

Apparently the answer was just as obvious. Puzzle solving is mental exercise, and as so many of the solvers discovered, when you solve puzzles in the knowledge domain you work in, the search for the solution leads you through all sorts of useful information you might never have come upon otherwise.

For simple problems, the first solution to come to mind is often the best — even if there are quicker, slicker, more efficient solutions — simply because it's at hand and they're not. It's in RAM, you might say, and they're out on disk. The charter of this column is to give you a cache of strategies so that more and better solutions come to mind first.

But the best problem-solving strategy anyone has ever discovered is exploration. And that's why I present puzzles in this column. Next month I'll report the winners of the October and November puzzles and present a new puzzle.
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The Case of the Quirky Computer

‘When you have eliminated the impossible, whatever remains, however improbable, must be the truth.’
—Sherlock Holmes

For the past two months, my usually trusty Mac II has suffered a critical case of the digital hicups. It started when I installed a Radius 24-bit-color system. In went the video boards and out went my sanity.

My Mac’s first symptom was something that many leading-edge Mac users are all too familiar with: The machine would work fine for a while, and then, without warning, the cursor would freeze on the screen and the keyboard would go dead. Talk about getting no respect — I wasn’t even getting a bomb box.

In situations like this, you gotta have a system. Since my Mac II had worked perfectly for months (not even an “unexpectedly quit” message in MultiFinder!), it was easy enough to assume that one of two things was wrong: either the Radius DirectColor or QuickColor boards I had just installed were defective, or the Radius or 32-bit QuickDraw software was being interfered with by something already installed in my System Folder. Since the Radius equipment was brand new; had been installed carefully and exactly as the instructions specified; and didn’t seem to have any obvious, observable problems, I guessed that I was stuck with one of the usual cdev or INIT conflicts that seem so prevalent these days.

I knew, for instance, that the On Cue INIT has memory problems that interfere with certain other programs I use (such as the THINK C Debugger). But this time around, I didn’t really know which, if any, of my INITs was causing the problem. This is where an INIT-manager utility such as CE Software’s Ask or Microseeds’ INITPicker comes in handy. You can use the INIT manager to disable all your INITs and cdevs and then reactivate them one by one; call publishers’ technical-support line.

Unfortunately, disabling cdevs and INITs didn’t help me one bit, although I took all the extra fonts and DAs out of my System file too. In fact, once I’d disabled all the INITs, I noticed that the freeze occurred the first time I pulled down a menu from the menu bar. What would cause that problem?

I eventually got around to playing with hardware, and sure enough, the problem disappeared the minute I removed my Orchid MacSprint II board (a low-cost RAM-caching card that speeds up a Mac II by 15 to 20 percent — one of the cheapest ways to pep up an aging Mac II). Turning the MacSprint II off by disabling its INIT wasn’t enough — apparently the card imposes a slight hardware-timing change even when its software is inactive. I then reactivated all my INITs, and everything

<table>
<thead>
<tr>
<th>Suspect</th>
<th>Sleuthing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrectly installed hardware or</td>
<td>Break down and read the manual; call the manufacturer or publisher; remove the offending item.</td>
</tr>
<tr>
<td>software</td>
<td></td>
</tr>
<tr>
<td>INIT or cdev conflicts</td>
<td>Disable all INITs and cdevs and then re-enable them one by one; call publishers’ technical-support line.</td>
</tr>
<tr>
<td>SCSI conflicts</td>
<td>Make sure no two devices have the same ID; try shorter cables; try longer cables; terminate, unterminate; check for internal termination; read “SCSI Solutions,” MacUser, December ’89.</td>
</tr>
<tr>
<td>Two or more incompatible programs</td>
<td>Use process of elimination by installing different combinations of software; call publishers’ technical-support line.</td>
</tr>
<tr>
<td>Software bugs</td>
<td>Call publishers’ technical-support line; consult user groups.</td>
</tr>
<tr>
<td>The inexorable march of progress</td>
<td>Move to Alienica: contact local Luddite group; switch to a Mac Plus and System 4.2.</td>
</tr>
</tbody>
</table>

When your Macintosh acts strangely, you should round up the usual suspects. Start with these.

By Thom Hogan
Now that you bought Excel...

Now, for the first time, a complete accounting Microsoft Excel spreadsheet General Ledger AR/AP/Inventory program that looks like manual books, works like manual books yet offers all the advantages of computerization. Accounting the way you've learned it, translated to the speed and power of Microsoft Excel, the ultimate spreadsheet. No long start-up periods, no extensive employee training, no difficulty in audit... just the most logical, fastest, most flexible way to keep books you've ever seen. For information, call Absolute Solutions at 1-800-458-3399 in CA, 1-800-633-7666 Natl., 1-619-966-8000 Intl.

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- Dr. Samuelson, Pepperdine University
worked again, so I thought I was home free. Little did I know.

**Little Boxes**

The following week, I received an HP DeskWriter, a Rodime Cobra 215 hard disk, and Adobe Type Manager. I quickly unpacked the drive, formatted it, partitioned it, and copied my backups off Bernoulli cartridges and onto the virgin hard drive.

The first sign of new problems turned up a few hours later when I used FileMaker to print out invoices. The first few came out of the DeskWriter just as they should. Then I looked a little more closely at the fifth page out of the chute. Instead of saying, "Make checks payable to Macreations," the page said "Моя Моя Моя Моя Моя." Really. A closer examination of the 50 or so invoices I had printed showed that about a third had random sets of lowercase characters replaced by the box (no character) symbol.

I did the obvious thing: I tried printing lots of documents from other programs. No problem. Only FileMaker seemed to have difficulties. Worse still, the second time I tried to print, FileMaker began complaining that no printer was chosen. I tried opening Chooser, but all I got was a beep (in MultiFinder, that usually means there isn't enough memory to load a program).

Since the problem could be solved simply by restarting the Mac and reprinting the problem invoices, I decided to just ignore it for a while. So I went about my usual business and suffered occasional and unpredictable print problems. Other applications eventually started showing weird little idiosyncrasies: PageMaker quit unexpectedly while printing; DAs wouldn't load; sometimes the system wouldn't boot the first time; and every now and then — at exactly the wrong moment, it seemed — the computer would do something major league, such as crash, bomb, or freeze.

I was really puzzled. Surely it couldn't be the HP DeskWriter. It obviously wasn't ATM, which others were raving about. Whatever the problem, it was driving me crazy. I started to dread sitting down to work at my Mac. I'm told I yelled at it several times, banged on my desk like Khrushchev, and generally ragged on anyone unlucky enough to walk by my office to see how I was doing. (Some might say this behavior merely reflects how grumpy I am when I'm working. But my close friends tell me I was even grumpier than usual.)

OK, it was time for a major restructuring. Out came the 19-inch monitor and accelerated 24-bit-color cards. Out came all the INITs and cdevs. Out came all questionable software. Out came ATM. Out came the DeskWriter. I was mad. I was going to strip my machine right back to its old, slow, unexpanded self. I'd just box everything up, make a heap in the driveway, and have a bonfire. I'd do anything to get my system back to normal.

I booted the stripped-down machine, and — oh no! I was still having problems! What the . . . wait just a second here. I was using the same System Folder that had worked perfectly for months prior to the upgrade madness. Maybe my Mac was getting ready to go south for the winter. Although I coveted a new Macintosh Iici, I didn't really want to have to write a check for one (and no, Apple doesn't give us columnists a break on price, either — and the last time anyone from Apple called to ask if I wanted to review something was more than two years ago).

I noticed that there was still one minor difference between my old, stable system and my current nightmare: the hard-disk drive. I couldn't believe that the driver for the Rodime hard disk would cause problems, but maybe the partitioning software would. After all, the BBSs are full of messages from people who've had problems with partitioning software. So the next step was to back up my hard-disk partitions onto Bernoulli cartridges, reformat the hard disk, and start over without partitions.

And the problems got worse. The system crashed repeatedly as I tried to perform Finder copies of files from a partition to a cartridge. This was getting scary — I couldn't even back up my system.

Fortunately, I already had backups of most of my work. I copied the few files I hadn't backed up one at a time to a cartridge. Then I reformatted everything. This time, I decided to leave out the partitions. I copied all of my files back from the cartridge to the Rodime drive and gingerly tried a few pieces of software. They worked! I added my INITs and cdevs. They worked! I added the DeskWriter driver and ATM. They worked! I tried backing up to cartridges. It worked! I printed invoices from FileMaker. It worked! Everything worked!

**The Fatal Floppy**

When — in a voice of awe — I described this whole perplexing process to my partner Kurt, he didn't say the old "Oh yeah, you probably ran into the . . . " routine. Two months of living with a finicky, buggy system, and now someone's tell-
POWER TOOLS

ing me that my problem was a predictable one? Maybe it really was. It seems that the Macintosh system software doesn't do too well with eight or more volumes on the desktop. I had partitioned the Rodime into five volumes. (Doesn't that seem reasonable? After all, I had 210 megabytes to divvy up.) My older drive represented a sixth volume, and the Bernoulli added two more volumes (the seventh and eighth, which might explain why I was having troubles backing up to the cartridges). Insert a floppy, and I was over the limit (and yes, I deal with floppies every day).

Indeed, looking back at my problems, I could see how errant handles and memory management in the System Heap (where the volume information is kept) could have resulted in all the symptoms I noted.

Of course, the sort of problem I experienced is just one in a long line of troubles we Mac pioneers have had (I got my first Mac in 1983 as a certified developer and fell in love with it immediately, despite its quirks). It all began with programs that almost worked, but didn't quite—usually because the authors didn't yet know how to program the machine (remember Habadex?). Then there was the switch to the LaserWriter, which seemed to make every existing Mac program stop printing. And then hard disks through the serial port, the Mac Plus and the new ROMs, MultiFinder, Color QuickDraw, System 6.0. Each new incremental change in the Macintosh design and operating system has brought new troubles to look out for.

We can't really blame Apple for (most of) our troubles. The Mac is at the leading edge of what is happening in computerdom. There's an old saying: Those who live on the leading edge will eventually be cut by it.

Let's face it: The Mac is temperamental. Not quite as unreliable as an older Alfa Romeo or MGB, perhaps, but certainly quirkier than we'd like it to be. Sure, a Mac Plus running System 4.2 on an Apple 20-megabyte hard drive is reliable (assuming you don't get stung by video-board/power-supply death), as long as you're satisfied with the software you're using and don't try to update to the latest, greatest version.

But for those of us who must keep up with the next release of virtually everything, life is going to become much more difficult in the near future. Between 32-bit QuickDraw, System 7, multimedia boards, virtual memory, Excel 3.0, hundreds of new INITs and DA's, and a never-ending list of other new goodies, the combinations and permutations of things that can go wrong are nearly endless. Dare I mention the upcoming Motorola 68040 CPU chip?

(From the standpoint of a software developer, things are getting out of hand. Just how many configurations must we test before we can feel reasonably certain

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that the vast majority of users will never have a problem?)

The issue that's about to become a major one is that of responsibility. When Apple changed to the new color LaserWriter drivers, a program that my company was developing stopped printing on some machines. Unfortunately, it was our problem—we had an errant routine that didn't check to see what data structure it was updating and was overwriting memory it shouldn't have. Then along came Excel 2.2, and my company's program stopped working again—this version of Excel sometimes stops reading files when it sees a null character in the text (previous versions ignored nulls). That's not our problem; it's Microsoft's. OK, these are clear-cut cases and easy enough to verify.

But what about the drive-partitioning problem I had? Whose fault was that? Rodime's? Apple's? Mine? It's easy to imagine what the HP or Adobe folks would have said if I had called their support lines. "You say your DeskWriter is printing boxes every once in a while instead of lowercase characters? What System are you using? Are you sure you installed the driver correctly? Did you try taking out the INITs? You did all this? Well, you've got me stumped .... "

And who should I have called when the Radius installation didn't work? Is it Radius' or Orchid's responsibility to test the use of the two pieces together? (This is where good dealers earn their living. If you've ever wondered why Businessland, for example, sells only certain combinations of equipment from a few selected vendors, you can probably now guess why. Resellers don't want to get into a situation where they have to spend hours trying to track down a user's problem—that doesn't make them any money.)

I bought my Macintosh to have more control over my work and be more productive, and I suspect that you bought yours for the same reason. I certainly don't want to spend weeks tracking down bugs and intermittent flakiness every time I use an update of a software product or install a new printer.

But that's what lies ahead, folks. When System 7 finally appears, the problems I've described here will probably seem trivial in comparison. It'll probably take a couple of months to get my system stable again.

I'm starting to think I should set up a permanent, reliable system for use in my everyday work, and then have an experimental machine for testing new software and hardware. It might be a waste of equipment—but it would certainly do a lot for my sanity. You see, now that my computer is working again, I reinstalled the Orchid MacSprint II card. Guess what? Yup. It wouldn't work until I took 32-bit QuickDraw out of my System Folder. And then I decided to try that new version of . . . .

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Welcome back. This month we're going to explore the THINK C programming environment, which you'll be using to write a simple application. We hope you've made a good start on the homework we suggested last month, because next time we'll jump right in and create a real Macintosh equivalent of Kernighan and Ritchie's well-known first-time programmer's example, Hello World.

All the Hello World program does is write a message to the computer's screen. There are easy ways to emulate that simple example, but they wouldn't teach you anything about the idiosyncrasies of programming on the Mac. Our version of Hello World will have the added challenges of initializing the Macintosh Toolbox, building the proper interface components (such as a menu and a window), and then displaying the message in the window.

Although the Hello World example might seem less than thrilling, it will serve a couple of important functions. First, because it's a real, complete program, we'll be able to show you the complete development process. Second, much of what you'll learn from Hello World will be directly applicable to other Macintosh programs. All Mac programs must initialize the ROM tool kit; all Mac programs must handle events; and all Mac programs must provide basic interface-handling components, such as windows, menus, and dialog boxes. Hello World will allow us to concentrate on these important aspects without burying you in application-specific information.

Programming in THINK C
But before we can introduce you to Hello World, an orientation tour of THINK C's programming environment is in order. What do we mean by a programming environment? It's an integrated package: You edit, compile, link, and run your program without leaving the environment's application. And, under MultiFinder with at least 2 megabytes of memory, you can also use the THINK C Debugger to trace execution of your program, following it step by step to see what it does at each point in your source code.

The THINK C Folder
Version 4.0 of THINK C comes on four distribution disks that contain nearly 400 files. Those of you with limited hard-disk space will be relieved...
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Magic without the markers.
to learn that you don’t need to copy all those files onto your hard disk. The side- 
bar “THINK C Disk Organization” describes how to organize your folders.

The two most important files are the applications called THINK C and THINK 
C Debugger. The former is the integrated 
programming environment, and the latter is THINK C’s debugger. You’ll also 
be using the libraries and header files. The other files shipped with your copy of 
THINK C are useful but not absolutely necessary — they contain sample proj-
ects and program utilities.

Programming Libraries

Let’s start with the libraries. Libraries are collections; for example, a medical 
library is a collection of materials about medicine. A programming library is an 
organized collection of program pieces. You can access these pieces, called 
functions, from any application that in-
corporates, or links, the library. The 
THINK C environment has a built-in 
linker for this purpose.

The functions in a library are in com-
pleted, or machine-readable, form. That 
means that you can’t see how they were 
created unless you have access to the 
original source code, which usually isn’t 
available, or, given a commercial library, 
is available for a price. We salute Symantec, the publisher of THINK C, for in-
cluding the source code for the UNIX 
and standard C libraries with the pack-
age. Look for a folder called Sources 
inside a folder called C Libraries on your 
distribution disks and add it to your 
THINK C folder.

Why limit access to the source code? 
Library code is (usually) thoroughly 
dbugged. That’s why compiled librar-
ies contribute to software reliability. If 
you modify the proven source code in the 
library, you might create new bugs.

The functions of a programming li-
ibary must have complete, descriptive 
documentation of their name, action, 
inputs, and outputs. The inputs to a func-
tion are called its parameters or, 
informally, arguments. The output of a 
function is known as its return value. All 
this information about library functions 
is collected in the Standard Libraries Reference manual.

The Standard Libraries Reference

The style of the entries in THINK C’s 
Standard Libraries Reference manual is 
borrowed from the original UNIX docu-
mentation, which is where C library-
function documentation first appeared. 
The entries are usually one function to a 
page, with four main sections for each entry. (Note: We’ll be referring here to 
the manual for version 4.0 of THINK C; 
other versions may look a little different.)

The function’s name is listed at the top 
of each page. Then comes the library that 
the function belongs to (in this case, 
ANSI).

The next line describes the syntax. For example, the function toupper() is 
listed like this:

```
#include <ctype.h>
int toupper (int c);
```

The first line tells us that we need to include the file ctype.h to use this 
function. The .h indicates that this is a 
header file. (We’ll get to header files in a moment.) The second line tells us that 
toupper() accepts an integer argument 
and returns an integer, which gives us 
enough information to use this func-
tion (see Figure 3).

The most important section of a li-
brary-reference entry is the description, 
which tells you what the function does. 
The manual says, “toupper() converts 
lowercase to the corresponding 
upercase letter,” so you know that 
toupper() transforms any lowercase 
letter into its uppercase equivalent.

If the function returns a value, the 
Returns section describes the error value 
or range of data values you can expect.

The Standard Libraries Reference 
manual is also organized by library. 
THINK C comes with several different 
libraries — exactly which ones depends 
on the compiler version you own. Here’s 
what you need to know about them:

MacTraps (versions 3.0 and 4.0): This 
is the most important library that comes 
with THINK C, because it contains all the 
references for the Macintosh Toolbox 
routines. (These are the pieces of code 
needed to access the functions built into 
the Mac’s ROM, such as management of 
windows, menus, and printing.) Any 
program that uses a Toolbox function 
neds to link with the MacTraps library.

In other words, virtually any program 
you write needs to link with MacTraps.

ANSI (version 4.0 only): ANSI (American National Standards Institute) 
has a committee on C, and for years it’s 
been actively attempting to standardize 
the language. Since one of C’s biggest 
assets is its portability from one platform to 
C programmers use header files to 
define constants, macros, data 
structures, variable declarations, 
and function prototypes.

THINK C Disk Organization

If you haven’t already done so, cre-
ate a folder on your disk called De-
velop/, and within this folder, create a 
folder called THINK Cf (type Option-f 
to create that f character; it’s a handy 
way to distinguish folder names from 
filenames).

Place these files and folders from the 
distribution disk into THINK Cf: 
THINK C, THINK C Debugger, Mac-
Headers, Mac # includes, Mac Librar-
ies, and C Libraries. That’s a bare mini-
mum. You can also copy any other 
folders that you might find interesting.

A good candidate is the Library Sources 
folder. Figure 1 shows the organization 
of THINK Cf.

Some of the sample projects that 
Symantec supplies are good for get-
ting started. If you want to include 
them, though, don’t place them in the 
THINK Cf folder; place them one level 
higher, in Develop/. Other file folders 
in Develop should be independent 
projects, programming libraries, or 
other developer tools.

Figure 2 shows the organization of 
a folder for an application called GenApp. 
The GenApp’s folder contains the proj-
etic file (GenApp.n), the resource file 
(GenApp .rc), a folder for the C-lang-
uage source files (GenApp Sources), 
and a folder for the header files (Gen-
App Headers). C programmers use the 
π symbol (Option-p) to distinguish the 
project GenApp from the actual Gen-
App application.
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another, such standardization is important. The functions in this library were designed to make THINK C more compatible with ANSI’s standard.

stdio (version 3.0 only): If you’ve read Kernighan and Ritchie’s book, or if you’re migrating to the Mac from a DOS or UNIX environment, you’ll expect the standard C functions to be supported by THINK C. All the I/O functions (input and output), including printf (), filestream utilities, and character-I/O primitives, are contained in this library.

math (versions 3.0 and 4.0): If you plan to use the C mathematical functions, such as the square-root, trigonometric, or logarithmic functions, you need to add the math library.

unix (versions 3.0 and 4.0): The unix library is provided to aid developers who are porting UNIX applications. Some of the functions don’t do anything — setpid(), for example, is provided just for compatibility. We’ve never needed to use this library, and unless your thinking is steeped in the UNIX tradition, you won’t either.

As you can see, you have a variety of choices with libraries. Hello World requires only the MacTraps library. As we progress, our projects will be using more of the Symantec-supplied libraries.

Header (Include) Files

C programmers use header files to define constants, macros, data structures, variable declarations, and function prototypes. A single header file is usually included by multiple source files, so it’s easier to affix a definition to one particular file in your project. Defining something such as a constant’s value in only one place makes good sense organizationally—if you need to change the value later, you have to do it only once. As your programs become larger and more complex—perhaps encompassing dozens of source-code files—the importance of properly maintaining header files increases.

THINK C comes with many header files, which are organized by Toolbox Manager, just as the Inside Macintosh books are. For example, Event Manager constants and structures are defined in EventMgr.h, QuickDraw stuff in QuickDraw.h, and Window Manager structures in WindowMgr.h. Most of the widely used structures, such as Point, Rect, Handle, Boolean, or Size, are defined in MacTypes.h, so you’ll have to include this file for most projects.

A note about the syntax of include statements: When the compiler sees double quotes around a file’s name, as in #include "constants.h" it searches the current project folder and any folders inside that folder, looking for the file constants.h. Conversely, when the compiler finds angled brackets, as in include <QuickDraw.h> it looks for the file in the THINK C folder. The angle brackets signify that the file is a “system” include and resides in the THINK C hierarchy. The way we’ve told you to set up your files necessitates that you use the second form.

MacHeaders

Inside Macintosh is your guide to what headers to include. If you’re using the Window Manager and accessing a WindowRecord data structure, you’ll need to include <WindowMgr.h> for the structure definition. One problem with this way of doing things is the number of files you’ll need to remember to include when developing most applications—the compiler’s syntax-checking error messages get to be pretty annoying until you come up with the right combination.

Beginning with version 3.0, Symantec has come up with an elegant solution to this problem: precompiled headers. The precompiled headers file supplied with THINK C, MacHeaders, contains definitions for most of the commonly used managers. The file is in binary form, unlike conventional header files, and so it loads quickly during compiling. What’s more, you get the convenience of never having to load a manager include file—the file is included automatically in every project with a compiler option. You invoke this feature as a Code Generation option by selecting it in the Options dialog box from THINK C’s Edit menu.

The Project Folder

It’s a good idea to keep all relevant files for each programming project in their own folder, called the project folder. A typical THINK C project folder contains four distinct types of files:

• The project file.
• C-language source files, called .c files.
• C-language header files, called .h or include files.
• The project resource file.

The project file is the master file for the project. It contains everything THINK C needs to construct the application from your source files. All project management is done from this file. Once you open the project file, a list of the source files appears in the project window. You open the source files by double-clicking on their names. The Full Titles option (on the Window menu) is useful when you have more than one version of the source code on disk. It displays the file’s path in the window title.

For program building, THINK C has a built-in, UNIX-like Make facility (when we say UNIX-like, we mean in essence, certainly not in appearance). This facility automatically keeps track of compilation dates and dependency information for your source files. When you change a file, the date and time are internally noted,
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so when you try to run the program, THINK C reminds you that the project needs to be brought up-to-date. You can also configure the environment to build the program automatically before you run it.

The project file holds the object code (machine-language instructions) that is compiled from the source files. (Some of you may have wondered where the .o files were.) It contains other data such as symbol and line-number tables for debugging and linking, and code-resource-segmentation data. You can imagine how this file might grow to be quite large. In future columns, we’ll show you how to use precompiled headers to reduce the size of your project file. For the time being, though, you won’t have to worry about taking up too much space.

A note on disk organization: It’s tidier if you minimize the number of files in a folder. So when a project acquires more than four or five source modules (.c files), subdivide the project folder into a source-file folder and an include-file folder to hold all the header files.

The .c or .h suffix in these filenames is a holdover from UNIX days. Because the Macintosh system-software designers chose to implement a free-form filename, you usually don’t have to suffer through names like ACCNTS09.DBF, as your MS-DOS counterparts do. On the Mac, there’s no need for a filename extension, the tail that classifies the file. The Finder carries the file’s origin internally, so you don’t need something such as .DBF to tell you that you’re looking at a dBASE file; the icon tells you that.

Unfortunately, source filenames in a development environment are a different story. C source filenames must end with a .c extension—that’s how THINK C recognizes them as source files. Likewise, header filenames must always end with .h. It’s a throwback, admittedly, but that’s the way it is.

The final item you might find in the project folder is the project resource file (although this month’s project doesn’t require one). We’ll talk about resources in more detail when we get to building a full-fledged application.

You now should be ready to develop in your THINK C environment. Unfortunately, we’ve used up our monthly allotment of space. Next month we’ll jump right into Hello World, so set up your disk and get familiar with your compiler. You might try following the Hello World tutorial in Chapter 3 of the THINK C User’s Manual. It demonstrates the easy way to do it. Next month, we’ll show you the Macintosh way.

The project file holds the object code that is compiled from the source files.
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Help Folder

Answers to Readers' Questions

Side-by-Side
Q. I have a Mac II and a two-page display monitor. Is there any word-processing utility that will let me see successive pages side by side (like the pages in a book) instead of up and down (like fanfold computer paper)?

John Black Lee
New Canaan, CT

A. You ask if there's anything that lets you see successive pages side by side. The answer is yes — Microsoft Word 4.0 has a Print Preview feature that lets you view (but not edit) your pages side by side.

If what you really want to do is edit pages side by side, you'll have to invest in a page-layout program. No word processor has this feature; you'll need something along the lines of PageMaker or Ready,Set,Go!

Help for Radio
Q. I've been searching (so far unsuccessfully) for radio-broadcasting software that runs on a Mac SE. I need a program that can generate daily radio-broadcast logs, keep track of network feeds, schedule commercials (or underwriting announcements, since we are a public radio station), do monthly billings and accounts receivable, track available time slots, make projections, and so on.

I'm running out of places to turn to for this information, and if nothing comes up soon, I'll have to design my own. Unfortunately, my schedule and work load won't make that easy.

Mark Wozniak
WBFO
Buffalo, NY

A. All things considered, you're asking for a lot — we couldn't find an application that does even part of what you're looking for.

From what you've described, designing your own application would be a huge undertaking. Unless you're extremely proficient with one of the relational-database products (4th Dimension, FoxBASE +/Mac, Omnis, and the like), you should consider hiring an expert in database programming.

ACIUS (10351 Bubb Road, Cupertino, CA 95014; [408] 252-4444), the publisher of 4th Dimension, has an excellent developer directory available for $10. It lists hundreds of applications written in 4th Dimension and includes the names, addresses, and phone numbers of the developers. If there's something listed that's similar to what you want, contact the developer — it's likely that it could be modified to meet your needs. If not, you could find someone to develop what you need from scratch.

Stormy Weather
Q. Now that another hurricane season is behind us, the saga of Hugo and other seasonal storms reminds us how important a good track system is. Hurricane-tracking charts are as common as a loaf of bread in homes here in south Florida. As tropical depressions form and move over the ocean, their coordinates are broadcast to the anxious public, who plot them on the charts. What a perfect assignment for the graphic abilities of the Macintosh!

Mac owners living along either U.S. coastline need a good software program to plot and track tropical storms, whether in the Atlantic or Pacific. Are you aware of any software that will do the job?

John Remensnyder
Palm Beach Gardens, FL

A. Check out MapMaker (Select Micro Systems, 322 Underhill Ave., Yorktown Heights, NY 10598; [914] 245-4670). Using its included maps, you can plot latitude and longitude points as far as several hundred miles offshore. The program comes with boundary files for the U.S. by state and county, boundary...
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You'll find a complete review in the December '88 MacUser.

Excel 2.2 Steps out of Line

Q. I'd like to call attention to the incompatibility of two outstanding programs: Excel 2.2 and Berkeley System Designs' Stepping Out II. Some of Excel's keyboard commands and especially the Page Preview no longer work when you use Stepping Out II.

Do you know of any tricks or have you heard of any forthcoming solutions for getting Page Preview to work right?

Earl Gardner
Redmond, WA

A. Let's look at your problem one at a time. First, the keyboard commands: Stepping Out II's are user-configurable. If you are experiencing a conflict, select Stepping Out II in the Control Panel and click on the Custom button. You can then change any keyboard commands that conflict with Excel's.

As for Page Preview, Excel is doing what it thinks is right. Excel thinks it's drawing your preview on a large screen and consequently places the Page Preview image at the center of whatever virtual screen you've selected; Stepping Out II is

A Special Form

Q. In 1987, the IRS began requiring those of us responsible for the closing of a transaction to report real estate sales. As an attorney whose practice consists largely of performing such escrows, I must report all my closings.

Before switching to the Mac, I was able to find MS-DOS software for doing the 1099-S. I'm having a tough time finding such a program for the Mac, though. It seems that this is a special IRS form that isn't contained in many of the "stock" tax packages.

Kristian E. Anderson
Spokane, WA

A. You're in luck. Heizer Software (Box 232019, Pleasant Hill, CA 94523; [800] 888-7667 or [415] 943-7667) can help you. Heizer offers a sizable catalog of custom templates, databases, macros, and tutorials for Microsoft Excel, Works, HyperCard, and SuperCard. One of the macros it offers for Excel is called Form 1099 Printer. Although the off-the-shelf version of that macro is not designed to handle a 1099-S, the company will be happy to modify it for a modest fee.

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*Computers in Accounting / January 1989*

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*The Macintosh Buyer's Guide / Spring 1989*

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not to blame. There are two things you might try if you’re not happy with this. If you’d like to see a Page Preview of the size of your actual screen (not the virtual screen Stepping Out II has created), use the Control Panel to turn off Stepping Out II before you select Print and enter Excel’s Page Preview mode. Another option is to use Stepping Out II’s Reduce command to get a 50-percent reduction of your Page Preview. Press Command-Option-space bar, and see if that helps.

Batteries Not Included

Q. The internal clock on my Mac Plus doesn’t keep time properly anymore, and the Chooser regularly loses track of which printer I’ve selected.

Everything else still seems to work, but having the clock and Chooser broken has me worried. Is this a sign that something more important is about to go wrong with my Mac?

Scott Wolf
Wheeling, IL

A. It’s nothing major; you just need a new battery for your Mac.

The clock and Chooser settings are stored in a special area of RAM called PRAM (parameter RAM) and are maintained by a battery when your Macintosh is turned off. It sounds as if yours has run down and needs to be replaced. On a Plus, the battery is inside the little rectangular “door” on the back of your Macintosh. You can get a replacement from your Apple dealer, or use an Eveready 523 or its equivalent.

Get Info to Stay

Q. I’ve heard that it’s a good idea to rebuild my desktop occasionally by holding down the Command and Option keys when I turn on my Mac. I tried it, and my computer seems to run a little faster, but all the comments in the little box that appears when I select Get Info for a file have disappeared.

I frequently use this feature to make notes to myself — is there any way to bring them back?

Frederick Ayla
Westlake Village, CA

A. There’s good news and bad news. The bad news is that rebuilding your desktop (which you should do occasionally — the desktop is a poor housekeeper and needs rebuilding every so often to keep it tidy) deletes the Get Info comments permanently.

The good news is that DiskTop (CE Software, 1854 Fuller Road, P.O. Box 65580, West Des Moines, IA 50265; [515] 224-1995) has a feature called CE Comments that lets you rebuild your desktop without losing the Get Info comments.

Sang Chaul Shin: Software Engineer, Seoul, Korea
Business: Ele.x Computer, Inc.
Word Processor: Nisus

I like the Nisus word processor very much. Many others must like it too, because Nisus will be supplied with every new Macintosh sold in Korea. Nisus is replacing the word processors Koreans use now because it is so powerful. Desktop publishers and business people really like it. There are many menus so you can be complicated or easy. The macros and Easy Grep are especially good because Koreans like to have as many functions as possible. Another thing Koreans like is the graphic support. With MS Word, there was no support. Nisus puts graphics right in the text.

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If you create color publications, you’ve probably experienced one of the most frustrating aspects of color desktop publishing — the lack of WYSIWYG color. The color you see on-screen rarely matches what shows up in print. And the same color looks different on different monitors. Although 100-percent WYSIWYG is impossible — the monitor can’t display some colors that can be printed, and vice versa — several companies are making strides in this area.

Radius is marketing the PrecisionColor Calibrator, which is a combination of optical-sensing hardware and proprietary software. The Calibrator, an ADB device that attaches to the screen with a suction cup, measures the output of red, green, and blue light and provides feedback to the PrecisionColor software, which adjusts the color temperature and tonal (gamma) settings to achieve accurate Pantone Color simulations. Calibration takes about three minutes and provides Pantone screen colors that are reasonable approximations of their printed counterparts.

You can adjust gamma settings to improve the display of scanned images, and the color-temperature control lets you compensate for changes in ambient light or differences between monitors. It’s too early to say how frequently you’ll have to recalibrate your display, but most systems seem stable once they’re on an hour or so. So far, the $695 Calibrator works only with Radius setups and Apple’s 8-bit-color system; the company may add support for other display systems in the future.

Radius and Pantone are jointly developing the Pantone Color Resource, a software technology that will standardize the way the applications implement and display Pantone Color simulations. Right now, for example, PageMaker and QuarkXPress generate Pantone colors that have different RGB values, and thus look different on-screen. Radius, 1710 Fortune Drive, San Jose, CA 95131; (408) 434-1010.

The first firm to address color calibration was Barco, which introduced its 19-inch Calibrator monitor last summer. The $6,700 unit works with several video cards, including those from Radius, RasterOps, and SuperMac. The Calibrator is aimed at the high-end prepress market, and has a microprocessor that controls all visual elements, including sharpness, geometry, and color quality. Colors are calibrated with the Optisense ($695), a sensor that attaches to the screen with a suction cup. Color accuracy is tied to CIE standards rather than Pantone colors, and the monitor’s electronics automatically compensate for various forms of color drift. You can specify calibration for both the color temperature and the luminance. Barco Industries, 472 Amherst St., Nashua, NH 03063; (603) 880-1430.

RasterOps has repackaged the Barco monitor and Optisense as the RasterOps Calibrator ($8,650). Add one of RasterOps’ ColorBoards for an even more upscale solution ($10,245 with the 8-bit board or $13,845 for the 24-bit system). RasterOps, 2500 Walsh Ave., Santa Clara, CA 95051; (408) 562-4200.

A third player, Tektronix, is using software to solve the problem of WYSIWYG color. Its new color-fidelity system, TekColor, helps you choose screen colors that have exact matches on your printer. TekColor is a client and it comes with a database for each supported monitor and printer. The TekColor Picker transparently replaces the Apple Color Picker and shows which colors can be both displayed and printed. (If you have a 24-bit board, you can get a smoother display by Option-clicking outside the dialog box.) When you press Print while working within an application, TekColor interprets the data and does color adjustments on the fly, matching the output to the screen colors. TekColor is based on Tektronix’s TekHVC (hue-value-chroma) color model, which in turn is derived from the CIE color standard. Tektronix hopes to get TekColor adopted as an industry standard for color fidelity, so TekColor has an open interface and the specifications are available without charge to other vendors. TekColor ($50) currently works with four display systems: the Apple color monitor, Radius Color Display, E-Machines T19, and RasterOps ColorBoard 224. For output, TekColor so far works only with Tektronix’s ColorQuick ink-jet printer, but the firm plans to add support for its thermal-transfer printers. Tektronix, Graphics Printing and Imaging Division, Box 1000, Mail Station 63-630, Wilsonville, OR 97070; (800) 835-6100.

— Aileen Abernathy

The TekColor Picker replaces the standard Apple Color Picker. To match colors between monitor and printer, you select a color from the area that is common to both the monitor leaf (in color) and the printer leaf (outlined in red). As you move up and down the hue bar (left), the leaf shapes change, indicating the colors each can access.
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Nobody reads copy anyway. MacDraw II.
Set in Their Grays

Here's a little experiment: Using a variety of programs, try printing a series of squares, each with a different percentage of gray fill. When you lay the results side by side, you may find some disturbing discrepancies in gray tones. For example, a 10-percent gray in PageMaker or FreeHand printed to a LaserWriter is much lighter than the same shade in Word, Illustrator 88, Ready,Set,Go!, or most other programs printed to a LaserWriter. Actually, the Aldus applications are producing a "true" 10-percent gray; the grays from the other programs are too dark.

Let's say you've drawn a simple square with a 10-percent fill in the original document. The PostScript code sent to the printer for this square consists mainly of PostScript instructions. When most applications (except for PageMaker and FreeHand) send a 10-percent gray to a 300-dpi printer, however, the output is actually closer to 30 percent. What gives?

One piece of the puzzle lies within the LaserWriter — in fact, within all 300-dpi PostScript printers. They cannot faithfully reproduce a wide range of gray values. Their relatively low resolution limits them to 31 shades of gray, plus black and white. Therefore, when you request a certain percentage of gray, either in a graphics application or by programming directly in PostScript, you get the printable gray that's closest to what you've specified, not the exact shade that's accessible on a high-resolution device. This "rounding error" can cause an approximate 2-percent shift in the value of your grays.

There's another, more significant factor at play — the printer's imaging technology. How big a printer's dots are and how much they spread when they hit the paper also affect gray tones, often making them appear too dark. PostScript has a command, settransfer, that compensates for this effect, but most printer manufacturers don't use this command. Fortunately, some applications do. Aldus products come with APD files, which optimize output for specific printers. APDs modify the PostScript environment of your printer that relates specifically to gray scales. If you open an APD in a word processor, you'll find a section in the first part of the file called NormalizedTransfer.

NormalizedTransfer redefines the gray-scale mapping so that when you summon a 10-percent gray fill with the PostScript .9 setgray command, the interpreter is forced to go through some machinations that convert the stated value of .9 into a value that better approximates a true 10-percent fill. In the case of the LaserWriter, this value is approximately .97.

The NormalizedTransfer example from Aldus' APD for the LaserWriter printer is fairly sophisticated programming. But you can create a simpler example that does virtually the same thing (see Figure 2).

This code takes your setgray value — say, .9 — and multiplies it by 100. The result, 90, is rounded off to an integer if necessary. The code then looks for the 90th value in the table of values (called transarray) and divides that value by 100. In this example, a .9 returns a value of .97, so the value passed on to the setgray operator is actually .97.

You can use this technique with a 300-dpi printer to create grays that approximate grays available from a commercial printer or graphic artist. The technique you use, however, varies from program to program.

In Word 4.0, you need to type only the transarray procedure into the header window of your document. Place the Word grouping command, .dict., at the top of the code, and format the entire block in the Word PostScript style. (For more on Word's PostScript commands, see the DTP section, September '89.) Now the gray fills in your document will print closer to their stated value — for example, when you place a 10-percent screen behind a paragraph.

What about programs that don't have a ready way to insert PostScript commands? They probably use LaserPrep, so save a PostScript version of your document by holding down Command-K while you click on OK in the Print dialog box. Open the resulting file and insert the transarray...
Dealing with Dingbats

When Apple released the LaserWriter Plus, it included Zapf Dingbats, a PostScript font of decorative doodads—arrows, stars, flowers, and so on—for adding spice to otherwise drab pages. Zapf Dingbats is now a workhorse font for most desktop publishers. For all its utility and beauty, however, Dingbats has some startling omissions and oddities. Here’s a short list of dingbat problems and solutions.

Ballot Box

The preeminent missing dingbat is the plain old ballot box. Granted, there are shaded boxes and an all-black one, but no simple square exists. Happily, the solution is simple: Use the black box (■) in Outline style. The result is □.

Left Out

In Dingbats, virtually everything points to the right. If you’d like to point to the left, you’re stuck with the pedestrian arrows from the Symbol font, ← and →. Here the solution isn’t as obvious as with the ballot box. You must convert the dingbat of your choosing, say the pointing hand (♦), to a graphic and then flip it. Using a graphics program such as Canvas or Cricket Draw, you can do this quite easily. The result appears above. Since PostScript doesn’t care which way a font character points, the graphic still prints at the maximum resolution of the printer.

Untypeables

There are three font characters that can’t be typed from the Macintosh keyboard. They correspond to ASCII numbers 252, 253, and 254. In the Dingbats font, the missing characters are ♠, ♦, ♣.

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POWER TOOLS

and ®. The font has more than enough arrows already, but if you're determined to access these, use Word's Character Code command, Command-Option-Q. You can then type in the ASCII number of the character you want. When you press Return, the desired character will appear. Using this technique, you can copy the untypeable arrows into the Scrapbook for later use in any application (and in any font).

Command-Key Symbol

Many users are surprised that the Command-key symbol (⌘) isn't included in the Dingbats font — especially since Apple thoughtfully provides its logo (⌘) in the other LaserWriter fonts. In fact, the Command-key symbol is hiding in the Chicago font in another nearly untypeable location: ASCII 17. Only owners of keyboards with Control keys — which excludes you if you own a Mac Plus — can type this symbol easily; they can access ⌘ by pressing Control-Q. Chicago isn't a PostScript font, so if you need high-quality output, try ChicagoSymbols, a shareware PostScript font. (Send $10 to Bradley Poulsen, Northwind Enterprises, 4003 Martin Lane, Two Rivers, WI 54241.) If you own Altsys' Fontographer, you can use the accompanying DemoFont, which also contains the Command-key symbol.

Missing in Action

Eventually you'll need a dingbat that's not in the Zapf collection. What to do then? You can buy Adobe Collector's Edition I, which contains 280 PostScript shapes: circles, squares, crosses, arrows, stars, and so on. They can be used as is or enhanced in FreeHand or Illustrator. You can get this $125 collection from Adobe Systems, Box 7900, Mountain View, CA 94039; (800) 344-8355.

Another possibility is a shareware PostScript font called Bill's Dingbats. It has 138 dingbats, including arrows that point in eight directions. This $8 font is available from U-Design, 201 Ann St., Hartford, CT 06103; (203) 278-3648.

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If that doesn't help, start looking through the numerous available picture fonts, such as Cairo and Mobile. Many are freeware or shareware and are available through most on-line services. It's like rummaging through Grandma's attic: You never know what treasures you might find.

Need Texas-style dingbats for your Lone Star newsletter? Check out the Armadillo font from Texan Russ Coffman, which is replete with six armadillos, four state maps, and the Texas flag. (Note that this PostScript font is "beerware" — you have to chug a Lone Star in the author's name if you use it.)

If all else fails, draw the dingbat yourself. A utility called Art Importer (a.k.a. KeyMester) lets you create an installable PostScript font containing EPSF and/or PICT graphics. The resulting graphic characters can be typed like letters in any other font. This $99.95 program is available from Altsys, 720 Avenue F, Suite 109, Plano, TX 75074; (214) 424-4888.

— Dave Valulis

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Moofing Files

Last month, we discussed Public Folder, a utility provided by Claris for moving files over a network without using AppleShare or TOPS. Public Folder lets you designate a folder on your hard disk as "public" so that anyone else on the network who's running Public Folder can retrieve files in your public folder.

Oscar, a utility written by Pete Helme of Apple's Macintosh Developer Technical Support (MacDTS), does Public Folder one better. While Public Folder only lets you retrieve files from someone else's Mac, Oscar lets you send (but not retrieve) files point-to-point over a network. Oscar is one of the first applications (along with Farallon's Timbuktu 3.0) to use ADSP (AppleTalk Data Stream Protocol), which provides an efficient means of moving large amounts of data, such as files, over a network.

Oscar is an application that runs under MultiFinder in a 225K partition. It creates two main folders: In Box and Out Box. Within the Out Box, it creates a separate folder for each user running Oscar. When you want to send a file to someone, place it in the appropriately named folder. Oscar automatically opens a connection to the destination node and sends the file in the background. You must be careful to copy rather than move files into an Out Box folder, because Oscar deletes a file once it has been sent. (Hint: To copy files in the Finder rather than moving them, hold down the Option key when dragging the file.) You can tell Oscar to create "From" folders within the In Box folder, so that you'll know who sent the files that you have received.

The term moofing — for transferring files via Oscar — has become an integral part of NetWorkShop parlance. The reason for this is one of Oscar's most important features: When a file arrives, not only does Oscar flash the DA menu's Apple icon but it also cries "Moof!". For the uninitiated, Moof! is the sound made by a dogcow, which is MacDTS's mascot (for further information on the dogcow, read Apple's Tech Note #31). Oscar is on Phil and Dave's Excellent CD: The Release Version, which Apple provides to developers. Unfortunately, even this version of the CD will be available only to developers (who will receive it in the mail). At press time there were no plans for general release. Because Oscar is not a commercial product, you will probably be able to get it only from user groups and on-line services.

— Stephan Somogyi

CL/1 Ships at Last!

After nearly two years of promises, Apple finally shipped its CL/1 Server for DEC's VAX/VMS minicomputer systems in December 1989. CL/1 is a database-connectivity language that provides a common means of connecting to and making queries of several different database applications that run on minicomputers and mainframes.

The product is shipping for VAX/VMS minicomputers; Apple plans to ship server software that will support IBM mainframe operating systems and databases in early 1990. The databases supported on the VAX include Oracle, Informix, Ingres, DEC's Rdb, and Sybase. With the CL/1 server software installed on a VAX, users can query any of these databases by using commands in the CL/1 language rather than having to learn the specific syntax of the query language for each separate database.

Mac applications that support CL/1 on the client (user) side include Full Impact, WinC, 4th Dimension, Omnis 5, and Impact. CL/1 is not supported on the Mac, but Apple plans to make it available for Macs in early 1990.

— Stephan Somogyi

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and GeoQuery. Fairfield Software offers Clear Access, a CL/1 query tool, as a DA. Apple also sells a set of HyperCard XCMDs and XFCNs called CL/1 for HyperCard. The CL/1 Server for VAX/VMS ($5,000 per CPU or cluster) and a CL/1 Developer’s Toolkit ($695 per user) for Macintosh are available from APDA (Apple Programmer’s and Developer’s Association).

Apple has announced another goody that many people have been anxiously awaiting: a version of AppleTalk for VMS that will support Phase 2 AppleTalk protocols. When Phase 2 was announced last June, mention of an upgrade to AppleTalk for VMS was conspicuously missing. Without this upgrade, VAX machines—and the AppleShare and print-spooling services that run on them—cannot be put onto Phase 2 networks. As a result, many large AppleTalk sites have been reluctant to migrate to Phase 2. When version 2.1 of AppleTalk for VMS ships in the first quarter of 1990, this barrier will be removed.

Apple has still not announced product details or a release date for the major Mac/VAX network-integration package first promised in February 1988. So we still have something to look forward to.

— Henry Hortman

**BRIDGES**

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— Henry Hortman

**Everything and the Kitchen Sync**

Wide-area networking is a popular way of keeping remote sites closely linked. Until now, high-speed modems used with products such as Shiva’s TeleBridge have been closing the gap with relatively low-speed asynchronous connections. Many large companies, however, already have high-speed synchronous lines installed as dedicated links to remote sites.

To enable AppleTalk connections across these synchronous lines, Engage Communications is shipping SyncRouter. This $1,895 half-router channels communications between two LocalTalk networks via V.35 or RS449 (it also has an RS-232 port); you need a SyncRouter at each end of the synchronous connection. The SyncRouter’s RS-232 port supports communication speeds of up to 19.2 kbps (kilobits per second), the other ports allow speeds of up to LocalTalk’s 230.4 kbps. The SyncRouter is compatible with Phase 1 and Phase 2 networks.

Synchronous lines are usually dedicated data lines that have a greater bandwidth than ordinary phone lines and that inherently provide simultaneous data flow in both directions. A synchronous router can make a remote site’s network appear as close as the Macintosh in the office next to you.

For more information, contact Engage Communications, 756 Marlin Ave., #4, Foster City, CA 94404; (415) 358-0264.

— Stephan Somogyi
In the beginning, *MacUser* created MiniFinders, and they were good. And being good, they multiplied like . . . well, like mice! To accommodate the flood of new Mac products, we’ve made some changes in the MiniFinder format; MiniFinders will now be published in quarterly tear-out supplements such as this one, so you can pull them out and keep them handy.

While the format is new, one thing we haven’t changed is our commitment to providing you with the best, most reliable information on the products that interest you. You’ll find product evaluations in virtually every category of hardware and software — for every kind of business — including word processors, spreadsheet, and database programs, number crunching, accounting, finance, DTP, graphics, communications, programming, and utilities. Our editors have carefully selected and evaluated all the products and rated them from one to five mice, in half-mouse increments. All the ratings are relative within a category; as the product options change, you’ll find that our ratings change too, reflecting the most current conditions.

So welcome back to MiniFinders, and keep your eyes on this section — we’re still working to make MiniFinders even better and easier to use. As always, you can count on *MacUser*!
**MiniFinders**

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- **Communications**
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is an electronic invoicing system for small businesses. MacInvoice provides a complete set of accounting features, including accounts receivable, accounts payable, and inventory control. It is fully compatible with the latest tax laws and regulations, and provides a complete set of financial statements.

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Version 1.0, Requires Mac Plus or later

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**COMMUNICATIONS**

**Accu-Weather Forecaster**

is a combination communications and meteorological data analysis program. It provides access to hourly National Weather Service station data and charts. It allows your to view weather data graphically. The telecommunications module is designed to reduce communication costs. Version 1.05, Requires 1 megabyte; 1.00, Requires 1 megabyte.

**Apple File Exchange**

is a file transfer service that allows you to transfer files from one Macintosh to another. It uses a client-server architecture and provides a secure and reliable communication channel.

Version 2.0, Requires Mac Plus or later

**AppleShare**

is a file server designed to network computers with different operating systems. AppleShare is one of the utilities that come free with the Macintosh system. It allows you to share files and resources across different networks or a LocalTalk and an EtherTalk network.

Version 1.0, Requires Mac II or SE equipped with 68020 accelerator card and 1 megabyte.

**Desktop Express**

is a simple-to-use, semiautomated program for using MCI Mail and Dow Jones News/Retrieval. It is user-friendly and ideal for users with limited experience.

Version 2.0, Requires Mac Plus or later

**LapLink Mac**

is a file translation program that can connect the Mac to a variety of other computers. It allows you to transfer files and share resources across different networks.

Version 2.0, Requires Mac Plus or later

**Liaison**

is a software-based Apple Talk bridge that connects two LocalTalk networks or a LocalTalk and an Ethernet network. It allows you to use your Mac to access other networks.

Version 2.0, Requires Mac Plus or later

**McBinary**

is a full-featured telecommunications program that supports various protocols, including AppleTalk, TCP/IP, and Ethernet. It allows you to connect to different networks and access resources.

Version 3.0, Requires Mac II or SE

**VersaTerm-PRO**

is a powerful terminal program with several special features. VersaTerm-PRO includes features such as character-by-character printing, high-quality Tektronix 4014 and 4015 emulation, and more.

Version 2.0, Requires Mac Plus or later

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**DATABASES**

**Database**

is a relational database management system that is easy to use. It handles pictures, text, and numbers with ease. It supports color, Converts QuickDox, and the other files. Version 1.2, Requires Mac Plus or later.

**dbase**

is a relational database management system that is easy to use. It handles pictures, text, and numbers with ease. It supports color, Converts QuickDox, and the other files. Version 1.2, Requires Mac Plus or later.
Desktop Publishing

DTP Advisor

A comprehensive tutorial on publishing with a project-management system. Beautifully designed but better off as a book. Version 1.0. Requires 1 megabyte and HyperCard 1.2. $79.05. Broderbund Software, 20 Winton Road, Suite 520, Woonsocket, RI 02895.

Retriever

is a spreadsheet-oriented DA flat-file manager that has solid reporting and analysis tools in addition to menus for many functions. His fast sorting capability, decent searching capability, and HyperCard interface. Version 1.03. Requires 512K. $69.95. Editions Deloney, Inc., 58 Webster St., Cambridge, MA 02138.

Desktop Publishing

is a collection of 72 designer-created templates for "instant" page layout. Their use is limited to rulers, gridlines, and quick gridlines. The package offers substantial savings over purchasing the typefaces individually, and the documentation has useful information on typeface characteristics. Requires 32K memory, Mac Plus and 128K RAM. $475. Adobe Systems, Inc., 1565 Charleston Road, Box 7700, Mountain View, CA 94039-7900. (408) 447-3577.

Publishing Packs

bundles together three Adobe typefaces that work well for a particular project. Requires Mac Plus and a hard disk drive. $149.50. Adobe Systems, Inc., 1565 Charleston Road, Box 7700, Mountain View, CA 94039-7900.

QuarkStyle

is a collection of 72 designer-created templates for "instant" page layout. Their use is limited to rulers, gridlines, and quick gridlines. The package offers substantial savings over purchasing the typeface individually, and the documentation has useful information on typeface characteristics. Requires 32K memory, Mac Plus and 128K RAM. $475. Adobe Systems, Inc., 1565 Charleston Road, Box 7700, Mountain View, CA 94039-7900.

QuarkXPress

is a program with 24-bit color, style sheets, and search-and-replace on text attributes. Also does four-color separations. Page layout is handled through text and graphic objects. For projects that are more complex, QuarkXPress is a better master. Version 2.12. Requires Mac Plus and hard-disk drive. $795. Quark, 350 S. Jackson St., Suite 100, Denver, CO 80209.

Ready, Set, Go

combines page layout, word processing, and graphics capabilities in one program. The only forms package with a database link. Version 1.1. Requires Mac Plus and 280K RAM. $199.50. Boulder Springboard, 7698 Springboard, Minneapolis, MN 55425. (612) 445-4780. (May '90)

TableTools

is a��伟的帐篷布料包装。它让您可以创建表格用于输入数据。优势包括布局、移动和插入数据。单元格也可以插入公式、图片和表格。TableTools使用迅雷插件进行数据布局。默认布局可以使用并支持多种数据类型。TableTools还支持自定义布局和数据过滤。

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可使用电子邮件进行数据传输。它支持将Microsoft Word和Lotus 1-2-3数据文件转化为各种格式，在编辑或打印Excel文件时非常有用。

Graphics & Design

Aldus FreeHand

is a powerful vector drawing tool that can handle both photographs and illustrations. It supports both CMYK and RGB color modes.

PhotoMac


Reflex Plus

is a relational database with "smart" entry and report design but no overall programming facility. Simple to set up yet. Graphically capabilities are quite limited. Version 1.0. $2795. (Sept '90)"
### MiniFinders

**ArtClips**
A collection of EPFS and EPFW art objects. Requires 1 megabyte or more. Tactic Software, 13915 South Dixie, Miami, FL 33176. (305) 373-4122. 

**Canvas II**
A full-screen drawing/painting program that provides the following tools: paintbrush, pencil, eraser, eraser, smudge, drawing, perspective, distortion, auto-dimensioning, area and perimeter calculation, auto-tracing of bitmaps, and full color support. Creates and edits high-quality vector graphics. D.A. Software, 20800 W. Dixie Highway, Suite E, Miami, FL 33180. (305) 668-6965. NCP (Apr 89)

**Click & Clip**
Offers seasonal graphics packages. Offered on a two-quarter schedule. Requires a Microsoft Windows or Macintosh operating system. Available from the Better Memory Corporation, 13615 South Dixie Highway, Miami, FL 33176. (305) 373-4110. NCP (Aug 89)

**Clip3D**
Is a line-of-3-0, color-art clip-art collection bundled with a powerful editing program. Images are in Pro3D format and provide exceptional output quality. Run on a Mac II 68030. DA doesn't offer a Mac II version. NCP (Apr 89)

**Clips 2000**
The latest version of the popular line of 2000 Clipart collections. Available in a Macintosh version. Requires a 1-megabyte hard disk. NCP (Apr 89)

**Color Pallette**
Is a series of high-quality MacPaint clipart volumes. 256 colors. NCP (May 89)

**ColorPaint**
Is an 8-bit color paint program that requires PaintClip's FreshPaint feature and has a new tool for editors. Requires an 8-bit color program, with Canvas 2.0 or Studio II. Version 1.0. Requires Mac for Mac II only. 2 megabytes. PaintClip 3.0 is required. NCP (May 89)

**ColorPaint**
Is a 24-bit color paint program with an interesting toolset. Not powerful enough for professional work but not enough to make it first choice in its price range. FreshPaint gives it the best of both object-oriented and bit-mapped approaches, but will not meet the 8-color needs of the 286 series.Version 2.0 requires Mac Plus or later and System 6.0.9 or later. Computers, 12050 Sorrento Valley Road, San Diego, CA 92121-1690 (Oct 89)

**CrystalPaint**
Is a 24-bit color paint program with an interesting toolset. Not powerful enough for professional work in color on Mac II. MultiFinder friendly. Requires 128K. Requires Mac II or SE. 4 megabytes. Great Software, 7000 Hillview Ave., Mountain View, CA 94039-7907. NCP (Aug 89)

**DeskPaint & DeskDraw**
Is an all-in-one graphics package. For MacPaint and MacPaint Pro users. Version 2.0. Requires Mac II or SE/30 with 8-bit color. MacPaint, 16155 Magnolia Ave., Suite 3-B, Riverside, CA 92503. (714) 785-8868. NCP (Jan 89)

**DigitArt**
Is an object-oriented clip art program containing 10 megabytes of art objects. Requires 1 megabyte. Tactic Software, 13915 South Dixie Highway, Miami, FL 33176. (305) 373-4122. 

**Drawing Table**
Is a low-price alternative to MacPaint II that has some nice tools, but does not fully compete with the market leaders. Coding 2000, 12155 Magnolia Ave., Suite 3-B, Riverside, CA 92503. (714) 785-8868. NCP (Jan 89)

**ElectronPaint**
Is the best-equipped tool for creating color and black-and-white presentations. Object-oriented animation capabilities provide animation and a superior multimedia toolkit. Requires Mac Plus or later, 2 megabytes for color. Hermes & Tribune Fonts. NCP (Sept 89)

**Fontographer 3.0**
Is a superior font editor that can handle many PostScript fonts. Features include an integrated screen-font editor, auto-tracing, and a tool for screen fonts. Version 2.0 requires Mac Plus or later, 3 megabytes. A limited version is available with smaller screen fonts for $95. NCP (May 89)

**Fowever**
Is the best-equipped tool for creating color and black-and-white presentations. Object-oriented animation capabilities provide animation and a superior multimedia toolkit. Requires Mac Plus or later, 2 megabytes for color. Hermes & Tribune Fonts. NCP (Sept 89)

**Mapmaker**
Is a series of TIFF clip art from the grandchild of the clip-art industry. The traditional-looking images are huge, so have a large hard disk handy. Requires Mac II or later, 1 megabyte. MetroSoft, 1740 B Chatsworth St., Granada Hills, CA 91344. (BOO) 522-2041. NCP (May 89)

**MacPaint**
Is a drawing/painting program with full Bezier curves. Features include an integrated screen-font editor, auto-tracing, and a tool for screen fonts. Version 2.0 requires Mac Plus or later, 3 megabytes. A limited version is available with smaller screen fonts for $95. NCP (May 89)

**Mac3D**
Is a feature-laden 3-D program with a MacPaint-like interface. Features include an integrated screen-font editor, auto-tracing, and a tool for screen fonts. Version 2.0 requires Mac Plus or later, 3 megabytes. A limited version is available with smaller screen fonts for $95. NCP (May 89)

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**MapMaker**
Is a series of TIFF clip art from the grandchild of the clip-art industry. The traditional-looking images are huge, so have a large hard disk handy. Requires Mac II or later, 1 megabyte. MetroSoft, 1740 B Chatsworth St., Granada Hills, CA 91344. (BOO) 522-2041. NCP (May 89)

**Modern Art**
Is a 24-bit color paint program and has added a few new features, but there’s not enough to justify the substantial price increase. Requires Macintosh II, 399.95. Computer Friends, 1620 Cortland Court, Sunnyvale, CA 94086. (408) 727-5250. NCP (Oct 89)

**Persuasion**
Is a powerful presentation program with a good interactive interface, practical tools, and special effects. Works with many file formats. Four-color separation is built in. Includes PixelScan utility for Sharp and HP 8000 series PostScript printers. Has font capability that matches most B - level PostScript fonts. Requires Mac II or SE with 32-bit color support and 2 megabytes. Super Mac Technology, 45th Potro Ave., Sunnyvale, CA 94083-0303. (408) 772-2041. NCP (May 89)

**Pixelate**
Is a pixel-based presentation program with a good interface, practical tools, and special effects. Works with many file formats. Four-color separation is built in. Includes PixelScan utility for Sharp and HP 8000 series PostScript printers. Has font capability that matches most B - level PostScript fonts. Requires Mac II or SE with 32-bit color support and 2 megabytes. Super Mac Technology, 45th Potro Ave., Sunnyvale, CA 94083-0303. (408) 772-2041. NCP (May 89)

**PowerPoint**
Is an easy-to-use desktop presentation tool. Good color schemes. Can send presentations to Geographics to produce color slides. Requires 2.0, 2 megabytes of RAM, 1.1 hard drive, and two 80K drives or hard disk. Microsoft, 1601 N.E. 35th Way, P.O. Box 7017, Redmond, WA 98073-7971. (425) 881-5924. NCP (Aug 89)
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*MacUser*, December 1989

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is a nifty PostScript utility designed as a DA. It creates special effects with both text and graphics, and it lets you import EPSF files into any program. The initial release has 15 text effects, functions like a paint tool, and can quickly create a flat design of a scene. 1.0.1. Requires 1 megabyte and PostScript printer. $49.95. (Emerald City Software, 660 Menlo Ave., Suite 102, Menlo Park, CA 94025.)

**Smart Art II and III**

are the second and third versions of PostScript effects for Windows. VersaCAD, 2124 Mam St., Huntington Beach, CA 92647. (415) 442-0200. NCP (Mar '88) $35. 957 Edby

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is a powerful CAD program that doesn't show any of its MS-DOS look, has some of ths most impressive flip-frame animation capabilities. You'll find an unlimited animation prevent, with postScript effects are available. Features include animation, import/export of 3-D objects, excellent effects, for artistic, design, or technical work. Version 1.0. Requires 1 megabyte. $129.95. (VersaCAD, 812 City Gateway Drive, San Mateo, CA 94404.)

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Radius Accelerator 25  

can make your Mac SE run 50 percent faster than a Mac II. The add-in accelerator card has a Motorola 68020 CPU that runs at 25-megahertz clock rate. Requires Mac SE; $525; $695 with power supply. Includes software: HP-PAK, $395; Digi-LINK, $345; and HP-PAK Pro, $595. First Data Corp., 400 Research Drive, Wilmington, MA 01887. (508) 657-8200. (May '89)

SpeedCard  

is an acceleration board for the Macintosh SE that more than doubles the speed of most applications. The board uses the 68000 chip found in the SE and an optional floating-point board ($999). Requires Mac SE/128; $299. Includes coprocessor. $1,995; $2,195 with optional 25-megahertz $68801. New for $1,395. Requires SE/256. $1,395. Inforsoft, 1710 Fortune Drive, San Jose, CA 95131. (408) 434-1011. (Oct '89)

Teletext  

is a hardware/software combination for creating and showing color presentation. Lets you create color presentations with an ordinary Macintosh program. Requires Mac SE; $699; $999 with coprocessor. SuperMac Technology, 4580 Potrero Ave., Sunnyvale, CA 94086. (408) 245-2202. (Nov '88)

StarTask  

is an expensive hardware/software combination for creating and showing color presentations. Lets you create color presentations with an ordinary Macintosh program. Requires Mac SE; $699; $999 with coprocessor. SuperMac Technology, 4580 Potrero Ave., Sunnyvale, CA 94086. (408) 245-2202. (Nov '88)

MacPac  

is a hardware/software encapsulator and a very powerful and rich, uses bit-mapped screen fonts. Most text has no scrollable palettes. Requires Mac II with color monitor. Recommended 8-megabyte RAM. RioDigital, 17000 P.O. Box 50035, Beaverton, OR 97007. (503) 835-6100. (Oct '88)

Turbo Mouse ADB  

is a fast, versatile mouse. Supports forward, reverse, and lock functions can be relearned for left-handed people. Has a "choreography" for a user-specified Command-key function. Excellent for use with Microsoft MicroDraw. Park Ave., S., New York, NY 10011. (Oct '88)

V-series Smartmodem 9600  

is the fastest modem you can get for the Mac. To achieve high speeds, you'll need a extra-differential cable and software that supports data rates of up to 9600 bps. Requires 512K. Mac-to-modem cable, and communications software. $2,999.42 and X.25 available. Apple Computer, 101 Infinite Loop, Cupertino, CA 95014. (408) 996-8251. (Oct '88)

WriteMove  

is an accessory for your Mac's ADB port. A slip-on kit that makes you can produce your documents at up to 192 dpi. It can run large-scale graphics and text data, and it can process more than 5 images on the paper and ink used. Printer Driver version 1.0 requires 1 megabyte and hard disk. $699. GCC Technologies, 580 Winter St., Waltham, MA 02154. (617) 890-9699. (Apr '89)

Number Crunching  

Analog Connection Workbench  

is a non-PostScript laser printer at a great price. Clumsy workarounds required in some applications. Printing can be slow. Requires 1 megabyte. $999. Latex Technology, 30348. (404) 441-1617. (Jan '89)

Apple ColorPrinter  

is the first color PostScript printer that uses a four-color thermal wax transfer technology. Works on AppleTalk. Excellent typographic capability. Currently supports only a handful of Bitstream fonts. Printing quality varies widely from page to page. $2,599. Tektronix, P.O. Box 3217, Redmond, WA 98073-3217. (206) 454-2030. NCP (Oct '89)

Apple ColorWriter  

is a non-PostScript laser printer at a great price. Clumsy workarounds required in some applications. Printing can be slow. Requires 1 megabyte. $999. Latex Technology, 30348. (404) 441-1617. (Jan '89)

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### Utilities

**Anti-Virus Kit**

An antivirus utility that comes in three parts: an alert INIT, an application that installs a history file on any disk that records dates and times of an infection occurred. Does not include repair capabilities. Version 1.0. Requires System 4.2 and System 4.1. $79.95.

**AutoSave DA**

is insurance against system crashes. It saves your work automatically before your application crashes. It may have to be rerun after a crash. Version 2.0. Requires System 4.2. $195.

**FontJDA Juggler Plus**

is similar to Tempo II and Apple's MacroMaker but is generally easier to use. It has a powerful Macro Editor. Version 2.0. Requires System 4.2. $79.95. Also distributed with Microsoft products (Word 3.0 and 4.0). Requires System 4.2. $195.95. Includes cable. Terrible. צפו: ויתור da. P.O. Box 2826, Bellevue, WA 98009. (425) 747-8532. NCP (Feb 98)

**AutoSave**

is an indispensable utility that installs a new button in the Open Application drawer. A button generally every Macintosh application. Press the button, type a search string, click on Find, and FindIt searches for any files that match. Click Open or double-click to open the file you want. Version 2.6.3. Upgrade available from NCP. Available for $59.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95061. (408) 423-5966. NCP (Nov 97) * Eddy

**OS/2 User**

is a file-management utility that tries to increase the power of the Standard File Dialog box. Your most frequently used files or folders are kept in an index drawer for immediate access. Let you press move or copy folders. A good idea, but it's buggy. Version 1.0. $99. Requires System 4.2. Latest MacSoft. Corp. 2615 61st Place West Suite 201, West Palm Beach, FL 33401. (561) 626-7897. NCP (Jun 99)

**DiskFinder**

is a utility that can scan your entire drive for any floppy or hard disks. A powerful manual-searching utility that can handle all kinds of macintosh applications. Press the button, type a search string, click on Find, and FindIt searches for any files that match. Click Open or double-click to open the file you want. Version 2.6.3. Upgrade available from NCP. Available for $59.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95061. (408) 423-5966. NCP (Nov 97) * Eddy

**Font/DA Juggler Plus**

is a printer driver that lets you print to HP non-PostScript printers. Provides a set of four special output fonts that automatically uses when you choose the standard Adobe fonts (additional fonts are available for $198). Includes cable. Terrible.
LANDesign \textit{ttt} is a bar-code generator software. It has a range of options that allow it to work like the way surveyors worked before they had a Mac to help them. This is an intelligent program and thus easy to use.

System 6.0.1 requires Mac Plus; hard-disk drive: 512K printer memory (1 megabyte recommended); LaserJet II, LaserJet II series, LaserJet Plus, DeskJet Plus, DeskJet HP, or HP-compatible printer; and System 6.0.4. $149. GOTE Soflworks, 4644 Lougheed Highway, Suite 200, Burnaby, British Columbia V5C 8T7, Canada (Jan ’90)

MacBarCode \textit{ttt} is a bar-code generator software. It outputs EPS files. Easily the best program of its kind. Requires 1 megabyte and hard-disk drive. $69.95. Computacorp, 18A Regent St., Harlestone, Le9 5DL, England. (Oct ’90)

MacPrint \textit{ttt} is a driver software that lets you print non-PostScript Hewlett-Packard printers. Provides screen fonts for every imaginable HP font cartridge and several common Screenographic screen fonts. Includes cable. Good manual. Check application compatibility before buying. Version 1.1. Requires Mac Plus; hard-disk drive: 512K printer memory (1 megabyte recommended); LaserJet II, LaserJet II series, LaserJet Plus, DeskJet Plus, DeskJet HP, or HP-compatible printer; and System 6.0.4. $149. GOTE Soflworks, 4644 Lougheed Highway, Suite 200, Burnaby, British Columbia V5C 8T7, Canada (Jan ’90)

NCP \textit{ttt} is a bar-code generator software. It has a range of options that allow it to work like the way surveyors worked before they had a Mac to help them. This is an intelligent program and thus easy to use.

PowerStation \textit{ttt} is an extremely easy-to-use, versatile, and powerful Finder. It lets you switch applications without returning to the Finder.

QuickKeys \textit{ttt} lets you make full use of your keyboard. Assign any command (menu choices, DAs, etc.) or series of text blocks and/or command for Apple Extended Keyboard owners. Requires 512K. $19.95. C Dover, 5506 W. Bay Court, Williston, VT 05495. (Nov ’89)

ReadIT \textit{ttt} is an upgrade of Olds’s ORC package. Still a good value and performer. Now includes printer drivers for most scanners, batch command execution, and a wide range of other enhancements, including clicking on any key or keyword combination.

Screwdriver \textit{ttt} is a set of extremely powerful DAs. Includes a text editor, text printer (supports LaserWriter), charter, terminal, and EXIF. Macs must have disk and no logs enabled. Version 1.4 now available for $499.95. MacPlus or later, System 6 or later. $199.95. Berkeley System Design, 1700 Shattuck Ave., Berkeley, CA 94709. (Nov ’90)

MultiDisk \textit{ttt} is an integral component that displays your Font menu, using the actual typefaces. Also adds Key Scroll, so you can navigate long Font menus easily.

Stepping Out \textit{ttt} is a software alternative to a large-screen monitor. Lets you output a wide range of information, including text, graphics, and video, on the Mac’s 6-inch screen. Automatically scrolisks to new document position as you type or draw. Version 2.0. Requires 1 megabyte. Berkeley System Design, 1700 Shattuck Ave., Berkeley, CA 94709. (Oct ’89)

StuffIt \textit{ttt} is an elegant tool that lets you capture screens or parts of screens. Differs from similar products in that the captured window remains on-screen instead of being replaced by a new window. Version 2.0. Requires System 4.1 or later. $36. Trillian Software, 21171 Cortney Road, Lomita, CA 90712. (Oct ’90)

SoundMaster \textit{ttt} is an elegant cdw that lets you assign sounds to a wide range of applications and let these sound files start up, shut down, disk insertion, and other events.

SuperGlue \textit{ttt} is the newest and best print-to-disk program. Offers superior performance when printing to disk. It provides a range of options (Note-‘l-k lines) and One-Timer, an Fley that makes operation immensely easier. Version 1.0. Requires System 6.0 or later. $129. Berkeley System Design, 1700 Shattuck Ave., Berkeley, CA 94709. (Oct ’89)

Tablecloth \textit{ttt} is an excellent application using MultiFinder less confusing and far more pleasant. Hides all but the active window when tri-click in the window. Version 1.1. Requires System 6.0 or later and MultiFinder 1.0. $95. Berkeley System Design, 1700 Shattuck Ave., Berkeley, CA 94709. (Oct ’89)
**Price:** $49.95. User-Tek, 444 4th Street, New York, New York 10017. (Oct '90)

**Vantage**

is a commercial version of Ms. Ink. It can change case, count the number of lines, words, sentences, or paragraphs in a selected text, and search for character strings (including abbreviations). Supports macros and external commands written in Pascal. Includes a spell-checking feature. Version 1.0 requires $52.95 or later. $559. Formulator **tttt**

is a powerful and easy-to-use formula-creating application. Can output to TeX as well as "regular" format. Version 1.1 requires 3 megabytes. Mac II and MultiFinder friendly. $89.50. ExpressWrite

is a $44.95 program that adds menus to a user's System 6 menu bar. Supports graphics, menus, and keyboard macro features. Enhanced speed and added features. $149. (Version 4.1 now available) Sensible Software, 233 E. 42nd Street, Suite 207, Too, Minny 14539, (312) 529-1510. NCP (Dec '88)

**QuickLetter**

is a stand-alone bazaar spell-checker. Also checks for punctuation and other common errors. Includes spell-checking, context-sensitive interface, but weak guessing. Version 2.0, $74.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95061-1844. (408) 425-6006. NCP (Dec '88)

**Sensible Grammar**

corrects some of the more glaring errors that writers make. Also analyzes text word count and includes a readability rating. Slow. Version 1.1d. Sensible Software, 233 E. 42nd Street, Suite 207, Too, Minny 14539, (312) 529-1510. NCP (Dec '88)

**Spelling Coach Professional**

is a character formatting tool. Version 1.0 requires $529.50. Working Software, P.O. Box 1844, Santa Cruz, CA 95061-1844. (408) 425-6006. NCP (Dec '88)

**Microsoft Word 4.0**

is the best word processor you can buy. Excellent speed and a huge list of useful features. Table commands let you create column tables and cross-references. Includes spell-checking, automatic capitalization, hyphenation, and page layout. Good guessing. $299.95. Microsoft Corp., 1 Summer Ct., Redmond, WA 98073-1701. (408) 441-5000. NCP (Sept '89)

**WordPerfect**

is a $195.95 program that allows users to create complex mathematical equations from within an application. Equation manipulation has never been easier. Version 2.0 now available for $129.95. Precise Technology, 620 9th Ave., Suite 1500, Seattle, WA 98104. (206) 225-8700. NCP (Sept '88)

**Expressionist**

is a powerful text editor that can create complex mathematical equations from within an application. Equation manipulation has never been easier. Version 2.0 now available for $129.95. Precise Technology, 620 9th Ave., Suite 1500, Seattle, WA 98104. (206) 225-8700. NCP (Sept '88)

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**FoMo-P**

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Sending a fax with a Data/Fax modem is as easy as printing. Simply select the fax icon from the Chooser and print as you normally would from any Mac application. BackFAX™ will send it in the background, while you go back to work, with or without MultiFinder™! BackFAX supports automatic scheduled calling, customized cover sheets, and distribution lists.

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For many of you, mail order is your primary means of purchasing Macintosh products and services. That's why MacUser has put together the following special section.

It's what you've been demanding — a convenient place to quickly find the products you need from the vendors you want to buy from. MacUser's Direct Line to products is just one more reason to turn to MacUser for relevant information aimed at the serious user.

### Macintosh Portables

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
<th>Details</th>
</tr>
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<tbody>
<tr>
<td>Macintosh Portable</td>
<td>$4,395</td>
<td>40 meg Hard Disk, $4,895</td>
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### Macintosh SE/30 system

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<tr>
<th>Model</th>
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<tr>
<td>Macintosh SE/30</td>
<td>$3,235</td>
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### Macintosh IIci color system

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<td>Macintosh IIci</td>
<td>$4,699</td>
<td>4 MB memory, Apple 14&quot; color monitor, 80 MB Quantum Drive, 134 Extended Keyboard, $6,578</td>
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### Quantum Internal Drives

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<th>Model</th>
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<tbody>
<tr>
<td>80 s (19ms)</td>
<td>$679</td>
<td>105 s (19ms) $749, 120 s (19ms) CALL, 170 s (19ms) CALL</td>
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</table>

All drives come preformatted, with headers, cables, and instructions. We carry a complete selection of large screen monitors and boards Call for current pricing.

### RasterOps 264 Board

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special</td>
<td>$649</td>
<td>24 bit color for Mac II family</td>
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### Sony Trinitron

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>19 inch color monitor</td>
<td>$2,898</td>
<td>Prices subject to change (on/ask... down) Please call for latest pricing. Leasing available to qualified businesses.</td>
</tr>
</tbody>
</table>

We are in the process of configuring our new Macintosh system. Our experienced Macintosh sales consultants will help you configure a system to your exact needs. Here are some of our most popular systems...

- **Macintosh Portables**
  - **Macintosh Portable** $4,395 delivered (or lease $162/mo.)
  - w/40 meg Hard Disk $4,895 delivered (or lease $181/mo.)

- **Macintosh SE/30 system**
  - **Macintosh SE/30** $3,235
  - 4 MB memory $320
  - 40 MB Quantum Drive $449
  - Extended Keyboard $134
  - Delivered Price $4,168 (or lease $152/mo.)

- **Macintosh IIcx 24 bit color system**
  - **Macintosh IIcx** $3,398
  - 4 MB memory $320
  - 24 bit color card $649
  - 14 inch color monitor $499
  - 10 MB Quantum Drive $49
  - Extended Keyboard $134
  - Delivered Price $5,449
  
  (or lease $198/mo.)

- **Macintosh IIci color system**
  - **Macintosh IIci** $4,699
  - 4 MB memory $320
  - Apple 14" color monitor $746
  - 80 MB Quantum Drive $679
  - Extended Keyboard $134
  - Delivered Price $6,578
  
  (or lease $239/mo.)

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Please circle 61 on reader service card.
## Software

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
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<tbody>
<tr>
<td><strong>DREAMMAKER SOFTWARE</strong></td>
<td>$366</td>
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<tr>
<td>Captures Vol 1 or 2</td>
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<tr>
<td>MacGallery</td>
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<tr>
<td>ELECTRONIC ARTS</td>
<td>$26</td>
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<td>Studio 8</td>
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<tr>
<td>EMERALD CITY SOFTWARE</td>
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<td>SmartArt 1.2 or 3</td>
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<td>LaserTalk</td>
<td>$179</td>
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<td>EMERAD CITY SOFTWARE</td>
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<td>LaserTalk</td>
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<td>FIFTH GENERATION</td>
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<td>Fastback II</td>
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<td>FOX SOFTWARE</td>
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<tr>
<td>GFILESYSTEM</td>
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<td>GRAPHICSOFT</td>
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<td>Generic CAD Level 1</td>
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<td>HAYES</td>
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<td>Smartcom II</td>
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<tr>
<td>2400 with Smartcom II</td>
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<td>INFORMIX</td>
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<td>INSIGHT DEVELOPMENT</td>
<td>$77</td>
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<td>MacPrint</td>
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<td><strong>NEW HORIZONS</strong></td>
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<td>ODESTA CORPORATION</td>
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<td>Data Desk Professional</td>
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<td>PARACOMP</td>
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<td>Swivel 3D</td>
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<td>Address Book Binder</td>
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<td>Acta Advantage</td>
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<td>HyperDA</td>
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<td><strong>SYSTAT FASSTD</strong></td>
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<td>Publish it! Mac</td>
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<td>TOPS for Mac (new version)</td>
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<td>TOPS for DOS</td>
<td>$109</td>
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<td>TOPS Flashcard</td>
<td>$156</td>
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<td><strong>VERSACAD</strong></td>
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<td><strong>WILLIAM AND MACAIS</strong></td>
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<td>Sticky Business</td>
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<td>My Dick &amp; Janelle</td>
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<td><strong>WOLFRAM</strong></td>
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<td>Mathematica for SE</td>
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<td><strong>WORDPERFECT CORP</strong></td>
<td>$678</td>
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<tr>
<td>WordPerfect</td>
<td></td>
</tr>
<tr>
<td><strong>THE LOWEST PRICES!</strong></td>
<td></td>
</tr>
<tr>
<td><strong>SAME DAY SHIPPING TILL 9:30 PM EST!</strong></td>
<td></td>
</tr>
</tbody>
</table>
America's Largest Macintosh Hardware Source

Prices good through March 1990

Unbelievable Quality
Unbeatable Price

Ricoh Laser 6000/PS
Postscript Laser Printer

- Adobe Postscript Version 50.5
- 35 Resident Fonts
- Letter, Legal, Envelopes, and European
- One Year Warranty with first 90 days on site
- Incredible Blacks and Clear Fine Lines
- Two Megabytes of RAM Expandable to Four Megabytes
- Optional Two Bin Automatic Paper Tray Available

Retail Price
$3,499

Introductory Price
$2,495

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.
The Reasons You Should Buy From MacLand...

1. Price—Because of our multi-million dollar buying power, we purchase large volumes of quality hardware at low prices and pass the savings on to our customers.

2. Delivery—We offer Same Day Shipping on all in stock items if we receive your order by 3 pm Mountain Standard Time. ALL credit card orders are shipped by FEDERAL EXPRESS STANDARD AIR service which means you get your merchandise fast!

3. Technical Support—MacLand has the best technical support, period. We provide you with technical support BEFORE AND AFTER your purchase. Best of all, to assure you the high est quality, our trained techni­cians test ALL hard disk drives for quality and viruses before we ship them to you.

---

## Externals

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<tr>
<th>Product</th>
<th>Retail Price</th>
<th>Sale Price</th>
</tr>
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<tbody>
<tr>
<td>20 Megabyte Cache Systems 20 40ms</td>
<td>$79.5</td>
<td>$42.9</td>
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<tr>
<td>CMS Enhancements 20 32ms</td>
<td>$79.5</td>
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<td>30 Megabyte Cache Systems 30 28ms</td>
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<td>CMS Enhancements 30 32ms</td>
<td>$79.5</td>
<td>$48.9</td>
</tr>
</tbody>
</table>

**Quantum Hard Disk Drives**

- Industry leading Quantum quality, dependability and fast access speeds at affordable prices. Backed by our Two Year Warranty, all Quantum drives come with cables and software.

**POWER Drive**

- Drive 30 40ms: $699: $399
- Seagate 31 40ms: $749: $449

**40 Megabyte**

- Cache Systems 45 28ms: $699: $549
- CMS Enhancements 45 32ms: $699: $589
- **POWER Drive** 45 40ms: $799: $449
- Quantum 40 19ms: $699: $549
- Seagate 46 40ms: $699: $489

**60 Megabyte**

- Cache Systems 60 28ms: $699: $579
- CMS Enhancements 60 40ms: $1,065: $649
- **POWER Drive** 60 28ms: $699: $539
- Seagate 62 28ms: $699: $579

**80 Megabyte**

- Cache Systems 80 28ms: $1,199: $679
- CMS Enhancements 81 28ms: $1,065: $779
- **POWER Drive** 80 28ms: $699: $588
- Quantum 80 19ms: $1,099: $789
- Seagate 81 28s: $1,099: $599

**100-200 Megabyte**

- Cache Systems 150 16ms: $2,499: $1,299
- Cache Systems 150 16ms: $3,299: $2,159
- CMS Enhancements 170 18ms: $3,999: $2,549
- **Imprimis MacWren** 170 16ms: $5,499: $3,499
- Quantum 105 19ms: $1,849: $1,099
- Quantum 120 15ms: $2,499: $1,099

---

## SE, SE30 & IICx, IIC Internals

<table>
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<tr>
<th>Product</th>
<th>Retail Price</th>
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<td>20 Megabyte Seagate 20 40ms</td>
<td>$599: $299</td>
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<td>30 Megabyte Cache Systems 30 28ms: $649: $375</td>
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<td>CMS Enhancements Pro 30 38ms: $649: $399</td>
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<tr>
<td>Seagate 31 40ms: $649: $399</td>
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<td>40 Megabyte Cache Systems 45 28ms: $619: $449</td>
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<tr>
<td>CMS Enhancements Pro 45 32ms: $619: $449</td>
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<td></td>
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<tr>
<td>Quantum 40 19ms (2 Year Warranty): $699: $449</td>
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<tr>
<td>Seagate 46 40ms: $699: $449</td>
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<td>60 Megabyte Seagate 62 28s: $699: $339</td>
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**Imprimis MacWren**

- MacWren 170 16ms: $2,549: $1,549
- **Toshiba 105 16ms** (2 Year Warranty): $869: $579
- Quantum 120 15ms (2 Year Warranty): $629: $399
- Quantum 105 1ms (2 Year Warranty): $629: $399
- Quantum 120 15ms (2 Year Warranty): $629: $399
- **Toshiba 105 25ms** (2 Year Warranty): $449: $299

---

## Mac II & IIX Internals

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<td>Seagate 80 28ms: $2,999: $1,499</td>
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<tr>
<td>Seagate 46 28ms: $2,999: $1,499</td>
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<tr>
<td>Quantum 170 15ms: $2,199: $1,149</td>
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<td></td>
</tr>
<tr>
<td>Quantum 105 15ms: $2,199: $1,149</td>
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<tr>
<td><strong>Imprimis MacWren</strong> 105 15ms: $2,199: $1,149</td>
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<tr>
<td>Quantum 120 15ms (2 Year Warranty): $2,199: $1,149</td>
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<tr>
<td>Toshiba 105 25ms: $2,199: $1,149</td>
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</table>

**Quantum 170 15ms**

- (2 Year Warranty): $2,199: $1,149
- **Imprimis MacWren** 105 15ms: $2,199: $1,149

---

**For Ordering and Technical Support Call 1-800-333-3353 (FAX #602-345-2217)**

5006 South Ash Avenue, Suite 101 Tempe AZ 85282 (602) 820-5802
WARNING: Beware of money-back offers on hardware! MacLand sells only NEW, NEVER USED merchandise. We will not send you re-packaged, slightly-used hard disks.

Ricoh Laser 6000/PS

The 6000/PS provides all of the power and performance that you'll ever need to get the job done. This Adobe Postscript Laser Printer can do letter, legal, envelopes, transparencies, and European paper sizes. Backed with a solid One Year Warranty. An unbelievable price of $2,495. this month!

Removables/Tape Back-Ups

<table>
<thead>
<tr>
<th>Retail Price</th>
<th>Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>44 Megabyte Removable Cartridges</td>
<td>$1,495.00</td>
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<tr>
<td>CMS Enhancements 44 25ms</td>
<td>$799.00</td>
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<tr>
<td>Peripheral 44 25ms</td>
<td>$1,194.00</td>
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<tr>
<td>POWERDrive 44 25ms</td>
<td>$1,395.00</td>
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<tr>
<td>40-150 Megabyte Tape Back-Ups</td>
<td>$1,495.00</td>
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<tr>
<td>Cache 150 Tape</td>
<td>$799.00</td>
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<tr>
<td>CMS Enhancements 150</td>
<td>$1,194.00</td>
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<tr>
<td>Irwin 40 Meg Tape</td>
<td>$949.00</td>
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<tr>
<td>Irwin 80 Meg Tape</td>
<td>$1,149.00</td>
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<tr>
<td>SyQuest Removable Cartridges (Will fit Any 44 Removable Drive)</td>
<td>$195.00</td>
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</table>

Erasable Optical

| Peripheral Land 635 Optical 45ms | $3,995.00 |

Printers

| Hewlett Packard DeskWriter | $1,299.00 |
| Ricoh PostScript Laser Printer | $2,495.00 |

Printers

| Hewlett Packard DeskWriter | $1,299.00 |
| Ricoh PostScript Laser Printer | $2,495.00 |

Memory Upgrades

Dove MacSnap Memory Upgrades and MarathOn Accelerator Boards

Need a memory upgrade for a Mac? Dove Computer's MacSnap line offers a variety for all models from a S/2 upgrade. Maybe you want to speed up your Mac. Dove's MarathOn accelerators are available for the SE, SE/30, II and Ix. And at these prices, MacLand makes it easy!

| MacSnap 524 | $995.00 |
| MacSnap 524E | $999.00 |
| MacSnap 524S | $999.00 |
| MacSnap 546 | $999.00 |
| MacSnap 546E | $999.00 |
| MacSnap 546S | $999.00 |
| One Meg SIMMS | $1,999.00 |

Accelerator Boards

| MacSprint II Cache Board | $999.00 |
| MarathOn 202 MSE 1 | $699.00 |
| MarathOn 202 MSE 2 (1 Meg) | $999.00 |
| MarathOn 202 MSE 3 (Math Chip) | $999.00 |
| MarathOn 202 MSE 4 (1 Meg-Math Chip) | $1,499.00 |
| MarathOn 202 MSE 5 (Math Chip) | $1,499.00 |
| MarathOn 030 Accelerator | $1,499.00 |
| radus Accelerator | $2,495.00 |

Monitors

| Magnavox 14" Color Display | $995.00 |
| Qume 14" Color Monitor | $999.00 |
| Qume Portrait Monitor SE, II, Ix | $1,089.00 |

Scanners

Hewlett Packard ScanJet W/Interface | $599.00 |
Microtek MS II Sheet Feed | $495.00 |
Microtek MSF 300GS | $599.00 |
Microtek MSF 300Z - Color W/Interface | $699.00 |

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.
The Lowest Prices with Technical Support, Too!

**POWER UP**

**POWERDrive**
Hard Disk Drive External Subsystems

<table>
<thead>
<tr>
<th><strong>POWERDrive</strong></th>
<th><strong>Price</strong></th>
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</thead>
<tbody>
<tr>
<td>30</td>
<td>$399.</td>
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<tr>
<td>45</td>
<td>$449.</td>
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<tr>
<td>60</td>
<td>$539.</td>
</tr>
<tr>
<td>80</td>
<td>$588.</td>
</tr>
<tr>
<td>150</td>
<td>$1,096.</td>
</tr>
<tr>
<td>200</td>
<td>$1,244.</td>
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<tr>
<td>320</td>
<td>$1,796.</td>
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<tr>
<td>600</td>
<td>$2,796.</td>
</tr>
<tr>
<td>45 Removable</td>
<td>$749.</td>
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</tbody>
</table>

All units are factory-tested and pre-formatted for hassle-free setup. Each steel external case comes complete with power supply, cabling, Ontrack's "Disk Manager Mac" software and a comprehensive reference manual. Just POWER UP and Go!

**radius**

Full Page Display
Two Page Display
Two Page Gray Scale
Two Page Color

**RasterOps**
RasterOps ClearVue Mac II .......................... $1,299.
RasterOps 19" ClearView SE ........................ $1,399.
RasterOps 16" 108 + Color System .................. $2,949.

**SIMMS**
MacLand has memory in stock! Call us for our current prices. Remember, if you bought your memory from someone else, you probably paid too much!

<table>
<thead>
<tr>
<th><strong>Fax Modems</strong></th>
<th><strong>Price</strong></th>
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<tbody>
<tr>
<td>Abaton Fax Modem 4800 Baud</td>
<td>$396.</td>
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<tr>
<td>Abaton Fax Modem 9600 Baud</td>
<td>$699.</td>
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<tr>
<td>Orchard Fax Modem 9600 Baud</td>
<td>$439.</td>
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<table>
<thead>
<tr>
<th><strong>External Floppy Drives</strong></th>
<th><strong>Price</strong></th>
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<tr>
<td>Kennect Technology Rapport</td>
<td>$215.</td>
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<tr>
<td>Drive 2.4</td>
<td>$359.</td>
</tr>
</tbody>
</table>

For Ordering and Technical Support Call 1-800-333-3353 (FAX #602-345-2217)

5006 South Ash Avenue, Suite 101 Tempe AZ 85282 (602) 820-5802

Please circle 50 on reader service card.
IT'S AS EASY AS 1, 2, 3

1. Please indicate which of the following computer users currently use in your organization or personal computer:

a) Mac Plus  
 b) Mac SE  
 c) Mac II

2. For how many microcomputers do you buy products:

- 1) 4   
- 2) 5-49   
- 3) 50+

3. Your primary job function is:

- 1) Administrative/General Management  
- 2) MIS/DP, Communications Systems, Programming
- 3) Engineering/R&D  
- 4) Finance/Accounting  
- 5) Marketing/Sales  
- 6) Computer Dealer/VAR

4. For which of the following professional products are you involved in selecting brands/models to be bought by your organization or company?

- 1) Accounting  
- 2) Spreadsheets  
- 3) Financial Planning  
- 4) Project Managers  
- 5) Word Processors  
- 6) Database Managers  
- 7) Graphics  
- 8) CAD/CAM  
- 9) Communications

5. Are you involved in the purchasing of microcomputer equipment at your company?

- 1) Yes  
- 2) No

6. If so, what function do you serve in the buying process?

- 1) Evaluations/Specifications  
- 2) Recommendation  
- 3) Buyer/Purchaser

PLEASE PRINT CLEARLY

MACUSER

Advertisement Information

Name:

Phone (___ ___ ___ ___)

Company:

Title:

Address:

City __________________ State __ Zip ____________

1. Please indicate which of the following computer users currently use in your organization or personal computer:

- a) Mac Plus  
- b) Mac SE  
- c) Mac II

2. For how many microcomputers do you buy products:

- 1) 1-4

3. Your primary job function is:

- 1) Administrative/General Management  
- 2) MIS/DP, Communications Systems, Programming
- 3) Engineering/R&D  
- 4) Finance/Accounting  
- 5) Marketing/Sales  
- 6) Computer Dealer/VAR

4. For which of the following professional products are you involved in selecting brands/models to be bought by your organization or company?

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- 4) Project Managers  
- 5) Word Processors  
- 6) Database Managers  
- 7) Graphics  
- 8) CAD/CAM  
- 9) Communications

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- 1) Yes  
- 2) No

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- 1) Evaluations/Specifications  
- 2) Recommendation  
- 3) Buyer/Purchaser

PLEASE PRINT CLEARLY

MACUSER

Advertisement Information

Name:

Phone (___ ___ ___ ___)

Company:

Title:

Address:

City __________________ State __ Zip ____________
Click on the link below to see our full line of Macintosh accessories and software products. 

**Try then buy! Why take a chance? MacStore™**

You pay a low trial fee now, the balance only after you decide it's right. For over four years we've been helping people like you make intelligent buying decisions.

*Ask about our new HyperCatalog with free bonus programs!* We have hundreds of titles available for the Mac. If you don't see what you want, call us!

Please circle 120 on reader service card. Please circle 173 on reader service card.

---

**Minimum order $20.00 • No Surcharge on VISA, MASTERCARD. COD orders add $3.00. UPS Surface shipping add $4.00 per each 100 Disks (First Class US Mail delivery add 9% extra).**

All Prices are subject to change without notice. **VISA** **MasterCard**

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<table>
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<tr>
<th>TAR</th>
<th>PRICE</th>
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</thead>
<tbody>
<tr>
<td>Adobe Type Manger</td>
<td>40.00</td>
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<tr>
<td>Beyond Dark Castle</td>
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<td>Deck Maker Plus</td>
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<td>Business Sense</td>
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<td>Calendar Maker</td>
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A Mark(eted)ed Man

I've seen one type of character over and over to me, epitomizes the typical dog-of-an-employee in a slimeball company. His name is usually something like Benjamin "Buddy." Knudsen (any relationship to any real Benjamin "Buddy," Knudsen is purely coincidental). I had the opportunity to interview him just last week.

Knudsen: OK, pal, I think you're a swell guy too, buddy.

Knudsen: Actually that's my real middle name — my friends call me Ben.

Knudsen: A columnist?! Really? I've always wanted to be a columnist. Who do I talk to at MacUser to write a column?

It was then that I pulled out a sawed-off shotgun that I keep in my Mac Portable case and cut the poor guy in half by emptying two rounds of buckshot into him at close range. Earlier that day, by coincidence, I had purchased a Saturday Night Special from Khruschev's Gun Shop and Massage Parlor and registered it under the name of J. W. Booth. I slipped the cheap pistol into the guy's hand (just like I'm told cops like to do in certain circumstances) and figured that someone else could make the Booth connection. I'd later tell the coppers that it all seemed pretty suspicious to me.

One of the interesting things about writing a widely read column is that I'm often approached by PR people who invite me to lunch or dinner with a new director of marketing for some small software company I've never heard of. The invitation is usually presented as some sort of opportunity for me to bask in the presence of the Great One: Francis X. Schmuck, V.P. of Marketing for Krum-Bum Software.

I'm always amused by these invites because they invariably begin with "Mr. Schmuck can fit you in for a 1:30 appointment on Thursday," I say I can't make it and a progression begins: "There's a 11 A.M. available." "What about noon?" "What time do you have open?" "Look, he has all the day open for you." "The whole week." "He's flying to California just to see you." Maybe I'm too harsh on these guys, but face it — they aren't the people who really make a difference in this industry. It's the engineers and the programmers and the visionaries and just about anyone but the marketing guys who make a difference.

If I do agree to have lunch with the marketing guy, I find that nine out of ten of these meetings include a PR woman (or two) who tells this joker what to say to me. If I ask the most mundane question, I encounter blank stares:

"Maybe Bert Jenkins, the head of programming, can answer that. What do you think, Mr. Schmuck?"

"Yeah, yeah, Bert might know."

"OK, great. But why doesn't Bert get to go to lunch? He can't; he's at the plant doing the real work! That thought kind of wakes me up. In fact, it did! And I found myself still listening to my friend Buddy Knudsen.

...so I first got started in the desktop computer scene in 1986. I guess that makes me something of an old-timer, right? Before I got involved in the computer game, I was an account executive at a big New York ad agency — that's where I got introduced to computers. One of my accounts was a company that made simulated-walnut computer stands. That was back, golly, all the way back in '85. I think. I read a couple of Peter McWilliams' books — you know, the ones about word processing — and pretty soon I was the resident computer expert. So... how do I write a column?"

I reached for the shotgun, before realizing that I've never owned one — damn!
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