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Thumb along, with Guy Kawasaki’s rules of thumb to guide your way through the challenges of being a Mac user. Plus the latest industry news, rumors, updates, reviews of the hottest new products, and more.

**Bobker’s Dozen**

BY STEVEN BOBKER

No-nonsense looks at 13 hot products:

**SAM 2.0**
upgrade it attack on new viruses.

**Remote/WakeUp**
lets you turn your Mac on and off from afar.

**Page Designs Quick!**
provide PDQ! PageMaker templates for newspaper publishing.

**Comic People, Volume 2: Kids Stuff**
prove that comics aren’t just for kids. Electric Dvorak is the best QWERTY alternative around. Cat-Back can catalog and back up your hard disk. AutoBack is good insurance for the lazy. Mac Envelopes Plus is the best envelope and mailing-list program you can buy.

**Take Control of Cholesterol**
helps you improve your health. Igor lets you analyze data visually — without dwarfs and lightning bolts. Nuts & HyperBolts brings HyperCard and grammar together. SecureInit can keep your Mac’s data safe from prying eyes. **Balance of the Planet**
gives you a chance to solve the world’s environmental problems.

**Reviews**

**Radius Pivot:** Radius’ combination portrait and landscape monitor is a turn for the better. .................. 55

**On Location:** Find files and text fragments on a hard disk, CD-ROM disc, or network — fast! ............ 55

**MacProof and RightWriter:** A pair of new electronic Strunk and Whites challenge Correct Grammar, the reigning champion. .................. 59

**TScript:** A no-frills, low-cost PostScript clone that makes non-PostScript printers PostScript-compatible — sort of. .................. 62

**Radius QuickCAD Graphics Engine:** Designed for display-list CAD software, this NuBus card increases the Mac’s redraw speed. 64

**CheckFree:** Electronic bill paying via Mac and modem goes on-line. 68

**Accountant, Inc. Professional:** A new integrated accounting package uses on-screen forms that look like the documents you already use. 75

**Practica Musica and Harmony Grid:** Used together, these two music programs offer an excellent balance of theory and experimentation. 77

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**Power Tools**

**Six PostScript Tricks for Word Processors**
by GREGORY WASSON
If you have access to a PostScript printer and can type a few short routines into your word-processing program, you can have an instant library of special printing effects. ........ 230

**Beating the System**
by MICHAEL SWAIN
Experience a live demo of System 7. Learn how to explore the hidden world on your disks with ResEdit, DiskTop, and the hot new Disk Editor from Norton Utilities for the Mac. And see the amazing answer to the question “How heavy is a megabyte?” .................. 237

**The Expert’s Edge**
by THOM HOGAN
Getting SCSI devices connected properly requires knowledge, patience — and voodoo. Especially as Apple’s instructions don’t always work. Fortunately, Hogan’s instructions do. ........ 243

**Power Programming**
by KURT W. G. MATTHIES
and THOM HOGAN
What application programmers need to know about Mac memory when they’re debugging C code. ........................................ 259

**Tip Sheet**
compiled by GREGORY WASSON
Readers send us their favorite tips, tricks, and undocumented features for Word, the Finder, MultiFinder, PageMaker, WriteNow, Excel, SimCity, and more. .......... 268

**Help Folder**
by BOB LEVITUS
The Doctor is in (Dr. Macintosh, that is), and he’s got the prescriptions for curing ADB-port trauma, foreign-language-dictionary dysfunction, Microsoft Windows anxiety, and other Mac maladies. .................. 283
Bonus Buyer's Guide

MiniFinders
Our directory of more than 500 concise product reviews and ratings is an indispensable reference for helping you find and evaluate every category of Mac hardware and software. ...................... 133

MacUser Labs

Chasing the IIfx: Accelerators
BY WNN L. ROSCH AND THE MACUSER LABS STAFF
MacUser Labs tests 30 ways to shift your Mac into high gear. Apple's new hyperfast flagship, the IIfx, has redefined the peak of Mac performance. But a dozen manufacturers offer ways to improve your Mac's speed, whether you have a humble Plus or the former champion speedster, the Iici. Our comprehensive benchmarks guide you through the labyrinth of options, from accelerator boards to CPU upgrades, to help you find the perfect balance of price and performance that fits your need for speed — and your budget. ... 84

Opinion

Paul Somerson
Windows of opportunity. 25

Robert R. Wiggins
Ten tips for making great presentations. ................. 29

Guy Kawasaki
Here's how the real pros evangelize. ................. 41

John C. Dvorak
Voice recognition and other duds. ................. 328

Letters
Readers GACJ (Gripe About Computer Jargon), reveal the secrets of their true-life file rescue tales, and get all topsy-turvy about the programmer's switch. ................. 11
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About MacUser
Splitting Hairs over Split Seconds
A product-testing lab is more than just a few Macs parked on a workbench. You also need a team of talented technologists to make sense of a sea of benchmark results. For this month’s massive accelerator-comparison test, senior project leader Jeff Pittelkau led a seven-person group through more than a thousand hours of research, product acquisition, testing, and analysis.

The behind-the-scenes effort that went into creating a meaningful test setup was mind-boggling. Testing these lightning-fast accelerator boards required months of meticulous and methodical planning; after all, accurately measuring split-second differences among accelerators is no mean feat. Subtle technical distinctions that could easily be dismissed as nit-picking and hairsplitting can make all the difference in the fast-paced world of accelerators.

In our test setup, every aspect of performance was rigorously controlled. “We had to assemble a set of CPUs with the latest — and identical — ROM version,” says Pittelkau. “Then we had to round up identical hard-disk drives to use in testing. FWB’s generous loan of five matched Pocket-Hammer drives let us run four test stations concurrently and keep a ‘golden’ source disk.”

After the design phase had been locked in, the actual testing and interpretation were even more challenging. Although engineers may grasp the significance of conventional—but abstract — Whetstone and Dhrystone tests, our aim was to develop a test suite directly applicable to normal business applications and to transform the resulting data into graphs that looked simple.

For example, we added disk-intensive tests that revealed accelerators in their worst light. Although this approach may not please accelerator manufacturers, we knew you’d want to see what accelerators do for everyday needs such as file duplication, application launching, and disk-churning accounting tasks (not much) as well as how they perform in CPU-intensive tasks such as spreadsheet recalculations or CAD surface rendering (where they really shine). We also created a unique QuickDraw benchmark to make the raw-performance chart — one more example of our ceaseless efforts to keep bringing you the kind of accurate, head-on comparison data you need to make critical and informed buying decisions.
Four reasons why 1990 will be the year of the workgroup.

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**LETTERS**

**SUM Totaled**

I recently had an interesting experience while trying to reclaim documents on a bad floppy disk. Using SUM II, I went through the normal routine and brought back all the lost documents. However, the one I really wanted — a 25-page document our intern had been working on in Microsoft Word — had some sort of file error that SUM II couldn’t get past.

I called Symantec’s technical support and was told that SUM II had little success in retrieving Word documents! Specifically, if you’re working on a Word document when a problem occurs, you can forget it.

So I gave our intern my condolences. Still, it nagged at me until I went back and found the article in the February ‘90 issue on file recovery (“Hard-Disk- and File-Recovery Methods,” page 240). And there was the answer I needed: “Page-Maker is a great program for recovering damaged MacWrite and Word files.” I tried it, and it worked like a charm.

Thanks for putting out such a great magazine. It’s proved its worth to me many times over, this being only the latest example.

**Connie Mahan**

Washington, DC

**Topsy-Turvy Switch**

Thanks for the wonderful tip in the Help Folder regarding the programmer’s switch (“He’d Rather Fight than Switch,” May ‘90, page 339). But the illustration accompanying the tip is wrong, at least for the Mac SE. You’ve got the switch upside down, and therefore the relative positions of the interrupt and reset switches are reversed. If I tried to install my switch your way, it would break.

Lest you think I’m really bright, though, after I saw your illustration, I immediately popped my switch off (where it had been working fine for two years) and tried to turn it upside down per your drawing. Oh well.

**James E. Trudeau**

Cumberland Center, ME

As you discovered, Apple designed the interrupt switches for the SE series and the II series so that they’re completely incompatible, installed on different sides of the machine, and pointing in different directions. Our illustration shows a Mac II and is correct for that machine plus its cousins the IIX and IIgs (the IIX and IIgs have a completely different switch that’s permanently mounted on the front of the machine). To see how the programmer’s switch should look when correctly installed on an SE, just turn your magazine upside down. — JB

**TORUCJ?** Ben Long of San Francisco, California, is (Tired of Reading Useless Computer Jargon, that is): “I have yet to see an article or ad that uses the term WYSIWYG without defining it. It’s stupid to use an acronym that you feel you have to explain. AAAIDSASBYTIAADWI (As an Acronym It Doesn’t Save Any Space Because You Have to Always Include a Disclaimer with It). Not to mention a guide to pronunciation.” Sorry, Ben, we’d have gotten back to you sooner, but you didn’t include an SASE.

**It’s Works for Him**

Enough is enough! Everybody who writes a review on word processing, flat-file databases, spreadsheet programs, and communications programs mentions Microsoft Works. Everyone always says it’s an OK program but that it’s entry-level. This is simply ludicrous. Programs such as Works have been able to handle my personal and business needs. I hope that the editors of MacUser open their minds to the fact that all programs don’t have to cost a lot to be good.

**Joseph J. Gudac, Jr.**

Uniontown, PA

You’re right. Works is probably the most underappreciated program for the Mac today. We haven’t entirely overlooked it, though—there’s an article coming soon that shows you how to make Works work even better.— JB

**Something for Nothing**

Last September an article appeared in Chicago Computing about a device called the Converter, which is essentially a precision hole punch designed to produce the extra hole in a floppy-disk case that allows the Mac to format and run the disk as a 1.44-megabyte high-density disk. The writer argued that the significant differences between double-density and high-density disks lie in two technical specifications, called signal return and coercivity, and that these factors vary more among manufacturers than between the double-density and high-density disk made by any one manufacturer.

This argument sounds reasonable to me, but I don’t have

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MacUser magazine recently awarded CanOpener “4 1/2 mice” and their famous Editors Choice Award for Best File-Management Utility.

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New ResMENU

In the May issue of MacUser, I noticed that my program ResMENU was mentioned in an article on editing menus ("Creating Resources and Menus," page 331). The article referred to an older version of the program, and I'd like to let your readers know that a new version (fully compatible with ResEdit 1.2) is now available. You can get it by sending a blank formatted disk and return postage to Alan T. Goates, OtherWare, 2055 Parley's Canyon Blvd., Salt Lake City, UT 84109.

Alan T. Goates
Salt Lake City, UT

Revenge of the Nerd

I look to your magazine for advice on what is the best in the Mac world, but I would like to comment on "The Mac IIcs: Fast Times at Apple Computer" by Russell Ito and John Rizzo (May '90, page 114). They stated as a fact, "Only nerds love UNIX." I believe this is their opinion and not a fact. I have met many UNIX users and would not call most of them nerds. If this statement were made at a UNIX convention, I believe you'd find it to be untrue of many of the people there.

Sherri K. Harms
Hays, KS

Sorry, no offense intended. Some of our best friends are nerds. — JB

Off the Critical List

Thank you for publishing "Critical Accounts" by Ken Landis (May '90, page 156). Accounting software is difficult and time-consuming to evaluate. Given the limited time a reviewer has to spend with a program, I fully appreciate the effort and results of Mr. Landis’ hard work.

The synopsis for our products Multi-Ledger, CashLedger, and Payroll, however, noted that we have no transaction journals. In fact, we have always categorized our transactions into five main journals: Disbursements, Receipts, General, Payables, and Sales. In addition to being in the journals, transactions for the entire year are listed in the General Ledger in account-number sequence.

James M. Martin, President
CheckMark Software, Inc.
Fl. Collins, CO

Powerful Support

I am writing to commend the support provided by Power Up! Software. After installing its Address Book Plus, I found the program wouldn’t print on my Ricoh PC Laser 6000/PS. I called Power Up! support. During two conversations, the principal author of the program, Kevin Jones, spent almost two hours leading me through the solution to my problem. It turned out the problem was in my system software and not in the Power Up! program. Two hours of telephone support — Power Up! called me — for a program that cost less than $50 is no way to make money. But it sure builds good will!!

Edward Ashworth
Lafayette, LA

Plenum of Nothin’

Your “Star Wars” article on networking (May ’90, page 186) was very useful, but the author is mistaken regarding plenum wire. Plenum is not “a special coating that doesn’t produce poisonous gases when burned.” The air space above a hung ceiling is a “plenum” when it’s used as the return air duct for a heating or air-conditioning system. Conditioned air flows through ducts in the ceiling and out into the room, and the “return” air goes back through the plenum (saving the cost of separate return ducts).

Fire officials have discovered that the air flow in plenums encourages the spread of fire along anything in the plenum that’s flammable, including normal PVC wire insulation. “Plenum cable” is shorthand for “plenum-rated cable,” and it signifies that the wire has passed a special test for fire resistance, flame spread, and low smoke generation. The insulation on plenum-rated wire is made of material such as Teflon or Halar, and it usually costs two to ten times more than normal cable. However, the installed cost of plenum-rated cable is usually lower than the alternative, which is to put cheap cable into metal conduit wherever it passes through a plenum.

The author is correct — always check building codes before installing cabling. And check the ceiling too — you may have a ducted return system, in which case the ceiling is not a plenum and it may be legal to use less-expensive cable.

David Lerner
New York, NY

Time to wipe the plenum off our faces. — HB

Adams’ Apple

“From the Ground Up” by Douglas Adams (May ’90, page 148) was absolutely on the mark in showing how human
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LETTERS

your magazine is just like the Mac. I love Adams’ books, and it’s my dearest hope that he continues writing on any Macintosh. Incidentally, the number 42 is approximately 10.5 million years old.

Mark J. Sieler
Java, SD

Windows Watchers

“Windows Won’t Kill the Mac” (May ‘90, page 315) by Thom Hogan was interesting. I agree with the premise of the article, but with all its faults, Windows for Mac is a real help to me. I have some Macintosh functionality on that otherwise-useless mass of silicon and metal on my desk at work. I am looking forward to getting the capabilities of Word for Windows on my Mac at home, where those abilities will be faster, more stable, and easier to use.

Unfortunately, Word for Windows does possibly the worst thing it could do for the Mac. It makes IBM users think they can do everything they can do on a Mac on a PC. That makes it even harder to convince someone to switch to the Macintosh. I’ll take a Mac Plus over the highest-end PC any day.

Tim Cimbera
Columbia Heights, MN

Mac users are thoroughly spoiled, so perhaps it isn’t surprising that Thom Hogan’s anti-PC bias showed in “Windows Won’t Kill the Mac.” He could have at least seemed more objective and at the same time have had the comparison come out even more in favor of the Mac implementation of Word.

I too use Mac Word and Word for Windows. Unlike Thom, I find WinWord slower in all regards on my 12-megahertz 286 than Mac Word on the Macintosh II at the office. Some of the dialog boxes seem to take an eternity to act and clear, and often the pointer icon is there for seconds before the hourglass appears, letting me know that I am supposed to sit and fidget. I’ve read comments on bulletin-board services that suggest that my experience is the norm, even with souped-up 386s.

Unless Microsoft does the impossible with Windows 3.0, PC devotees will think they have caught up with those lucky guys who could afford Macs but Mac users will know better and the Mac advantage will be secure for a few more years.

Me? I’ll stick to my clone at home until something brings Apple pricing to where it ought to be.

Colin Taylor
Mansfield, TX

Bigger Isn’t Better

Robert Wiggins put an insulting twist on an excellent piece of advice (“Creative Cost Cutting,” April ‘90, page 27). His suggestion to shop by mail order is right on target. However, his recommendation of “the majors, the ones with the multipage ads” while relegating the “smaller outfits” to use by only “the brave” is both ill-conceived and a slap in the face to your small-space advertisers.

MacStore has been in the pages of MacUser since the birth of your magazine. Over the years, we have watched so-called multiple-page majors come and go. Even today, with the burgeoning catalog clones, few match our continuity or attempt to duplicate our services.

Quality in a business is instilled by its people, not by the gloss of its advertising. Big does not mean better.

Jim Tucker, Manager of Marketing
MacStore
New Braunfels, TX

Haranguing on the Telephone

This is a warning to readers who may have succumbed to Apple’s Christmas advertising of rebates and extended credit. Apple Credit has apparently sold its account list to a bunch of telemarketers. At least, I got a call from an outfit selling “auto advantage” (a discount auto-service plan) that claimed to be calling because of my account with Apple Credit. I expected to get onto some more mailing lists when I bought a Mac but not onto a phone list. I object strenuously to telemarketers. I have a phone for my convenience, not theirs.

I would like to ask any readers of MacUser who have been getting such calls to protest to both Apple and Apple Credit. Maybe if we get together, we can put a stop to this invasion of privacy.

David Dean
San Diego, CA

CD-ROM Ratings

We are responding to the CD-ROM article in the March ’90 MacUser (“Most Valuable Players,” page 150). Here at EDUCORP, a pioneer in the CD-ROM industry, we use the Apple, Denon, and Toshiba CD-ROM drives.

A two-and-a-half-mouse rating for the
SuperLaserSpool™ makes “Waiting for LaserWriter™” a thing of the past, and lets everyone get back to work immediately. Because it takes care of printing in the background, while you take care of business in the foreground.

SuperLaserSpool comes complete with the LaserQueue™ desk accessory for efficient document handling—to prioritize or redirect documents to other printers. It includes document preview, and notifies users when print jobs are complete. Plus SuperLaserSpool works with just about any printer your Mac can drive. It also supports virtually all Macintosh® applications, including PageMaker.*

No wonder it’s the single most popular spooling utility available for Macintosh.

So go to your nearest SuperMac dealer and pick up a copy of SuperLaserSpool. Or an economical five-pack. Then get back to work. Immediately.
LETTERS

Running Boards
Who needs accelerator boards? Mac Plus owners, that’s who. Please run some of the boards through your MacUser Labs.

Ricardo González
Mayaguez, Puerto Rico

We’re ahead of you on this one. Check out “Chasing the Hype: Accelerators” this month to find out whether the accelerator option can compete with Apple’s current upgrade programs. — JB

Secret Keys
Almost every month, an article or a letter discusses “keyboard secrets”—obscure but helpful Finder commands, most of which are nowhere to be found in the instructions that come with a Mac. Although I appreciate the hints, it angers me that it’s necessary to learn them in this way.

Why must Apple keep such things secret? Doesn’t the purchaser of the product have the right to this information in the manuals? Is there anywhere users can get all this information in one place, preferably without having to pay (again) for it?

Gordon Paine
Fullerton, CA

The Grass Is Bluer . . .
Although I’m a dyed-blue-in-the-wool IBM microcomputer user, I also am fortunate enough to have access to Macs and MacUser magazine. Allow me to cheer the Mac. I like it. However, Mac fanatics are nuts for putting up with the extortionist prices charged by Mac suppliers. Prices for 20-megabyte hard-disk drives were quoted as ranging from a “low” of $399 to a high of $899!

Even under the assumption that I would tolerate a minuscule, creeping, 20-megabyte hard-disk drive, I would not expect to pay more than $250 for the same capacity and performance in the IBM marketplace. Sincerely, and hurting for you . . .

Mark Wheeler
New York, NY

. . . on the Other Side
I’m a PChacker who’s been stuck with a Mac at work. Actually, I don’t mind too much. If Mac folk weren’t so haughty (bordering on arrogant), it would be quite a pleasant platform to work on! (Actually, I like the long filenames better than the bit-mapped interface or anything else!) Naturally, I’m turning to MacUser for

Denon DRD-253 CD-ROM drive is a great injustice. The Denon’s access time is about the same as that of the Apple drive. Another SCSI port can be installed for about the same price as a terminator, although most users find internal termination to be more convenient.

The size of the Denon drive allows you to put your Mac or your Mac II monitor on top of the drive so you can free up desk space. Denon also has a sleep mode that shuts the laser down when the drive is not being used. This feature helps protect the drive from wear and tear.

The power button on the Denon is located conveniently on the front of the drive, so users do not have to reach around to the back to turn the power off. Finally, Denon offers a toll-free technical-support line.

Suzi Reavardi, Manager
EDUCORP
Solana Beach, CA

Sampling Advice
“Sound Advice” (May ’90, page 284) stated that “down-sampling is when you take a sample recorded at one frequency and use SoundEdit’s Mixer option to convert it to a lower frequency.” This is true, but you didn’t mention that the same effect can be accomplished with copying and pasting, a much faster and more natural method.

You also left out that you can “up-sample” by using either method, although in normal circumstances you wouldn’t want to. An up-sampled sound requires more disk space, without a corresponding increase in sound quality. Nevertheless, in some cases it might be useful. For instance, if you wanted to use a sound sampled at 11K in Crystal Quest, you would have to up-sample it to 22K to make it play at the right pitch.

Jason Townsend
San Antonio, TX

Abstract Addition
Thank you for publishing the short review of MacInfo in Bobker’s Dozen (June ’90, page 46). We would like to make one important correction: MacInfo does include a short abstract for every article it indexes. In fact, the current version of MacInfo has 4,460 abstracts from MacUser, MacWeek, and other Mac publications.

Emmanuel Rosen
Niles and Associates, Inc.
Berkeley, CA

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18 August 1990 MacUser
EYESORE Vs. EYE PROTECTION

As today's monitors get bigger and brighter, anti-glare filters become less of an option and more of a necessity.

The right filter can combat eye fatigue, help eliminate headaches, even reduce overall body stress.

Yet, the irony is that something so good for your eyes can be such an eyesore.

In fact, most filters look like they belong to someone else's system.

The fit is sloppy. The colors don't match. The materials are different.

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Kensington has custom designed screens for the Mac, Mac Plus, Mac SE, Apple IIgs, as well as for the entire Mac II family of large screen monitors.

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Several months ago, Apple unveils its Macintosh IIx, a 40-megahertz screamer so powerful that it eases dedicated graphics workstations for breakfast. Like all other Macs, it sports an attractive, truly intuitive interface and a high degree ofsmarts.

Like all other Macs, it can handle multitasking and memoryglutinous software without a hitch, and it can run the nearly5,000 applications that are on the market. Few journalists even lifted an eyebrow.

Then a week before Memorial Day, Microsoft trots out itsamplified screeching hype machinery. Suddenly everyone forgets that this company was responsible for inflicting DOS

Windows Watchers

By Paul Somersron

Chairman Bill Gates plunks down ten million bucks — onehundredth of his bankroll — on a bicoastal potlatch designed to turn Windows 3.0 (or Win3) into a household word. And the media laps it up. You know those polls reporting that a fairly significant percentage of the American public can’t even name the current U.S. president? Well, even those geeks have heard about Win3.

The response to this hoopla was certainly predictable. Headlines scream that Apple is dead meat. Breathless DOS wags actually link it to the Second Coming. One benighted DOS analyst even announces that he’s lowering his Apple stock recommendation.

So what does this epochal new Win3 offer? The ability to use more than 640K of memory. Proportionally spaced fonts. Icons and windows. Multitasking. Network support. Patterenedonscreen backgrounds. A button-driven hypertext toolbox with its own scripting language. Hmmm...Hold on a second...Haven’t we seen all this somewhere before? Maybe on every recent Macintosh?

Never mind that Win3 can’t really run very well on anything except pricey new ‘386 systems loaded with RAM and top-ofthe-line monitors. Or that there aren’t many applications yet available that actually take advantage of these new abilities. Or that it is really just one more thing slapped on top of DOS. Or that one reviewer lavished praise on it in the local Silicon Valley newspaper by gushing, “Windows no longer crashes as often...”

A week after the media frenzy, exiled Apple exec Jean-LouisGassée put it all in perspective. Speaking on-line, at the invitationof MacUser columnist Guy Kawasaki, Gassée used a car metaphor to compare Macs with DOS machines clanking along withWindows: “What is clear is that there isn’t going to be a difference such as text screens vs. bit maps, menus, windows, mouse, anymore. Now that all cars have four wheels, the battle will be on quality and fits and finishes.”

Exactly. Which is why Americans have shown that they prefer Hondas and BMWs over Detroit rattletrap, Macs are smooth and seamless; on even the best Win3 systems, the seams really show. Input and output are still vastly better with Macs — as are overall system functions and housekeeping chores. And built-in networking. And a huge inventory of time-tested applications that all operate with the same basic commands. And if the Cupertino skunkworks stays on track, the next two years of Mac advances should make Win3 look like one of those pathetic tin cars Russians wait years to buy.

We asked some of MacUser’s in-house industry watchers for their opinions on the recent events. Here’s their lowdown:

Associate editor Russell Ito thinks that “Windows 3.0 ultimately may hurt IBM’s sales even more than it hurts Apple’s. Those who find Windows attractive may choose to go with the Mac simply on the basis of Apple’s longer — and deeper — commitment to a graphical user interface.” Similarly, technical editor John Rizzo concedes that “Win3 may be improved, but it’s still only an application sitting on top of DOS, unlike the Mac’s Finder, which is integrated with both the operating systems and applications.”

Nancy Groth, MacUser’s managing editor, agrees but wonders whether Apple can get that message across to potential customers. “The benefits of the Mac — even with the enhancements coming under System 7 — are subtle. One of the Mac’s strongest points — consistency across both time and applications — is not something users see in a five-minute demo. Win3, on the otherhand, is clearly a more professional-looking product than Windows 2. Ultimately, though, Win3 will increase Apple’s market share by further legitimizing graphical user interfaces.”

Associate editor Bruce Mewhinney points out some of the less cited advantages of the Mac, ones that are Macintoshes are smooth and seamless; on even the best Win3 systems, the seams really show.
unaffected by the release of Win3. “Even more important than the Mac’s speed and consistency advantages is the ease with which the average user can install, reconfigure, and troubleshoot the computer’s operating software, data, and application programs. Mac users can also enjoy a continuous software-upgrade path from the entry-level Mac Plus right up to the Mac IIx.”

Senior editor Lee Thé notes, however, that “Win3 doesn’t have to be better than the Mac to succeed; it just has to work reliably and give PC users a marked improvement over plain-Jane DOS applications. And it looks as though Win3 does those things. So it behooves Apple and independent Mac product developers to get busy filling in the gaps.”

Mewhinney replies that the Cupertino crowd is certainly keeping busy. “While IBM, Microsoft, and the clones are busy copying the Mac’s windows and mice, Apple has been developing HyperCard, System 7, A/UX, Ethernet links, ISDN, desktop video, CD-ROM, and more.”

We also posted the Win3 question on Zmac, our new on-line service. First, what do users like about Win3? Louise Kohl (70414,204) chimed in with “It has a great solitaire game . . . .” David Smith (76424,3254) countered that “Windows 3.0 is important not because of what it can do but what the stuffed shirts and uninformed press think it will be able to do.”

Meanwhile, Raymond E. Feist (76657,2776) says that peaceful coexistence, if not full-fledged détente, is possible. “Windows 3.0 is a nice addition to the MS-DOS world. It will make some MS-DOS users very happy. It won’t take Mac buyers away from Apple, because no matter how much you squint your eyes to make it all soft, warm, and blurry, no matter how hard you wish, no matter how much you want it to be as good an interface as a Mac . . . it’s just not.”

Vernon Keenan (76535,1612) think the question is moot; he believes that “Most DOS users are quite happy with their character-based WordPerfect and Lotus 1-2-3” and won’t get around to upgrading to Win3 for a while.

But not everybody believes Apple can survive the Win3 blitz. Al Vinei (76216,466) thinks this could be the last straw, citing various Apple problems besides the new competition from Win3 — everything from MultiFinder crashes to paying more than his PC colleagues pay for virtually identical peripherals — and thinks that “Windows 3.0’s introduction date of May 22, 1990, will go down in history as ‘The Day The Mac Died.’”

What do you think? Drop me a note or log on to Zmac, and let me know if you think Win3 is the Windows of opportunity or the Windows of vulnerability.

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General Limitations

Good presentations are a lot rarer than good presentation programs. MORE 3.0 and Persuasion 2.0 continue to push the envelope of presentation technology, while PowerPoint, Visual Business No. 5, and the rest of the pack offer plenty of alternatives. The Mac has always been a favorite machine for preparing presentations — even in the days of MacWrite and MacPaint — and these new presentation specialists make it even easier to produce beautiful results. The hardware has kept pace too, with several options for output, ranging from on-screen display to transparencies to slides (in full color or black-and-white). There’s a hardware and software combination for almost every budget.

But no hardware or software can give you common sense and good taste. No matter what medium or program you use to create your presentation, you are ultimately responsible for the look and feel of the finished product. To help you in your quest for the perfect presentation, here are ten ROT’s (rules of thumb) that apply to all types of presentations. Although these suggestions are based on practical experience, they aren’t cast in stone. These guidelines are worth following unless you have a compelling reason not to or have given enough presentations that you’re sure of what you’re doing.

Keep It Simple

A common error many people just starting out in presentations make is trying to squeeze too much information onto a slide. Even those with experience sometimes get carried away and make a slide too information-dense. The first few ROTs should keep you safely out of this pitfall.

ROT #1: Write net. Use bullets and short phrases rather than sentences. Bullets are outline placeholders on which you build your presentation. Use no more than five bullets per slide and no more than five words per bullet (preferably short words). Remember, you can use notes to jog your memory.

ROT #2: Use graphics wisely. Graphs should be as simple as possible with no obfuscating text. There should be no more than two graphs per slide.

ROT #3: Simplicity is key. If you’re working in color, use only a few coordinated colors. Whether you’re using black-and-white or color, keep the number of fonts, styles, and sizes strictly limited. Three sizes of the same font and style are almost too many.

Present, Don’t Read

Another mistake is to read the material either off the slides or from notes. There’s nothing more boring — and more insulting to a viewer’s intelligence — than enduring someone reading his flustered, or lose your train of thought, have notes to help you get back on track. Just remember ROT #4, and stop using your notes as soon as possible.

ROT #4: Keep it short. Five minutes per slide should be an absolute maximum, and two minutes is better. If you spend more than five minutes on a slide, you’re going to lose your audience. If you have that much to say, you need another slide.

ROT #7: Maintain suspense. If you make handouts of your slides, don’t pass them out until after the presentation. If the audience members have handouts during your presentation, they’ll skip ahead and anticipate you instead of keeping pace with you. If you know the audience will need to take notes, distribute the handouts, but be aware that they’ll read ahead, and plan your presentation accordingly.

Effective Yet Honest

Every day in hundreds of businesses across the country, honest presenters lie to their bosses, employees, and customers. They don’t mean to, but in an attempt to add some sizzle to their presentations, they make their charts and graphs misleading and even flat wrong — which is worse. Here’s a true story: A Texas oil company used a chart with drawings of two barrels of oil, one of which was supposed to be twice

Presentation Quality

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the size of the other. As is typical of charts such as this, the second barrel was drawn twice as tall as the first one, but it had the same proportions. This made the second barrel actually occupy four times the area on the chart. And if the drawing had been done with 3-D perspective, the second barrel would have had eight times the volume of the first barrel.

How can you avoid such unintended distortions? If you exercise a little care and follow two more ROTs, you can keep your graphs honest.

ROT #8: Keep it flat. Don’t introduce an extra dimension unless it illustrates a point. There’s currently a trend toward 3-D graphs that represent only two dimensions’ worth of variables. A little shading or a drop shadow is one thing, but full 3-D should be used when you really have three variables.

ROT #9: Scale properly. When using pictographs (such as the oil barrels), use numbers or multiple items of the same size to make comparisons, rather than size alone. In our example, if the oilman’s chart had shown two stacked barrels instead of a larger one, the concept of “twice as much” would have been clear—with no chance of misinterpretation.

There’s a modern classic on this subject called The Visual Display of Quantitative Information by Edward R. Tufte ($36, available from Graphics Press, Box 430, Cheshire, CT 06410). If you plan to do a lot of presentations, you should get this book and study it. Tufte’s long-awaited sequel, Envisioning Information ($48, also from Graphics Press), is hot off the presses and also contains a wealth of information. If you follow all Tufte’s recommendations, you won’t be guilty of distorting information in your charts and graphs.

There’s one last ROT you need to remember when preparing presentations:

ROT #10: Don’t hide behind your presentation. Don’t let technology and/or art obscure your message. When you’re using these state-of-the-art presentation programs, it’s easy to be seduced by their nifty features. MORE’s background gradients, Persuasion’s graphic builds, and Visual Business’ 3-D charting, for example, are all easy to overdo, and the result is a presentation in which style smothers substance.
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- Generic Software
- Generic CADD Level I .... 83.
- Graphisoft
- Blueprint ... 216.
- MicroCAD-3.0 CALL
- Innovative Data Design
- Dreams ... 318.
- MacDraft 1.2b ... 168.
- Strata
- StrataVision 3D ... 374.
- VersaCad
- VersaCad Drafter ... 395.

**ENTERTAINMENT**

- Access Software
- World Class Leader Board ... 26.
- Accolade
- 4th & Inches ... 25.
- FastBreak ... 27.
- Grand Prix Circuit ... 27.
- Hardball ... 25.
- Mean 18 ... 25.
- Jack Nicklaus' Greatest 18 ... 35.
- Activision
- Cosmic Osmo ... 39.
- Cosmic Osmo CD ROM ... CALL
- Manhole ... 27.
- Manhole CD ROM ... 33.
- Addison Wesley
- The Hobbit ... 22.
- Fellowship of The Ring ... 22.
- The Shadows of Mortor ... 26.
- The Crack of Doom ... 26.
- Broderbund
- Ancient Art of War ... 26.
- Ancient Art of War at Sea ... 25.
- Playmaker Football ... 26.
- Shuttlecock Cafe ... 22.
- SimCity ... 1.1 ... 28.
- SimCity Color ... 46.
- Star Wars ... 23.
- The Playroom ... 27.
- Where In the World is Carmen Sandiego? ... 28.
- Where In Europe ... 28.
- Where In The U.S.A. ... 28.
- Bullseye Software
- Ferrari Grand Prix ... 31.
- P-51 Mustang Flight Sim ... 30.
- Casina
- Voyager 1.2 ... 66.
- Casady & Greene
- Crystal Quest 2.2 ... 24.
- cwriteEditor ... 38.
- Centron
- Casino Master B & W ... 44.
- Casino Master Color ... 49.
- Data East
- Super HangOn ... 26.
- Electronic Arts
- Band's Tale ... 30.
- Chessmaster 2100 ... 31.
- Chuck Yeager's A.F.T ... 30.
- Might & Magic II ... 38.
- Panzer Battles ... 28.
- Patton vs Rammel ... 14.
- Starflight ... 39.
- Infocom
- Arthur: Quest for Excalibur ... 28.
- Quarterstaff ... 28.
- Inline Design
- Bomber (w/headphones) ... 25.
- Lucasfilm
- Pipe Dream ... 16.

**MEDICAL**

- Medigenic
- Shanghai ... 18.
- Micro League Sports
- Micro League Baseball II ... 37.
- MicroProse
- Pirates ... 34.
- Microsoft
- Flight Simulator 1.02 ... 31.
- Miles Computing
- Fool's Errand ... 31.
- Harrier Strike Mission II ... 31.
- Puzzle Gallery ... 25.
- Mindscape
- Balance of Power 1990 ... 28.
- Colony ... 28.
- Crossword Magic ... 28.
- Dog's Life II ... 28.
- Guantlet ... 11.
- Shadowgate ... 28.
- Trust & Betrayal ... 29.
- Uninvited ... 29.
- Origin Systems
- Space Rogue ... 30.
- Postcard International
- Citadel ... 26.
- Citadel Secrets ... CALL
- Premier Technology
- NetTrek-The New Version ... 33.
- Strategic Conquest 2.0 ... 33.
- Shadow
- Leprechaun ... 26.
- Silicon Beach Software
- Apache Strike 1.1 ... 13.
- Beyond Dark Castle ... 31.
- Dark Castle ... 31.
- Software Toolworks
- Cribbage King/Gin King ... 37.
- Hunt for Red October ... 20.
- Life & Death ... 31.
- Sphere
- Falcon 2.2 ... 29.
- Gato 1.4 ... 29.
- PT-109 ... 25.
- Solitaire Royale ... 19.
- Tetris ... 19.
- Wiffle ... 20.
- Spinaker
- Sargent IV ... 27.
- Strategic Simulations, Inc.
- ADS&D: Pool of Radiance ... 32.
- Strategic Studies Group
- American Civil War Vol 2 ... 28.
- Halls of Montezuma ... 28.
- Three Sixty
- Sands of Fire ... 34.
- Warlock ... 28.
- Toyggo, Inc.
- Nemesis Go Master ... 48.
- Nemesis Josefik Tutor ... 29.
- Visionary Software
- Synchronicity ... 38.
- XDR Corporation
- Lunar Rescue ... 32.
- Mac Recreatholic ... 32.
- MacCourses ... 32.
- MacGolf ... 33.
- MacGolf Classic ... 51.
- NFL Challenge ... 53.
- Pro Challenge ... 26.
- Road Racer ... 37.
- TaskMaker ... 26.

**EDUCATION**

- Addison Wesley
- Inside Macintosh, Vol. 1 ... 19.
- Inside Macintosh, Vol. 2 ... 19.
- Inside Macintosh, Vol. 3 ... 17.
- Inside Macintosh, Vol. 4 ... 20.
- Inside Macintosh, Vol. 5 ... 22.
- Inside Macintosh, X-Ref ... 8.
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- DaynaFile-Dual Drives: 360K/525M/1G: 270
- 360K/525/1G/4.35M: 748
- DGS Mounter: 54

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- Multimedia Pack CALL
- Multimedia Pack CD CALL
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- 30 User Pack: 128
- Timbuktu: Remote: 120
- Remote Access Pack: 948
- Remote Wakeup Pack CALL
- Portable Pack CALL
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- Star Controller EN: 1,590
- Star Controller EN: 10 Pack: 1,373
- Traffic Watch: 124
- Repeater: 312
- PhoneNet Check Net: 53
- PhoneNet/FaxTalk Adapter: 80
- DB-9: 31
- DIN-4: 31
- DIN-10 (1 Pack): 198

**Insigia Solutions**
- SoftPC: 244
- SoftPC Porte: 244
- SoftPC ESAIT: 144

**Microcom Software**
- Carbon Copy Mac: 118
- Carbon Copy Mac-TwinPack: 179

**Micfoosh**
- Microsoft Mail 2.0 CALL
- Microsoft Mail 2.0 CALL
- 1 Workstation: 83
- 20 Workstations: 968

**TOPS**
- TOPS DOS Ver 2.1: 117
- TOPS 3.0 Network Mac: 186
- TOPS 3.0 Network Mac 3.5: 164
- TOPS 3.0 Network Mac 3.5: 354
- FlashCard: DOS (DOS) CALL
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- TOPS Telecommuter: 23
- TOPS NetFlex 2.0: 118
- InBox 3.0 DOS Admin: 214
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NuVotch II .............................. 271
NuVotch SC ............................. 309
Turbo Bridge ........................... 318
Turbo Net - DB-9 ....................... 318
Turbo Net - DIN-8 ...................... 28
Turbo Net ST - DB-9 ................... 261
Turbo Net ST - DIN-8 .................. 231
Shiva Corporation
EmerGate ............................... 1,264
NetBridge .............................. 338
NetSend ............................... 274
TeleBridge ............................. 338

Nuvotech
Nuvotech II .............................. 271
Nuvotech SC ............................. 309
Turbo Bridge ........................... 318
Turbo Net - DB-9 ....................... 318
Turbo Net - DIN-8 ...................... 28
Turbo Net ST - DB-9 ................... 261
Turbo Net ST - DIN-8 .................. 231
Kraft
Kraft QuickStick (512K & Plus) ....... 39
QuickStick ADB .......................... 49

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Fujisoft
Fujisoft 650k Drive (Plat.) ............. 139
OnTrack Software
OnTrack ................................. 28
PLI (Peripheral Land., Inc.)
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TurboFloppy 1.4 ...................... 358
50mb turbo ....................... 358
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Relational Objects ................... 154
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The Resume Kit ........................ 35
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StratiVision 3D ......................... 374
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Abaron
Pro Point ADB (SE & II) .......... 78
Advanced Gravis
MouseStick ......................... 64
MouseStick (ADB) ................. 84
Alfa
Feix ............................... 125

ACCESSORIES
American Power Conversion
UPS 110SE ......................... 208
Avery Labels
Diskskate
Imsagewriter 3/1/2 (252) .... 12
Laser 3/1/2 (630) .............. 28
Address
Clear 3/1/2 x15/16 (500) .... 11
Transparencies
8 1/2 x11/8 (500) ........ 22
Byte Brothers
Care-Free Security Kits
for Mac 512K & Plus .......... 26
for Mac SE, II & NcX2 .... 26

Datadesk
Hyper Dailer .......................... 29
Mac 101 Keyboard .................. 129
Switchboard ......................... 175
Kensington Microwave
Turbo Mouse ......................... 108
Turbo Mouse ADB .................. 108
Keytronics Keyboard
Mac Pro KB-105 ADB .......... 125
Kraft
QuickStick (512K & Plus) ...... 39
QuickStick ADB ..................... 49
Krusk/A-ADB/Transmission
Cordless 4 Button Cursor .... 64
8 1/2 x11 ......................... 254
12" x11 ............................ 304
12" x17 ............................ 624

Legitech
Scan Man 32 ......................... 336
Microtouch
UnMouse ............................. 188
Mobius
Fanny Mac ............................ 55
MSC Technologies
A Mouse (512k & Plus) ........ 58
A Mouse ADB ......................... 75
NEC CD ROM Drive
Battery Pack ........................ 58
Interface CD-R 35 ................. 480
Olivegrid
Solve It Personal 2.1 ....... 134
Solve It OCR 2.1 ................. 245
Orange Micro
Graphic Chip/Canson/GS ... 78
Graphic LS .......................... 68
Graphic Mac IX ..................... 128
Graphic Spooler .................... 46
Studlonics, Inc.
Colorset 1.5 ......................... 228
Summaragicc Billed Plus
12" x12 Tablet - ADB ....... 315
The Complete PC
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Thunderware
Lightning Scan ...................... 368
ThunderScan 5 ...................... 184

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Polarizing Filter .........................
Superbase ............................ 29
PowerBacker 360 ................... 287
PowerBacker 450 ................... 337
PowerBacker 500 ................... 397
PowerBacker 800 ................. 746
PowerBacker 1200 .................. 946
Mac Packs - Linebacker
Navy Wine or Gray ................. 45
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Back when I worked for Apple, my job title was software evangelist. Full of fervor and zeal, I would meet with developers, show them a Macintosh prototype, and convince them to develop Macintosh software. Based on this experience, I thought I knew a lot about evangelism.

I learned something recently: There are a lot of people who know a lot more about evangelism than I do. This revelation occurred when I attended the Billy Graham School of Evangelism in Albany, New York, last April. This was a four-day course in evangelism for pastors and ministers. (If you’re wondering why I went, it’s because I’m writing a book about evangelism.) Let me share this experience with you.

Not the Center of the Universe

I arrived in Albany after attending the 1990 National Apple User Group Conference. It was quite a transition to go from a conference where people talked only about Macintosh to a conference where people had barely heard of it. For a while, I was in a state of shock. My wife attributes this to the extensive ego damage that occurred because no one at the conference knew who I was.

One thing I could immediately relate to was the quantity of books for sale near the registration desk. Arthur Naiman of Macintosh Bible fame would die and go to heaven if he knew how many books were sold over the course of four days. I know I did.

Fish Out of Water

I was clearly a fish out of water at the conference. Attending was not the equivalent of a Macintosh owner going to Macworld Expo. It was the equivalent of a humble Macintosh owner going to a hackers-only event, such as the Apple Developer’s Conference. Ministers and pastors are different from you and me. For example, when we sang hymns, everyone knew them by heart. Except me. I just hummed softly a lot.

For example, when the instructor said, “Let’s read X passage together,” everyone opened their Bibles directly to the passage. It’s called DBA (Direct Bible Access). I had to develop another technique: “Hmm, he’s about two-thirds of the way into his Bible. I’ll start looking from about two-thirds through mine.” After a while, I just pretended to be taking copious notes.

For example, I learned that it’s perfectly OK to shout out “Praise the Lord” or “Amen” in the middle of a presentation. One woman shouted “Praise the Lord” every two minutes. I thought she was rude, but I guess I was wrong, because she was publicly introduced on the last day. If she were a member of BMUG, she would be the one at the meetings shouting “Praise the Macintosh.”

Conference Camaraderie

The attendees showed an incredible level of camaraderie and friendliness — much more than those at Macworld Expo or Apple Developer’s Conference. I made two buddies on the first day — two guys from New Hampshire called Hank and Dick. Hank was a retiree who wanted to join a pastoral staff. Dick refurbished submarines during the week and was a pastor on weekends.

After we got into his 1970 Cadillac, Dick said, “Don’t let the car fool you; we’re as poor as Job.” As we were driving around looking for the conference hotel, Dick said to Hank and me, “I’ll drive, you navigate, and this guy will pray.” We did find the place in a very short time.

On Believing

If you think that Macintosh owners believe, ministers and pastors believe. And they don’t complain — about bugs in the world or about when the second coming will ship. They also believe in prayer. If they prayed just once for System 7, it would ship, bug-free, before the Boston Macworld Expo (the August 1990 one, that is).

Our industry could learn a lot by going to a conference such as this. Admittedly, you have to get past the singing, the praying, the holding hands, and the arm waving and approach it with an open mind. Once you do, however,
there is more solid marketing information than at the conferences I usually attend. For example, one session explained how to make good speeches. It covered background preparation, the qualities of an effective message, delivery of the message, and how to invite response.

We could also learn a lot about how to put on a conference. Every session started and ended on time. Each attendee was given a syllabus that contained the outlines of every presentation. (Have you ever gotten a syllabus for a Macworld Expo or an Apple Developer’s Conference presentation?) And to top it all off, the four-day conference cost $25 and you could get a scholarship if you couldn’t afford it. Twenty-five bucks barely gets you a hot dog and a Coke at Macworld Expo.

**Outstanding Speakers**

The speakers at the conference were outstanding. Apple should hire them to introduce its new computers. Every opening joke worked. Every speech was peppered with great stories, analogies, and metaphors. The speakers “built” the presentations: “There are four key points to disciplining. Point 1 is... Point 2 is... Point 3 is... Point 4 is... ” Frankly, the worst speaker at the conference (and I would be hard-pressed to pick a bad speaker) was about three times better than the best speaker in the computer business.

I tried to illustrate this to Dick one night during dinner at Denny’s: “The plenary-session speaker was a much better speaker than John Sculley.” His response was, “Who’s John Sculley?” I didn’t bother comparing the speaker to Jean-Louis: “Well, you see, there was this French guy with a diamond earring who was president of one-fourth of Apple until he told The Wall Street Journal that he was going to resign because Apple had brought in this German guy who also used to be in charge of one-fourth of Apple...”

All in all, I’m glad I went. I learned a lot about evangelism. I learned a lot about Christianity. And I met some very nice people. I’m going to see them again when I’m in Boston for Macworld Expo. Maybe, I’ll bring them to the Expo and show them the Macintosh way. A good evangelist never rests.
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EMAC has found a way to prevent unnecessary Macintosh hard drive fatalities with SCSI Sentry, an engineering breakthrough in disk drive reliability. It protects your disk drive from damaging shorts that can trap data inside your hard disk. Which makes any drive with the SCSI Sentry substantially more reliable.

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Anthropologists tell us that it was the opposable thumb that gave mankind the power to be its best. So this month Guy Kawasaki is all thumbs — rules of thumb, that is. If you want megabytes of benchmarks and data specs, skip ahead to this month's MacUser Labs reports. But in case you just want some simple and unopposable rules of thumb, here are a few time-tested axioms to live by.

By Guy Kawasaki

Innovation: The level of innovation of a company’s products is inversely related to the number of people the company brings to Macworld Expo.

Macintosh failures: A Macintosh will break down either when you first open the box — or on the 366th day after.

Microsoft Word: Every dialog box in Microsoft Word is one dialog box further than you think it should be.

Electronic bulletin boards #1: Each year a person is married adds one hour of connect time per month.

Electronic bulletin boards #2: Each bulletin-board service that a married person belongs to adds 5 percent to their probability of divorce.

Optimal amount of RAM: The optimal amount of RAM you need, in megabytes, is equal to the number of times you go to the bathroom during the day.

Optimal size of hard disk: The optimal size of a hard disk, in megabytes, is equal to twice a person’s annual salary, in dollars. (Subtract 1,000,000 for Apple executives.)
Software for a new computer #1: It takes three years for a new computer to get a great collection of software.

Software for a new computer #2: It takes the market another year to realize it.

Software for a new computer #3: By the time the market realizes it, another computer is introduced.

The Macintosh love affair #1: During the first year, you love your Macintosh.

The Macintosh love affair #2: During the second year, you hate it.

The Macintosh love affair #3: During the third year, you understand it.

Vaporware: The length of time a product is vaporware varies inversely to the amount of Jolt that the programmers drink.

Bugs: The number of bugs in a product varies directly with the amount of Jolt that the programmers drink.

Magazine columnists: A great magazine columnist can write three great columns a year. A lousy magazine columnist can write three great columns a year.

LOTUS AND NOVELL PART
CAMBRIDGE, MA — Less than two months after the announcement of a merger that would have created the largest software company in the world, Lotus Development and Novell have canceled their $1.5 billion merger. The deal killer reportedly was the companies’ inability to agree on the composition of the board of directors for the new venture.

APPLE ANSWERS ACADEMIA
CUPERTINO, CA — Responding to a direct challenge from IBM in the one field Apple Computer dominates — education — Apple has announced that it’s slashing prices of Mac Pluses, SEs, and SE/30s it sells to educational institutions by as much as 66 percent. Only a week before Apple’s announcement, IBM introduced a pair of personal computers aimed directly at the educational market and a card that lets the IBM units run Apple II software. As an additional measure to bolster its flailing educational sales, Apple also announced its plans for the first low-end color Mac. The unit is expected to feature a built-in color monitor and to have a list price of approximately $1,500, which would mean schools could purchase it for around $500. The new Mac, which will also be able to run Apple IIgs software, will reportedly ship by the end of the year and possibly as early as October.

SYMANTEC SWALLOWS NORTON
CUPERTINO, CA — The utilities war that many observers and users expected between Symantec and Peter Norton Computing has been averted with the signing of an agreement that will merge Norton into Symantec. The stock swap valued at approximately $70 million is expected to be completed in August. As with Symantec’s other divisions, Peter Norton Computing will remain responsible for the development and technical support of its own line of products, including Norton Utilities for the Macintosh. The merger leaves the future of SUM II, Symantec’s file-recovery utility, in doubt, but for the moment, Symantec has announced that it will sell and support both SUM II and Norton Utilities. No cross-purchase plan for current SUM II owners has been announced.
Bobker's Dozen

1. SAM (Symantec AntiVirus for Macintosh)

Good software improves with age, and the newest version of SAM, version 2.0, is a good example. Its most significant new feature is an upgrade procedure that lets users easily upgrade SAM to fight new viruses as they develop. As the updates come out, bulletin boards will post the necessary text strings, and you can obtain them by calling Symantec's 24-hour Virus Newsline (which should be, but isn't, a free call). This way, you won't have to wait for updates to be mailed or even have to pay for them.

The INIT portion, SAM Intercept, has been improved slightly, although its interface suffered a hit in the process. Virus Clinic (the batch-checking application that's included with SAM) now sports a better interface and some new power. I use SAM 2.0 as my own virus preventer/checker.

Symantec, 10201 Torre Road, Cupertino, CA 95014; (408) 253-9600. Virus Newsline (408)255-8744. Version 2.0. $39.95.

2. Remote/WakeUp

One of the drawbacks of communicating with your Mac while you were away used to be the need to leave your Mac on. Remote/WakeUp is a slick hardware/software solution that lets you turn on an ADB-capable Mac from any modem and that also shuts the Mac down after a user-specified period of inactivity.

Remote/WakeUp starts up your Mac via a special modem cable that plugs into both the modem serial port and an ADB port. Any incoming modem activity can then generate the ADB startup signal. You have to wait for the Mac to boot before you can do anything else — other than this inconvenience, the cable is flawless.

Auto Shutdown is an INIT that turns the Mac off. It also works flawlessly, except that version 1.0 doesn't work if Suitcase II 1.2.6 is installed. It works fine with all other versions of Suitcase.

Remote/WakeUp was designed for use with Timbuktu and Timbuktu/Remote, but it also works with any communications software that automatically receives binary files (such as MicroPhone).

FaraDon Computing, 2000 Powell St., Suite 800, Emeryville, CA 94608-9305; (415) 691-9100. Software version 1.0. $49.95.

3. Page Designs Quick! (PDQ!)

Most commercially available template programs lean toward the fancy and elegant side. Page Designs Quick! and Page Designs Quick! 5 take a quicker-and-dirtier route, which is often the best and most practical path to your solution. PDQ! is designed for newspaper publishing exclusively; you can use the templates for other projects, but there's no mistaking that these are newspaper layouts.

The two sets contain a lot of templates: 60 three-column, 60 four-column, and 225 tabloid-sized five-column layouts. Although the quality of the templates is excellent, they are bare bones, with no art at all. Thus, they require a bit of design expertise to use. You can modify all layouts from within PageMaker. The selection of templates is useful, and the manuals are very good.


4. Comic People, Volume 2: Kids Stuff

On the surface, a collection of characters and backgrounds for making comics about kids seems well, questionable. Why is it here? Because Comic Strip Factory has more uses than just making funnies — for example, you can use it for training and editorial purposes.

This set of Comic Strip Factory add-ons, drawn by Trici Venola and Kurt Wahner, is of extraordinary quality and range.

Kids Stuff presents five children and two grown-ups of both sexes and various ethnic backgrounds. It also includes backgrounds, sound effects, a very spry cat, and some Little Extras.

One warning: This isn't clip art — it's best used from within Comic Strip Factory.

Foundation Publishing, 5100 Eden Ave., Edina, MN 55438; (612) 925-6027. $39.95.
No, the Dvorak keyboard was not invented by John C. Dvorak. It's actually a remapping of the common QWERTY keyboard layout that was designed to facilitate faster typing. Electric Dvorak is the best Dvorak implementation for the Mac. The basic program is an installer that puts the small (about 3K) resources in your System file. Once that's done (and it takes only seconds), you can toggle between the standard key mapping and the Dvorak arrangement by using a keyboard command equivalent.

The INITs provided set up and startup procedures for the Mac. The documentation, which is all electronic, is brief but excellent. A small chart of the key-caps layout is provided as well.

If you're already a Dvorak fan or are just learning touch-typing, Electric Dvorak is the best tool of its kind.

Tom Phoenix, Box 285-ed, Portland, OR 97207-0265. Version 1.0. $6 (or free if you include a self-addressed, stamped envelope and a blank formatted disk).

The price of this software is very high for an envelope-printing program, but it's quite a fair one, considering what you get. MacEnvelopes Plus, intended for small businesses and group users who do substantial mailing, is the best envelope and mailing-list program available. It automatically prints bar codes, sorts and reports by zip code or carrier routes, and does everything necessary so that your mailings can qualify for the lowest bulk- and regular-mail rates.

Operation is fast and very, very slick. It includes predefined templates, which make label printing and changing sizes and types of envelopes (MacEnvelope Plus is also a great label printer) a snap.

The name-and-address database is powerful and simple, a rare combination. Documentation is complete, and all the necessary extra fonts are included. Also included is a nice DA so you can print envelopes on the fly from within other applications.

Synex, 862 Tenth St., Brooklyn, NY 11215-4502; (718) 488-8289. Version 2.0. $350.

Take Control of Cholesterol

Take Control of Cholesterol is one of a series of health- and food-related programs from Lifestyle Software Group. It's clearly a port from simpler interfaces (there are no graphics), but in spite of that, it's a good tool. It's designed to be used with Eater's Choice, a book that tells you how to reduce your cholesterol by lowering your saturated-fat intake.

The program sets up worksheets and has you fill out meal plans. It makes keeping track of your calorie intake easy. There are complete online instructions, and the food database is complete enough to cover the eating habits of most users.

Lifestyle Software Group, 63 Orange St., St. Augustine, FL 32084; (800) 239-1157 or (904) 825-0220. Version 2.0. $38.85.
**10 Igor**

Data lies at the heart of business decisions, and how you visualize, manipulate, and use it can critically affect your business success. Spreadsheets handle data adequately, but programs such as Igor do it better. Igor uses what it calls wave input to speed up data entry. The program offers a pretty complete set of options — although you don’t get all the data-manipulation features of a statistics program, you can use Igor to mathematically define anything you want. A powerful macro language and easy command structure (with its own entry window) make repetitive tasks simple. Igor’s performance is very good, and printing quality and speed are excellent.

You can import graphics as well as data, and the program supports color. The manual is adequate. To get the most from Igor, you should probably do some homework first. (For more information on tools for visualizing data, see “10 Reasons Why You Need a Charting Program,” June ’90, page 126.)

**SecureInit**

Sometimes I wish that a program did less than it does. The SecureInit utility is a case in point, although you can shut off its “extra” features. SecureInit is a well-thought-out program that can lock files and folders, make the System Folder invisible, erase files not on its user-specified protected list, lock disks after use, refresh (replace) specified files with clean copies after use, and password-protect everything. It can also purge files as a disk fills up, but this is too dangerous a feature to use in most cases. SecureInit is particularly good at resisting efforts to bypass it.

I'm very wary of most security software, but SecureInit is pleasantly well-behaved. It's also tough, working exactly as the manual says and withstand ing my attempts to break and bypass it. It's a bit much for home use, but I'd feel good if it were on all computer-lab and service-bureau machines; there would be far fewer virus infections and other problems around if it were. Users usually don't think about security programs as virus protectors, but they can be highly effective. While they can't warn you about previously infected files, they can help keep your currently clean files from being infected, giving you some peace of mind.

**11 Nuts & HyperBolts**

Learning English grammar is no picnic. Nuts & HyperBolts is a series of large HyperCard stacks that help make that task more palatable. The stacks present a well-designed sequence, branch intelligently, and contain quite a lot of solid material.

The cards are a bit plain, however: There's no sound or animation to hold your interest. It can be awkward to navigate around Nuts & HyperBolts, as the normal HyperCard menu commands and key equivalents have been disabled. You can work only via the mouse; there are no keyboard shortcuts — period. That means the only way to move around is by using the on-card buttons, making it difficult to go backward if you make a navigation error.

**12 Balance of the Planet**

Have no doubt: Saving the earth from its inhabitants is going to be tough, both in real life and in Balance of the Planet. The game is mechanically similar to Crawford’s earlier classic, Balance of Power. It’s difficult to win, but you should eventually be able to get positive scores and your awareness of environmental issues will be greatly enhanced.

Players set the basic bias of the game: It comes with biases ranging from pro-nuclear industrialist to extreme “green.” Try the point of view you most disagree with — that’s truly educational.

Balance of the Planet supports color, but it could use this feature better. There are lots of screens, but they sort of blend together after you use the program for a few hours. A little animation, which would make this already big package huge, would help a lot.

**13 See Run Spot**

BOBKER’S DOZEN

Learning English grammar is no picnic. Nuts & HyperBolts is a series of large HyperCard stacks that help make that task more palatable. The stacks present a well-designed sequence, branch intelligently, and contain quite a lot of solid material.

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Sterling Swift Software, P.O. Box 43325, Austin, TX 78756-0008; (512) 230-2491. Version 2.0. $199.95.
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Another reason the MacUser editors couldn't take their eyes off PLP II was its user-friendly front-panel LCD display. Who could blame them? With the simple push of a button, you can set your SCSI ID. Check your percentage of consumables used. Adjust your print density. And more. But what the MacUser editors especially liked was PLP II’s “sleep mode,” which automatically silences the printer when not in use.

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**GCC Partitions DA** allows partitions to be mounted, unmounted, locked. Also provides password protection from within any application.

**When you call, be sure to ask for our free catalog.**

**The UltraDrive Family.**

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<th>Model</th>
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<td>UltraDrive 20</td>
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If you can think of better ways to spend your time than backing up your hard disk, you need Fastback II. It's the world's fastest and most reliable backup software for the Macintosh. It's also the easiest to use, with simplified file selection, adaptable data compression, advanced error correction and other features to make your backups fast and foolproof.

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

After all, you have better things to do.
Radius Pivot

Radius' combination portrait/landscape monitor is a turn for the better.

The Radius Pivot is a 2-bit black-and-white, or 4-gray, monitor that can rotate 90 degrees into either a landscape or a portrait orientation. The Radius hardware and software automatically rotate the pixels, so it can be used in either configuration without rebooting.

When Radius introduced the first full-page monitor in 1986, the timing was perfect. DTP was just taking off, and desktop publishers found that a full-page display was an invaluable tool. When other users investigated the situation, however, they found that a portrait display didn't suit their needs with applications such as spreadsheets, where the data was arranged primarily horizontally. This resulted in the popularity of two-page displays, which in turn proved to be overkill for both word-processor and spreadsheet-program users. What was needed was a monitor that could work in portrait and landscape orientations, and that's exactly what the Radius Pivot does.

TURN STYLE Using a combination of hardware and software, the Pivot lets you rotate the display 90 degrees into either a portrait or a landscape orientation. During rotation, the screen blanks out briefly, while Radius' rotation engine reorients the pixels correctly and automatically expands the window to the full-screen size. The unit is carefully balanced, so rotating it is both easy and safe — there's no danger of the monitor's falling over.

All it takes is a gentle push or pull on the upper left and lower right corners. The Pivot's screen is the same size as that of the Radius Full Page Display. It's a 2-bit black-and-white, or 4-gray, unit that can display up to 16 grays (with the extended memory installed), but as our gray-scale tests are designed for 8-bit systems, we opted not to test the Pivot's gray-scale performance.

In general, the Pivot's performance was good. The brightness was even across the entire screen, the transitions between our black-and-white test bars were sharp, and there was no noticeable jitter or noise.

But there were some problems. Although the focus was excellent in the center, the edges and corners were fuzzy. Our screen-geometry test showed some distortion, and in spite of the fast refresh rate (69 hertz), flicker was slightly noticeable when the brightness was set to maximum. The biggest problem, however, was glare. The Pivot's screen is extremely glare-prone, and Radius doesn't offer any antiglare coatings. Of all our tests, this was the only one that the Pivot failed outright.

PIVOT PRECAUTIONS The Pivot is unique, but it pays a price for this privilege. Because Radius' software isn't part of the Mac System, the Pivot's rotation capabilities can put you into some precarious situations. The biggest problem is with dialog boxes. When a standard dialog box is active, Radius' software disables the Dynamic Desktop feature and prevents you from performing the rotation unless you answer the dialog box first. Unfortunately, many programs (yes, quite a few of them are Microsoft applications) use nonstandard dialog boxes that the Pivot's software interprets as document windows. In these situations, pivoting results in a dialog box with the response buttons cut off, which prevents you from returning to the original orientation. Fortunately, the Pivot's software does have the ability to add different dialog-box types to its list of recognized boxes, so you can configure your work situation as needed.

Radius includes a booklet with compatibility information that you should definitely read before working with the Pivot. The guide describes some problem situations and specific application problems you should be aware of before doing a pivot. FileMaker II users should pay special attention to the information, as pivoting from landscape to portrait in Page Preview locks you into Page Preview and forces you to restart the Mac in order to proceed, which could possibly result in a damaged database.

THE BOTTOM LINE The Pivot's rotation software and hardware work smoothly and elegantly, and our only reservations are about the fuzziness around the edges, the slight distortion, and the lack of glare protection — none of which are related to the monitor's pivot abilities. If you're trying to decide between a full-page and a landscape monitor, your decision doesn't have
these days it seems like Apple is introducing computers quicker than you can say ‘M-a-c-i-n-t-o-s-h.’ Trouble is, most of the new Mac models sport some pretty lofty price tags. And that, of course, only puts ‘the power to be your best’ further out of reach of most Mac enthusiasts. At least until now...

Introducing the MegaMac™ Solution.

Here's good news for aspiring Macintosh power users everywhere. Connect a NewCo Technology 50MHz MegaMac™ to your existing Mac SE/SE 30 or any Mac II and you may never again have to bow your head in reverence to a faster and more expensive Mac.

The combination of your Macintosh and the NewCo MegaMac can outperform the the fastest Mac available including the new IIfx. That's astonishing considering the MegaMac costs a lot less than a IIfx. Plus, with a MegaMac, you can upgrade your system anytime you need extra performance...without ever having to scrap a single piece of Mac hardware. You'll never again have to worry that the Macintosh you just plunked down big bucks for is no longer 'top drawer'.

Apple Should Have Invented This.

If you're thinking the MegaMac is just another 'accelerator' board, think again. The MegaMac is a totally self-contained CPU Performance Extender — with its own memory, microprocessor and power supply. There's even an internal, 'fx' style Processor Direct/NuBus expansion slot and dual compartments for installation of up to 400 megabytes of high performance disk storage.

Unlike some old-fashioned accelerator boards that require tricky Macintosh circuit modifications, the MegaMac connects to your Mac via a snap-in NuBus accessory card. There's no soldering, no voiding your Apple warranty and no complicated software to install. Just plug it in, switch on your system and enter a whole new world of 'power' computing.

Premium Performance, Not Price.

The secret to MegaMac's astonishing performance is its proprietary design. A 50MHz 68030 microprocessor combined with 64K of 12 nanosecond write-through™ cache memory and up to 64 megabytes of high speed dynamic RAM provides blistering fast program execution. The result? Productivity gains greater than you ever imagined... all for much less than the price of a Mac IIfx!

The Guarantee Is Even Better.

Should your MegaMac ever require service, just return it to the factory for a no-charge repair for up to three years from date of purchase. NewCo can afford to back the MegaMac this well because it's been making microcomputer products longer than Apple — nearly 18 years now!

The next time you feel humbled by the price tag on one of Apple's shiny new Macs, call us at 1-800-662-9005 to arrange a MegaMac 31-day money-back evaluation. Or, if you prefer, send us a sample diskette of some of your toughest, most time consuming computing tasks. We'll show you how the MegaMac™ can make 'being your best' a whole lot better... not to mention a lot less expensive.

NewCo Technology, Inc.

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to be an either/or choice. Since the Radius' performance is very nearly equal to that of the Apple Portrait Display, if you like that monitor, you'd do well to consider the Radius. While the Radius may fall slightly short of the Apple in some respects, the Pivot's dual orientation may be more than sufficient compensation. The Radius Pivot is a good monitor that, with just a few improvements, could be a great one.

— Jeff Pittelkau and Russell Ito

### Utilities

#### Finding Location

Finding files doesn't have to be like looking for needles in a haystack.

Q: What are the three most important things to consider when you buy real estate? A: Location, location, and location. This truism can apply to the real estate on hard disks too. If you spend more time searching for files than actually using them, look into On Location, a utility from ON Technology that helps the Finder find files fast.

**ON'S PURPOSE** As with a real desktop, the desktop interface doesn't cut it when the desktop gets too cluttered — whether it's because you have too many folders or because your folders have too many documents or because your folders have too many folders. On Location lets you search directly for any filename or — more significantly — for any text string inside a file.

If you're looking for a particular memo, for example, you can search for any piece of the filename you remember (memo, say), the recipient's name, or the date (more on dates in a moment). As soon as On Location finds the file — which is usually very, very quickly — you can view the contents (for most common document formats); open it in its native application; or copy, delete, rename, or move it. You don't have to wait for On Location to search the whole volume — it starts searching for target text strings as soon you launch it, modifying the result of the search with each character you type. It displays the results, sorted by filename, size, kind, or date of the last modification.

On Location is hardly the first utility to do any of this — Eureka and Find File can locate files, GOfer and CanOpener can search for text inside files, and programs such as DiskTop give you file-manipulation capabilities from a DA — so what's all the fuss about?

**ON TIME** Let's start with speed: On Location finds files nearly as quickly as you can type the filename on a small hard disk and in only a few seconds with larger volumes, including everything from CD-ROMs to file servers. The magic behind the blitz is its index. When you install On Location, you also have to index your hard disk (or whatever volume you want to be able to search). Building the index takes a while — anywhere from a coffee break for a small hard disk, to a long lunch hour for a full CD-ROM, to overnight for a monster hard disk or file server.

The good news is that the indexes occupy much less hard-disk space than you might expect — only about 2 percent of the amount of data they're indexing, or about 20K per megabyte (obviously this can add up if you're indexing CD-ROMs on a hard disk). You can create separate indexes for separate volumes, and the indexes are separate from the volume they're indexing. So, for example, you can copy your file server's index to your Mac Portable and know exactly how to tell colleagues back at the office where to find all your files.

Most impressive of all, the indexes are automatically updated in the background, whenever you create or change a file's name or contents. (Although ON Technology has resolved many known prerelease conflicts among the updater INIT

### Get Info

**On Location**

Published by: ON Technology, One Cambridge Center, Cambridge, MA 02142; (617) 225-2545.

Version: 1.0

List Price: $129.95.
Click here for power.

Let's take a moment to fantasize.
Imagine administration software that lets you add, modify and delete users, groups and volumes on your Macintosh® network. Imagine being able to backup local drives to the server. And publishing usage reports to monitor network activity and troubleshoot bottlenecks. And electronic mail that connects with any UNIX® e-mail system. And a dual-processor architecture server, designed for intensive disk operations and demanding I/O processing.

All available at the click of a mouse.
Now let's talk fulfillment: uShare Plus™ software on the Sony NEWS® fileserver. It offers all the above and more—installed, configured and administered from the comfort of your Macintosh environment. Fully AFP compliant, so all existing applications run without modification.

Click for yourself and find out. Call 1-800-624-8999, ext. 96, to arrange a demo.
and other INITs, the manual warns of possible future conflicts; you can update manually if you experience any problems. If you have a noisy hard disk, you may find the automatic updating a little creepy as your untended hard disk chugs away all by itself.

ON THE EDGE On Location's interface is functional and intuitive, although it deviates in some ways from the standard Mac interface: It sports NeXT-like buttons with depth, has scroll bars in surprising places, and lacks some standard keyboard command equivalents and menu choices (such as Quit or Command-Q — you have to click on the close box to exit).

All text strings must begin with a letter; leading numbers and punctuation are ignored — which means, for example, you can't find dates in the format 1/1/90. The manual explains these limitations — On Location doesn't search for text strings shorter than three characters, for example — but the program does nothing to warn you that you're doing anything illegal or that the results of illegal searches are meaningless.

There's another problem with On Location. With a list price of $129.95, On Location is pricey for a one-trick pony. DiskTop, for example, does a lot more, for $99. The price includes a one-year money-back guarantee directly from the publisher, however, so you can decide for yourself if this one trick is worth that much to you.

THE BOTTOM LINE If you can't find things on your hard disk, On Location can make your life a lot easier — if you have a little extra RAM and hard-disk space. Although its quirks may slow you down every now and then, On Location can save you time and aggravation.

— Jon Zibler

GRAMMAR CHECKERS

MacProof and RightWriter

A pair of new grammar checkers challenge each other for the top slot, but Correct Grammar is still the winner.

For years there were no decent grammar checkers for the Mac; now there seem to be a couple of new ones every month. In addition to MacProof and RightWriter, there are Grammatik Mac and Correct Grammar (still the best) (see StartUp, June '90, page 59).

MACPROOF The latest version of MacProof, 3.2.1, deserves an award for comebacks. It's been around for a long time, but early versions weren't that useful and consequently weren't well received. This new version will please many people, however.

The program is a DA and is format-compatible with MacWrite 4.6 and 5.0, MacWrite II (although it must be used with care), Word 4.0 (but not 3.0 or earlier), MindWrite 1.0 and 2.0, and PageMaker 3. It worked well with all the programs and also with MultiFinder (at least 2 megabytes of RAM are required). MacProof also handles text files, and file handling is fine, although you must follow the precautions (well highlighted in the manual) if you use MacWrite II. It works on all Macs from the Mac Plus on, with good speed on a 4-megabyte SE and excellent speed on a 4-megabyte IIGx running Virtual.

Operation is simple. You select the text you want to analyze and run MacProof. After a few seconds, an excellent interactive grammar-checking window appears. This window is by far the best interface of any Mac grammar checker — it makes using MacProof easy and a pleasure.

MacProof has good performance, but its set of grammar rules set is somewhat skimpier than that of RightWriter and Grammatik Mac. There are no glaring errors — just an overall tendency to find simple things and ignore more-serious mistakes. Given that, the spelling-checker, capitalization, and double-word-elimination functions are superb (this can't be said for the competition).

MacProof offers a wide range of customization possibilities. With some simple changes, it can replace your spelling checker. You can add and select enough rules to raise it to any level you desire. To get the most from any grammar checker, you must be able to modify it to your taste. MacProof requires more modification than most, but once you've set it, it's excellent.

The program also has an excellent set of analysis tools. It can list sentences for separate analysis, highlight the first and last sentence of each paragraph, and perform several other useful analyses. All analyses can be printed out. MacProof is the weakest of the four checkers when it comes to document statistics, however. Although it does simple counts and averages, it isn't capable of calculating any reading levels.

The documentation is short for a grammar-checker manual, but it goes into enough detail that you can run the program and understand how it works. The paucity of rules partially accounts for the shortness of the manual.
Color Hardcopy
To The Macs.

Once you've created that breathtaking color masterpiece or designed the winning presentation on your Macintosh™ II, bring those colors to life. For brilliant color hardcopy, choose a Mitsubishi® color thermal printer.

Mitsubishi printers can be used with virtually all Macintosh II-based applications. These printers are easy to use and will excel in any Mac II environment where high quality, color hardcopy is essential.

The G330, G370 and G650 color thermal transfer printers unleash all the bold, bright colors of your designs—every time. And for near-photographic quality, the S340 sublimation printer utilizes a state-of-the-art “dye-diffusion” process capable of printing up to 16.7 million colors. The S340 received the 1989 MacUser Magazine Editors' Choice Honorable Mention Award for Most Significant Hardware Product.

Mitsubishi color thermal printers are the logical choice for a wide variety of Macintosh II color graphic applications including graphics design, business graphics and all other color imaging applications. You'll get color to the Macs!

To find the location of your nearest Mitsubishi Electronics dealer, call 1-800-556-1234, ext. 54R in the U.S. and Canada (in California, call 1-800-441-2345, ext. 54R).

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Mitsubishi Electric Sales Canada, Inc., 8855 Woodbine Avenue, Markham, Ontario L3R 5G1.
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MacProof is the latest version of one of the Mac's oldest grammar checkers. It's still a DA, and it's generally excellent — although expensive — but its rule set is skimpier than its competition. You perform your check interactively, using this elegant window.

RightWriter is a port of a popular DOS grammar checker. This marked-up document was opened for entering changes in Word 4.0. RightWriter's comments are underlined, but it's hard to tell which passage the comments refer to.

RightWriter works differently from every other grammar checker I've seen so far. It's a port of a popular DOS application, and it doesn't have an interactive mode. Instead, it produces a marked-up copy with embedded comments. You revise the marked-up document inside your word processor and then run it through RightWriter again to remove all the comments, leaving you with a clean copy. This process sounds far more awkward than it is, and it works correctly, smoothly, and quickly.

As RightWriter is an application, it can be used on any Macintosh with at least 512K of RAM. It works well with MultiFinder and is best used under MultiFinder in conjunction with your word processor. It's format-compatible with all versions of MacWrite (from 2.2 to 5.0), MacWrite II, Word 3.0 and 4.0, WordPerfect (1.00 to 1.04), WriteNow (1.07, 2.0, 2.2), and all text editors. It handled correctly all the files I gave it. It automatically makes working copies and names them as such, always leaving the originals intact.

I actually prefer to edit my own work with a marked-up copy, so RightWriter fits right in with my work style. Almost. There's one major problem. You can't easily tell — especially on a printout — exactly what parts of the text the comments refer to. If the relevant text were underlined or otherwise delimited, this would be the chump of grammar checkers. As it is, I find it nearly impossibly frustrating.

RightWriter is the strongest checker on grammatical matters. It is, as the others are, fully customizable, and you must take advantage of that ability to make the most of it. It automatically calculates indexes of readability, strength, and jargon level and also does a superb summary analysis. Its abilities in these respects far exceed all the competition.

You can set RightWriter to analyze at several different reading levels and for several different markets. Setting these controls correctly greatly reduces irrelevant comments, making editing much quicker and easier.

The manual is good, which is important, as you need to refer to it often for explanations of the too-cryptic embedded comments. The comments all include a code that tells you where you can find the explanation in the manual. Fortunately, the codes are individually indexed in the manual.

THE BOTTOM LINE

Unlike other writing aids such as spelling checkers, grammar checkers require substantial preparation time before they can become truly useful. Since the way you write is highly personal, don't expect a program straight out of the box to suit your needs. Both MacProof and RightWriter can be customized, so be prepared to spend some time with them in the beginning.

MacProof and RightWriter are excellent grammar checkers that work in radically different ways. MacProof will be more useful to more people, but unfortunately, it is the most expensive grammar checker available, with a list price approximately twice that of the competition. If it were cheaper, it would be my first choice in almost all cases.

RightWriter is strong on checking but flawed on presentation. If it had some way of more clearly indicating what text its embedded comments referred to, it would be highly rated. Both programs are far better than Grammatic Mac, and they give Correct Grammar, currently the best of the genre, a run for its money.

— Steven Bobker
The most expensive part of a PostScript printer is not so much the hardware but the PostScript itself, because you have to pay licensing fees to Adobe. But software PostScript clones are popping up with considerable regularity. Freedom of Press was the first (and it's still the best), but it's a little too expensive for many users. A low-cost alternative, called TScript, may be the answer to a poor man's PostScript prayers — if that poor man is willing to suffer some severe limitations.

**WHAT'S IN TSCRIPT?** Put simply, TScript, like Freedom of Press (see review, January '90, page 77), makes a variety of QuickDraw-based and other non-PostScript printers PostScript-compatible. This means that you can even print EPSF clip art on a lowly ImageWriter. If you use it with something more sophisticated, such as an HP LaserJet, the output should be nearly indistinguishable from what would shoot out of a LaserWriter Plus.

To use TScript, you need a hard-disk drive on which the program and nearly 700K of outline fonts can comfortably fit. The fonts are special clones of the Times, Helvetica, and Courier typeface families of the basic Apple LaserWriter.

The program's interface is simplicity itself. There are two windows. One displays any ASCII or text-only file (it must be 16K or smaller), and you use this window to type in your own PostScript code. The other window previews the code window or previews any EPSF or PostScript file. To preview the code window, you select the code (which must include a `showpage` command at the end) and issue TScript's `Run` command. You can convert any previewed file to TIFF, PICT, or MacPaint formats, or you can use the Print PostScript File command, select a file from a standard dialog box, and print it to the screen without actually opening it.

If you want to print a Word document or a graphic created in Illustrator, you must first capture the file's PostScript code to disk by clicking on the Disk File box in the LaserWriter Print dialog box (TScript comes with a special LaserWriter printer driver that contains this option). You then choose the icon of one of the printers TScript supports (Apple LaserWriter IISC, ImageWriter, HP LaserJet and DeskJet series, GCC Personal Laser and WriteMove printers, or any QuickDraw-based output device), and TScript processes the captured PostScript file and sends it to the printer.

If you are running under MultiFinder and are printing to an HP LaserJet, Canon, Mitsubishi, or Minus device, you can also select TScript as a printer driver in the Chooser, which you select from the Apple menu. This avoids the file-capture step outlined above.

**WHAT'S NOT IN TSCRIPT?** It has only two menus. That's it. No frills. No debugging tools. No way to cancel a Run command. And no batch processing of files, a feature that would certainly make the long waits more tolerable.

The documentation claims that TScript supports the entire Adobe type library if you use ATM. This is only partially true. Version 1.2 can preview a PostScript file with any Adobe font quite readily. But if you try to rotate, apply fills, or condense or expand a text string in any font other than Times, Helvetica, or Courier, the output can suffer from the jaggies.

TScript, while not blazing, is remarkably quick about its business. You'll have to wait more on a low-end machine such as the SE than on a IIcx, but I didn't find the latest version of the program obnoxiously slow. Users of the program's earlier incarnation (MacRIP) will be pleased with this accelerated version.

**THE BOTTOM LINE** Does TScript have anything going for it? Well, it's cheap — it costs a mere $145. Within the limitations detailed above, it has some usefulness and even greater potential. It may indeed be the answer to more than just a few prayers.

— *Gregory Wasson*

**TScript**

Published by: TeleTypesetting Co., 474 Commonwealth Ave., Boston, MA 02215; (617) 734-9700.

Version: 1.2.

List Price: $145.
Mitch Kapor, chairman, ON Technology.

“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, just type ‘Simmons’ and ‘insurance.’ Within seconds, On Location starts looking as you type, and often finds the file before you finish.

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.

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.

If you do remember a file name (or part of one), you can type that in the search window. On Location starts looking as you type, and often finds the file before you finish.

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.”
Radius QuickCAD Graphics Engine

If you use one of the two applications it supports, Radius’ accelerator is worth investigating.

Waiting for your drawing window to update, zoom, or scroll is not only irritating but also unproductive. A skilled architectural-engineering drafter’s time is worth a lot per hour, so anything that promises to accelerate CAD graphics deserves serious consideration.

QUICKER CAD The Radius QuickCAD Graphics Engine is a NuBus card that takes a specialized approach to the problem of increasing the Mac’s redraw speed. It uses a 10-megahertz RISC chip (the VLSI Technology VL86C010) as a display-list processor, backed by 256K of high-speed static RAM. A display list stores the coordinates and attributes of each object, in order of creation. This was the earliest kind of graphics software, and it still forms the basis of many mainframe and minicomputer CAD programs and their descendants on desktop computers and workstations. The original display-list technology was relatively slow in redrawing and updating the screen, but it made very efficient use of memory and CPU cycles, back in the days when those things were precious.

The Radius QuickCAD Graphics Engine can increase the Mac’s redrawing speed to 10 to 30 times that of a Mac II. Unfortunately, right now it works with only two programs: AutoCAD and VersaCAD.

Only two Mac programs — AutoCAD (release 10c5) and VersaCAD (version 2.2) — currently use integer-based display lists in a way that QuickCAD can access directly. Some programs that use a floating-point display list (notably MacBravo) do not benefit from QuickCAD.

In design and workmanship, the QuickCAD board reflects Radius’ usual high standards. Most of the chips are socketed, and there are no jumpers or DIP switches to worry about. The card requires no cables or video-monitor connections — it simply occupies its NuBus slot, drawing 2 amps at +5 volts. The package includes a conductive wrist strap that helps minimize the risk of damage from electrostatic discharge during installation or removal. An illustrated booklet provides clear instructions for installation, operation, and troubleshooting.

QuickCAD is designed to work with Radius monitors and video cards to accelerate standard Mac QuickDraw graphics as well as display-list CAD software. QuickCAD follows Apple’s standards for 32-bit QuickDraw, ensuring compatibility with future System software. Although QuickCAD also works with Apple’s 8-bit-video card, in this configuration, it provides only display-list — not QuickDraw — acceleration, and this will continue to be the case with Apple’s new video boards.

Two startup files control QuickCAD’s operation. An elegant little Installer program automatically copies these INITs into your System Folder. The QuickCAD INIT provides a simple cdev with a Master Switch and a Caps Lock Enable/Disable switch that lets the Caps Lock key toggle the board on and off. This design choice was unfortunate, because the Caps Lock key is used for other things in many Macintosh programs and forgetful users can inadvertently disable the board by leaving this key in the wrong position. The QuickColor INIT, which you install only if a Radius video board is installed in your Macintosh, provides QuickDraw acceleration.

A FAST PERFORMER QuickCAD’s performance depends on the software you’re using and your drawing’s complexity. Radius claims QuickCAD can boost display speed to 10 to 30 times that of a Mac II. With an 8-megabyte Mac Ilcx, an 8-bit Radius color card, and a 19-inch Radius...
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## Software

<table>
<thead>
<tr>
<th>A L A N C E R</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quark or PageMaker</td>
<td>195</td>
</tr>
<tr>
<td>4th Dimension</td>
<td>469</td>
</tr>
<tr>
<td>ACUTE SOLUTIONS</td>
<td></td>
</tr>
<tr>
<td>Adobe Illustrator '88 (incl. ATM)</td>
<td>269</td>
</tr>
<tr>
<td>Adobe Type Manager</td>
<td>55</td>
</tr>
<tr>
<td>Adobe Type Set 1 &amp; 2</td>
<td>55</td>
</tr>
<tr>
<td>Adobe Type Align</td>
<td>58</td>
</tr>
<tr>
<td>Streamline</td>
<td>254</td>
</tr>
<tr>
<td>TrueForm</td>
<td>224</td>
</tr>
<tr>
<td>Photoshop</td>
<td>495</td>
</tr>
<tr>
<td>Fonts</td>
<td>Please Call</td>
</tr>
<tr>
<td>ANDROMEDA</td>
<td>55</td>
</tr>
<tr>
<td>AEC MANAGEMENT SYSTEM</td>
<td></td>
</tr>
<tr>
<td>AEC Info Manager</td>
<td>429</td>
</tr>
<tr>
<td>FastTrack Schedule</td>
<td>133</td>
</tr>
<tr>
<td>ALDUS</td>
<td></td>
</tr>
<tr>
<td>PageMaker</td>
<td>522</td>
</tr>
<tr>
<td>Freehand 2.0</td>
<td>235</td>
</tr>
<tr>
<td>Persuasion</td>
<td>319</td>
</tr>
<tr>
<td>ALPHAGRAPHICS</td>
<td></td>
</tr>
<tr>
<td>Template Software for QuarkXPress, PageMaker, Style, Ready Set Go, 25 Smart Forms Cards</td>
<td>29</td>
</tr>
<tr>
<td>ALSOFT</td>
<td>54</td>
</tr>
<tr>
<td>DiskExpress II</td>
<td></td>
</tr>
<tr>
<td>Master Jagger</td>
<td>54</td>
</tr>
<tr>
<td>ASD SOFTWARE</td>
<td>113</td>
</tr>
<tr>
<td>Fireguard</td>
<td>86</td>
</tr>
<tr>
<td>ASIV</td>
<td></td>
</tr>
<tr>
<td>AshtrayVelum</td>
<td>695</td>
</tr>
<tr>
<td>BLTTH SOFTWARE</td>
<td>355</td>
</tr>
<tr>
<td>BRODERBUND</td>
<td></td>
</tr>
<tr>
<td>CAERE</td>
<td>117</td>
</tr>
<tr>
<td>OmniPage</td>
<td>599</td>
</tr>
<tr>
<td>OmniSpell</td>
<td>68</td>
</tr>
<tr>
<td>OmniDraft</td>
<td>68</td>
</tr>
<tr>
<td>CE SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>Quickmail 10 User</td>
<td>258</td>
</tr>
<tr>
<td>QuickDraw</td>
<td>64</td>
</tr>
<tr>
<td>DiskTop 4.0</td>
<td></td>
</tr>
<tr>
<td>CENTRAL POINT</td>
<td></td>
</tr>
<tr>
<td>Copy II Mac</td>
<td>22</td>
</tr>
<tr>
<td>Mac Tools Deluxe</td>
<td>72</td>
</tr>
<tr>
<td>CENTRON SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>Casio Master</td>
<td>38</td>
</tr>
<tr>
<td>Casio Gaming Color</td>
<td>45</td>
</tr>
<tr>
<td>CHANG LABS</td>
<td></td>
</tr>
<tr>
<td>Rags to Riches 3-Pack</td>
<td>168</td>
</tr>
<tr>
<td>CLARIS</td>
<td></td>
</tr>
<tr>
<td>MacWrite II</td>
<td>142</td>
</tr>
<tr>
<td>FastWord</td>
<td>269</td>
</tr>
<tr>
<td>MacDraw II (including ATM)</td>
<td>275</td>
</tr>
<tr>
<td>ClarisDraw</td>
<td>559</td>
</tr>
<tr>
<td>SmartForm Designer</td>
<td></td>
</tr>
<tr>
<td>COMPUTER ASSOCIATES</td>
<td>199</td>
</tr>
<tr>
<td>Cricket Graph</td>
<td>124</td>
</tr>
<tr>
<td>Cricket Paint</td>
<td>124</td>
</tr>
<tr>
<td>CONNECTIX</td>
<td></td>
</tr>
<tr>
<td>VirtuaL</td>
<td>113</td>
</tr>
<tr>
<td>Virtual with PMU5</td>
<td>185</td>
</tr>
<tr>
<td>CUSTOM APPLICATIONS</td>
<td></td>
</tr>
<tr>
<td>Freedom of Press</td>
<td>249</td>
</tr>
<tr>
<td>PANTONE COMPUTER COLOR BOOK</td>
<td></td>
</tr>
<tr>
<td>Some New Pantone colors look even better when printed in spot and process color modes with the PANTONE Color Cube Imaging Guide, the only way to verify color selection when designing for your favorite program</td>
<td>59</td>
</tr>
<tr>
<td>DATA VIZ</td>
<td></td>
</tr>
<tr>
<td>MacLink Plus PC</td>
<td>121</td>
</tr>
<tr>
<td>Deneba</td>
<td>185</td>
</tr>
<tr>
<td>Canopus</td>
<td>119</td>
</tr>
<tr>
<td>UltraPaint</td>
<td>119</td>
</tr>
<tr>
<td>DIGITALX</td>
<td></td>
</tr>
<tr>
<td>Smalltalk/V Mac</td>
<td>119</td>
</tr>
<tr>
<td>DREAMMAKER SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>Citations Vol 1 &amp; 2</td>
<td>26</td>
</tr>
<tr>
<td>ELECTRONIC ARTS</td>
<td></td>
</tr>
<tr>
<td>Studio 8</td>
<td>225</td>
</tr>
<tr>
<td>Studio 100</td>
<td></td>
</tr>
<tr>
<td>Disk Tools Plus</td>
<td>44</td>
</tr>
<tr>
<td>Thunder II</td>
<td>52</td>
</tr>
<tr>
<td>EMERALD CITY SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>SmartArt 1, 2, 3 or 4</td>
<td>52</td>
</tr>
<tr>
<td>FIFTH GENERATION</td>
<td></td>
</tr>
<tr>
<td>FastBack II</td>
<td>125</td>
</tr>
<tr>
<td>DiskLock</td>
<td>44</td>
</tr>
<tr>
<td>SoftFile</td>
<td></td>
</tr>
<tr>
<td>FRANKLIN SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>Language Master</td>
<td>57</td>
</tr>
<tr>
<td>FREESOFT</td>
<td></td>
</tr>
<tr>
<td>Write</td>
<td>81</td>
</tr>
<tr>
<td>GRAPHISOF</td>
<td></td>
</tr>
<tr>
<td>Mirraco 2</td>
<td>499</td>
</tr>
<tr>
<td>BluePrint</td>
<td>543</td>
</tr>
<tr>
<td>GENERIC</td>
<td></td>
</tr>
<tr>
<td>WordPerfect</td>
<td></td>
</tr>
<tr>
<td>WordPerfect Level 1</td>
<td>83</td>
</tr>
<tr>
<td>HELP SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>High Design Vol. 1 &amp; 2</td>
<td>55</td>
</tr>
<tr>
<td>MICROCOM</td>
<td></td>
</tr>
<tr>
<td>Cocoon Copy Mac</td>
<td>112</td>
</tr>
<tr>
<td>QuarkXpress</td>
<td>51</td>
</tr>
<tr>
<td>VirEx 16 Pack</td>
<td>345</td>
</tr>
<tr>
<td>HYPERLEOT</td>
<td></td>
</tr>
<tr>
<td>Jenius</td>
<td></td>
</tr>
<tr>
<td>Word Texture Spanish, Russian, French, Italian &amp; German</td>
<td>29</td>
</tr>
<tr>
<td>Verbo Tutor for above languages</td>
<td>39</td>
</tr>
<tr>
<td>Tennis for above languages</td>
<td>39</td>
</tr>
<tr>
<td>Tense for above languages</td>
<td>39</td>
</tr>
<tr>
<td>INFORMIX</td>
<td>238</td>
</tr>
<tr>
<td>WINGZ</td>
<td></td>
</tr>
<tr>
<td>INNOVATIVE DATA DESIGN Software</td>
<td>94</td>
</tr>
<tr>
<td>Dinamix</td>
<td>185</td>
</tr>
<tr>
<td>INSIGHT DEVELOPMENT</td>
<td></td>
</tr>
<tr>
<td>SignIn</td>
<td>242</td>
</tr>
<tr>
<td>LANGUAGE SYSTEMS</td>
<td></td>
</tr>
<tr>
<td>Fortan with MPW</td>
<td>398</td>
</tr>
<tr>
<td>LAYERED SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>Adobe Acrobat</td>
<td>275</td>
</tr>
<tr>
<td>IMAGE Plotter</td>
<td>388</td>
</tr>
<tr>
<td>LETTRETT</td>
<td></td>
</tr>
<tr>
<td>ImageStudio</td>
<td>260</td>
</tr>
<tr>
<td>DesignStudio</td>
<td>538</td>
</tr>
<tr>
<td>ColorStudio</td>
<td>1566</td>
</tr>
<tr>
<td>LETTERPRESS</td>
<td></td>
</tr>
<tr>
<td>MacProof</td>
<td>108</td>
</tr>
<tr>
<td>MACROMIND</td>
<td></td>
</tr>
<tr>
<td>Macrofriend Director</td>
<td>125</td>
</tr>
<tr>
<td>Acrobat</td>
<td>125</td>
</tr>
<tr>
<td>MAGIC SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>AutoSave II</td>
<td>54</td>
</tr>
<tr>
<td>BatchPrint</td>
<td>36</td>
</tr>
<tr>
<td>POWERPrints</td>
<td></td>
</tr>
<tr>
<td>MacWrite</td>
<td>119</td>
</tr>
<tr>
<td>MacDraft</td>
<td>119</td>
</tr>
<tr>
<td>EMPOWEROFT</td>
<td></td>
</tr>
<tr>
<td>EMPOWEROFT II</td>
<td></td>
</tr>
<tr>
<td>MATHERSOFT</td>
<td></td>
</tr>
<tr>
<td>Mathcad Mac</td>
<td>335</td>
</tr>
<tr>
<td>SATORI SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>Bulk Master Plus</td>
<td>198</td>
</tr>
<tr>
<td>Project Billing</td>
<td>318</td>
</tr>
<tr>
<td>SENSITIVE SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>Sensible Grammar</td>
<td>50</td>
</tr>
<tr>
<td>Sensible Books</td>
<td>59</td>
</tr>
<tr>
<td>SILICON BEACH SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>Super Paint 96</td>
<td>123</td>
</tr>
<tr>
<td>Digital Darkroom</td>
<td>244</td>
</tr>
<tr>
<td>Supercard</td>
<td>185</td>
</tr>
<tr>
<td>SOLUTIONS INT'L</td>
<td></td>
</tr>
<tr>
<td>Screencast</td>
<td>46</td>
</tr>
<tr>
<td>Squirrel II</td>
<td>69</td>
</tr>
<tr>
<td>THE CURATOR</td>
<td></td>
</tr>
<tr>
<td>SOFTWARE VENTURES</td>
<td></td>
</tr>
<tr>
<td>Microphone II</td>
<td>209</td>
</tr>
<tr>
<td>SOMAIK</td>
<td></td>
</tr>
<tr>
<td>ScriptEdit</td>
<td>46</td>
</tr>
<tr>
<td>Shapen Up</td>
<td>57</td>
</tr>
<tr>
<td>CD Rem Clip Art Vol 1 or 2</td>
<td></td>
</tr>
<tr>
<td>SPINMAKER</td>
<td></td>
</tr>
<tr>
<td>Publisher II</td>
<td>86</td>
</tr>
<tr>
<td>Hidden Agenda</td>
<td>34</td>
</tr>
<tr>
<td>Sargon IV</td>
<td>22</td>
</tr>
<tr>
<td>STUDIOGRAPHICS</td>
<td></td>
</tr>
<tr>
<td>Catpilot</td>
<td>209</td>
</tr>
<tr>
<td>SUPERSOFT</td>
<td></td>
</tr>
<tr>
<td>Pixel Paint Professional</td>
<td>385</td>
</tr>
<tr>
<td>Pixel Paint</td>
<td>229</td>
</tr>
<tr>
<td>Superpawp</td>
<td>58</td>
</tr>
<tr>
<td>Superuser Spool</td>
<td>88</td>
</tr>
<tr>
<td>MASTER TUNER</td>
<td></td>
</tr>
<tr>
<td>Turns your Mac into a visual tuner for most accurate measurements. Tunes historical or experimental performances and gives reference tones.</td>
<td>55</td>
</tr>
<tr>
<td>SYMANTEC</td>
<td></td>
</tr>
<tr>
<td>Think C-6.0</td>
<td>159</td>
</tr>
<tr>
<td>Think D.0</td>
<td>159</td>
</tr>
<tr>
<td>SAM</td>
<td>63</td>
</tr>
<tr>
<td>TUNEY</td>
<td></td>
</tr>
<tr>
<td>SYSTIM SYNTH</td>
<td>104</td>
</tr>
<tr>
<td>SYNTENIC</td>
<td></td>
</tr>
<tr>
<td>TeXspend</td>
<td>255</td>
</tr>
<tr>
<td>SYNERGY</td>
<td></td>
</tr>
<tr>
<td>Kaledigraph</td>
<td>155</td>
</tr>
<tr>
<td>XVelocity</td>
<td>169</td>
</tr>
<tr>
<td>TACTIC SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>ClearVantage</td>
<td>45</td>
</tr>
<tr>
<td>Icon Inf</td>
<td></td>
</tr>
<tr>
<td>Sound Clip</td>
<td>45</td>
</tr>
<tr>
<td>ArtClip</td>
<td>45</td>
</tr>
<tr>
<td>FireShare</td>
<td>125</td>
</tr>
<tr>
<td>TECNOGRAPHY</td>
<td></td>
</tr>
<tr>
<td>HyperBase</td>
<td></td>
</tr>
<tr>
<td>TELETYPESETTING</td>
<td>65</td>
</tr>
<tr>
<td>TIMETRACKS</td>
<td></td>
</tr>
<tr>
<td>Publish It Mac</td>
<td>219</td>
</tr>
<tr>
<td>Publish It Easy</td>
<td>109</td>
</tr>
<tr>
<td>Hyperworks Organizer</td>
<td>56</td>
</tr>
<tr>
<td>TIPS</td>
<td></td>
</tr>
<tr>
<td>Network Bundle for MAC</td>
<td>179</td>
</tr>
<tr>
<td>Network Bundle for DOS</td>
<td>149</td>
</tr>
<tr>
<td>Network Bundle for DOS 16-Pack</td>
<td>823</td>
</tr>
<tr>
<td>TOUCHSTONE</td>
<td></td>
</tr>
<tr>
<td>Teleconnectors</td>
<td>28</td>
</tr>
<tr>
<td>TRAVELING SOFTWARE</td>
<td></td>
</tr>
<tr>
<td>Luggage Accessory Combo Pack</td>
<td>111</td>
</tr>
<tr>
<td>MacLink Network pack</td>
<td>179</td>
</tr>
<tr>
<td>T-MAC</td>
<td></td>
</tr>
<tr>
<td>Write Now</td>
<td>115</td>
</tr>
<tr>
<td>VERTICAL OPTIONS</td>
<td></td>
</tr>
<tr>
<td>From 8 to 12</td>
<td></td>
</tr>
<tr>
<td>VERTICAL SOLUTIONS</td>
<td></td>
</tr>
<tr>
<td>Fastlabel</td>
<td>56</td>
</tr>
<tr>
<td>Fastmark</td>
<td>41</td>
</tr>
<tr>
<td>WORLDFOREST CORP.</td>
<td></td>
</tr>
<tr>
<td>WordPerfect</td>
<td>208</td>
</tr>
</tbody>
</table>
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Hardware

APPLE
Mac Systems - Lowest Pricing. CALL
ABATONE
Interfax Fax-modem 12/48 ... 262
Interfax Fax-modem 24/66 ... 239
250 EuroScanner ... 369
PostScript Laser Printer ... 2448
ALTRA
Felix the Mouse ... 117
ACX
DoubleTime16 Doubles speed of SE/199
BEST DATA
Maine 2400 ... 143
CALCOM
Wiz ... 145
CANNON
Canon Still Video ... CALL
CAYMAN SYSTEMS
GetBox ... 1890
GetBox E for Mac SE ... 432
GetBox E's for Mac SE ... 432
Mail to Mail ... 168
CUTTING CAYMAN SYSTEMS
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ABATON
ALTRA
Returns
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Monitor MacRecorder .. .. ............ .............. .... 162
Micronet II
30 Meg Hard Drive ... 239
30 Meg Hard Drive ... 429
45 Meg Hard Drive ... 429
45 Meg Removable ... 162
800K Floppy Drive ... 145
Monitor 15" Monochrom ... 956
OSC
VideoDesk Live color capture ... 4268
DATABASES
Mac - 101 Keyboard ... 128
Switcher II
FAVAROL
MacRecorder ... 162
PhoneNET PLUS ... 31
PhoneNET PLUS (10 Pack) ... 219
PhoneNET Star Controller ... 816
PhoneNET Star Controller EN ... 1568
Timbuktu ... 23
Timbuktu Remote ... 126
HAYES
Smartmodem II ... 85
Smartmodem 9600 V ... 729
2400 with Smartmodem II ... 839
HEWLETT PACKARD
Desk Writer ... 828
Scanner Plus ... 1688
PaintJet ... 1140
PaintJet XL ... 1995
Printer Jet ... 1995
ICD
Imagem ... 83
IDS
Pro series 20 Meg ... 379
Pro series 40 Mac ... 719
Pro series 80 Meg ... 719
WIP ... Same price as above
IMEGA
Benouli II Single 44 Meg ... 1378
Benouli II Dual 44 Meg ... 2078
I-PROTECT
Radiation Shield for SE/Plus ... 70
Radiation Shield for MAC II ... 70
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KENNETT TECHNOLOGY
Report ... 192
KENSINGTON
Turbor Mouse ... 106
Mac II Stand & Cables ... 62
Masterpiece Mac II ... 101
KEYTRONICS
Keyboard, inc. Tempo II ... 118
KINETICS
Ether Port II ... 484
Fast Path 4 ... 1965
KOALA
MacBox ... 209
KOEK
Dincon M150 Portable Printer ... 499
MAGS MICRO
ColorSpacit FX ... 2549
ColorSpace II ... 1662
Data Pack ... 599
Data Pack for Mac ICM ... 1075
MEGA GRAPHICS
15" Rival System, SE, SE/30, 133 MHz ... 1045
15" Rival System, SE, SE/30, 166 MHz ... 1145
15" 256 Greyscale ... 2028
15" Sony Color II, Ilx ... 3995
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You can get faster computer graphics in many ways. The most expensive way is to buy a faster computer or an accelerator board that boosts the CPU to a higher clock rate. Another approach (seen in Apple's new Macintosh Display Card 8-24 ctc video card) is to accelerate all QuickDraw operations with a graphics coprocessor. Radius QuickCAD combines the advantages of both approaches — at least in the specialized category of display-list CAD software. The QuickCAD RISC processor can compute six million instructions per second, with a data-transfer rate of 32 megabytes per second — seven times the normal transfer rate of a Mac II. The RISC processor even has its own customized on-board multitasking operating system that medi­ates the bus control between the Mac CPU and QuickCAD's RISC chip and keeps them from stepping on each other.

**THE BOTTOM LINE**
For users who have already made an investment in Radius monitors and one of the two display-list CAD programs, buying a QuickCAD board is an economical way to get a dra­matic improvement in overall system performance. Those who use one of these programs with an Apple video card and monitor will still get some benefit. If Radius can persuade addi­tional CAD-software publishers to modify their applications to support integer display-list processing, this specialized board could be a serious contender in the market for Mac performance enhancers. Radius says a half-dozen applications will support QuickCAD by the end of the year, so my advice is to wait if you can.

---

**CheckFree**

One of the greatest disappoint­ments of the computer revolution is that the technology does not deliver on the promise of a paper-free office or home. Wherever you go, computers seem to be generating more paper. CheckFree Corp. is hoping to change this with the intro­duction of a Mac version of CheckFree, a system that pays bills electronically by trans­ferring funds from your bank account directly to the payee.

**ELECTRONIC CHECKING** CheckFree pays merchants via three methods. The first and quickest — provided the vendor has set up an agreement with CheckFree, MasterCard RPS, or the Federal Reserve ACH system — is a direct electronic transfer from your bank to the merchant. The second method is the electronic-check mechanism that pulls money from your account on the day the bill is to be paid and sends the merchant a laser-printed draft that contains your bank-account number. Third, CheckFree can send just a laser-printed draft. All CheckFree drafts and a record of electronic transfers are returned by your bank in your normal statement.

CheckFree has agreements for elec­tronic transfers with many of the major credit-card companies — such as American Express and MasterCard — and banks, and its merchant development group is working on increasing the number. Currently, CheckFree doesn't tell users how many agreements it has or what percentage of their transfers will be performed electronically. Additionally, even if an electronic agreement is set up, CheckFree processing heuristics might prevent an electronic transfer. This information is very important to users, as CheckFree drafts don't represent normal payment methods. Merchants usually pro­cess them as exceptions, which may mean that users have to schedule extra time for their payments.

Beyond paying bills electronically, CheckFree maintains your check register

---

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Monitors

Magnavox Mac Color 14" High Resolution Monitor

This affordable 14" RGB analog monitor is fully compatible with the Macintosh II series of computers when equipped with Apple's Hi-Res video card. The tilt/swivel base provides easy adjustment for optimum viewing. (shown on system photo on next page!) $459

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CheckFree is an electronic bill-paying service. This draft was sent by Checkfree to a merchant. The bottom left corner of the check has the user's bank and account numbers in standard magnetic ink. The check does not require a customer signature.

on the Macintosh and allows for the addition of manually written checks. Finally, CheckFree creates budgeting reports to show variances in month-to-month spending in various CheckFree-defined categories. CheckFree users can also export all register data to MacInTax for tax filing.

Signing up for CheckFree involves filling out a form and mailing it to Checkfree with a voided check. The company claims that its turnaround time for new applications is about two weeks, although some recent applications have taken more than a month. As of this writing, CheckFree charges $9 for the first 20 payments per month and $3 per 10 payments above 20.

CHECKING IT OUT When you launch CheckFree, it displays an electronic bankbook detailing all past and scheduled CheckFree payments. Payments in bold indicate future or recurring payments. For recurring payments, such as fixed-amount auto loans, CheckFree has several recurring-payment plans, such as paying the merchant monthly on a given day. You can define the number of payments in the future or continue the payments until you notify Checkfree to do otherwise.

Before any new payments can be made, you must add merchant information via the Merchant List item on the View menu. After selecting Add from the window, you enter the merchant's name, address, and telephone and account numbers and indicate whether or not the merchant should be paid by CheckFree.

Paying a nonrecurring merchant is as simple as selecting the merchant from the list and clicking on the Pay button.

HP offers you the best things next

From input to output, Hewlett-Packard leads the way. With a full line of Mac-compatible printer and scanner choices.

For photographic-quality scanning, there's the HP ScanJet Plus scanner. Combine that with one of HP's high-quality printers. The DeskWriter, the new LaserJet III, the LaserJet II P, or the LaserJet IID. HP even has color printers. The PaintJet and the PaintWriter XL.

Plus, HP stands behind all their products with exceptional service and support. And a one year warranty. It doesn't get much better than that.

There is a better way.
CheckFree then displays a stylized version of a check for you to fill out. After you’ve entered all payments, your last step is to send the information to CheckFree via the Send to CheckFree command on the Actions menu. This step requires a 1,200- or 2,400-bps modem and a call to a local or toll-free number.

In one year of using the PC version and three months of using the Mac version, I have experienced only one CheckFree processing error. Unfortunately, this was my mortgage payment of $700, which was two weeks late. CheckFree’s merchant-relationship group was able to convince the bank that I’d intended to pay on time, however, and the bank waived the late fee (which CheckFree otherwise would have paid).

THE BOTTOM LINE The CheckFree software works well — although it’s quirky under MultiFinder — and the service is a great convenience. The only areas that need improvement are the manual (which doesn’t contain even a single screen shot or an index), customer service (which seems to be vastly understaffed, judging by the time I spent on hold), and acceptance of electronic bill paying among merchants and other payees — ultimately the most limiting factor for CheckFree.

— Jeffrey A. Steinberg

**REVIEWS**

**CheckFree**

Published by: CheckFree Corp., 720 Greencrest Drive, Westerville, OH 43081; (614) 898-6000.

Version: 1.5.

List Price: $29.95.

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to your Macintosh.
BetaWatch
Products on the Horizon

Studi0/32 is the long-awaited 24-bit upgrade of Studio/8, Electronic Arts' 8-bit color paint program. In addition to 32-bit color support, Studio/32 includes anti-aliasing tools, four-color separations, support for the Pantone color-matching system, an independent text layer for PostScript-quality output, unlimited layers, editable Bezier curves, multiple-document support, and 3-D perspective. $695; upgrade from Studio/8, $150. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404; (415) 571-7171. ETA: Summer 1990.

PageBrush is the most unusual input device we've seen in a long time. It's a combination optical mouse and hand-held scanner from Mouse Systems, the manufacturer of the A+ optical mouse. Using an acetate grid, PageBrush can scan an image and automatically stitch the scan passes into a single image of any size. If you move the scanner too quickly across the graphic, all you need to do is back up and scan that section again. The scanner includes variable contrast control, so you can adjust the contrast level on the fly and vary it from one portion of the scan to another. PageBrush scans at resolutions from 75 to 300 dpi, with up to 64 shades of gray, and when it's not being used as a scanner, it serves as an optical mouse. $795. Mouse Systems, 47505 Seabridge Drive, Fremont, CA 94538; (415) 656-1117. ETA: Fall 1990.

Pigments for your imagination.

HP color printers let you draw splashy color from your Macintosh.

Entertain your thoughts with HP's PaintJet and PaintWriter XL color printers. Both are fully Mac-compatible and let you use all Quickdraw-based software applications. That means high-quality Macintosh II output in 16.7 million colors.

Print on paper or transparencies with 13 scalable outline fonts. And for shared use, the PaintWriter XL offers AppleTalk, faster speed, and auto sheet feed. For sample output and the name of your authorized HP dealer, call 1-800-752-0900, Ext. 1167.

There is a better way.
BUSINESS ACCOUNTING

Accountant, Inc. Professional

Softsync’s small-business-accounting system is a worthy contender in a crowded field.

With every passing month, the small-business-accounting segment of the market gets more crowded. The latest entrant, Accountant, Inc. Professional from Softsync, is an integrated general-ledger, accounts-receivable, accounts-payable, payroll, inventory-management, and project-management system.

Its entry format is highly stylized and streamlined, and the screens are similar to the input documents that you would normally use with an accounting system, such as invoices, purchase orders, and receipts. System navigation is easy and intuitive.

The system’s design is forgiving even if you don’t have a detailed knowledge of accounting, but some basic knowledge of accounting mechanics is required. Accountant, Inc. Professional is based on double-entry-bookkeeping principles, so if you’re familiar with manual double-entry bookkeeping, the program is a snap.

Installing the program is easy. HyperCard tutorial stacks and sample company setups get you started. The documentation is well indexed, well laid out, and a valuable tool that won’t collect dust on the shelf.

Accountant, Inc. Professional was designed for use in several industries and business types, including service organizations. Its flexible chart of accounts lets you customize it for almost any setting, although it’s not suitable for write-up business or multicompany consolidations.

The system’s reporting module provides more than 100 financial reports and analyses. Rather than offer a report writer, Accountant, Inc. Professional offers an export capability so you can analyze your accounts in a spreadsheet.

You can password-protect every menu command. Passwords can be assigned at the employee level, and each employee can be granted unique access. The program can also generate an audit trail so you can keep track of your activities.
MODEL MODULES: The general ledger provides automatic account updating. The chart of accounts is flexible and offers user-defined names, with up to 13 open periods kept on-line.

In accounts receivable, you can define multiple sales-tax tables. Credit memos are linked directly to inventory, and each item on an invoice can have up to four description lines. The system automatically generates an aging schedule for accounts receivable. The accounts-receivable module can also handle time billing for professional-services organizations. It can produce customer mailing labels as well as automatically generate overdue-account notices.

The accounts-payable module generates checks as well as remittance advice. The payables system produces an aging schedule that is especially helpful for improving small-business cash flow. Purchase orders in the system track inventory items, and the system also generates a purchase and expense analysis.

The inventory system tracks parts and assembled items. Back orders are automatically generated, and a reorder list is available at any time. Inventory valuation can be based on weighted average or last cost.

The payroll system can handle variable payroll periods. It supports nine income categories and works with both hourly and salaried employees. It can also automatically generate federal forms 940, 941, and W2 and provides for up to 50 user-definable deductions.

Accountant, Inc. Professional can capture income and expense information related to projects or jobs and can produce specific management reports. It also lets you distribute salaries to projects and can create automatic profitability and margin reports for each project.

THE BOTTOM LINE: Accountant, Inc. Professional has done a creditable job of establishing itself as a contender in the increasingly crowded small-business-accounting market. The system offers a...
great deal of functionality, a high degree of conformance to the Mac interface, and solid accounting and bookkeeping fundamentals. Its closest competition is Teleware's M.Y.O.B. (Mind Your Own Business) (see "Critical Accounts," May '90, page 156). M.Y.O.B. is only a third the price, although adding the separate payroll program makes the prices more even. Nonetheless, Softsync's program is worth considering if you want to do all your accounting in one package.

— Ken Landis

Get Info

Accountant, Inc.
Professional
Published by: Softsync, 162 Madison Ave., New York, NY 10016; (212) 685-2080.
Version: 1.01.
List Price: $299.95.

MUSIC

Practica Musica and Harmony Grid

Used together, these two music programs offer an excellent balance of theory and experimentation.

Harmony is the underlying structure, progression, and relation of chords that governs most Western musical composition. It is also the bane of music majors and precocious amateurs.

Learning the basic vocabulary of any discipline is not as exciting as practicing the real thing. Experimenting by scooting your mouse about, hearing pleasing tones, and seeing graphic representations of music is a lot more interesting than memorizing those annoying half and whole steps that make up scales and chords. But whether experimentation or pure theory is appropriate for you depends on what your musical needs are and where you plan to go from there.

Practica Musica, from Ars Nova, is strictly old school: solid basic harmony structured into games (read: drills). Sure, some cute touches have been added, such as the sound of applause on successful completion of an activity and words of encouragement when you are doing well.

have it all. (But keep it to yourself)

The HP DeskWriter printer puts laser-quality printing right at your fingertips.

With a small size and a $1,195 price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

The DeskWriter is also designed for easy use with your Macintosh, and has both serial and AppleTalk interfaces. It even includes scalable and outline fonts. Combine that with the DeskWriter's whisper-quiet operation, and keeping it to yourself will be that much easier. So call 1-800-752-0900, Ext. 1004 for your authorized HP dealer.

There is a better way.
But all in all, it's still Harmony 101. Harmony Grid from Hip Software is an alternative approach to learning the basics of harmony. Tones are represented on a grid so that scales and chords can be seen as repeating patterns. You play these tones by moving the mouse over the grid, which provides the visceral pleasure of musical improvisation without any training or technique.

Practica Musica On booting Practica Musica, I felt suddenly transported back to the days of first-year harmony. There they are: the keyboard, the staff, the dreaded German augmented sixth chord...the only thing missing is the gleam of my professor's shining pate behind the Steinway. And, as in first-year harmony class, the lessons here are organized into 11 activities, ranging from simple pitch reading and writing to scales, modes, interval recognition, chord spelling, and ear training. Each activity is then broken into four levels of difficulty. For each "game," you earn points for correct answers and lose points for mistakes. As you master each level, you garner the coveted round of applause and a mark is made on your overall progress report, indicating successful completion of that game. As many as four people can keep individual progress reports.

Input is available either through mouse clicks on the graphic keyboard and staff or through an external synthesizer via MIDI. If you have access to a MIDI device, use it. Some of the activities are based on speed, and mouse input earns you only weak praise and few points. Also, through MIDI, you have the option to use your synth's sounds rather than the three programmed sounds (piano, organ, and harpsichord) played through the Mac's internal speaker and output jack.

Although this program is aimed at users new to harmony, it has enough activities to challenge even seasoned musicians. For those classically trained and venturing into the world of jazz, an ear-training activity is supplied that lets students work with the HP ScanJet Plus, you've

The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.

That means 256 shades of gray for the hottest-looking output from your Mac. And it's so easy, too. At the click of a mouse, you can get negative or mirror images, as well as scaling in 1% increments from 4-200%. All for $2,190, about what you would expect to pay for a 4-bit scanner.

So if you want the richest, most detailed images from your Mac, you've got it made with Hewlett-Packard. Call 1-800-752-0900, Ext. 1005 for your authorized HP dealer.

There is a better way.

For all its amenities, ease of use, good image quality, and low price, Publish! recommends the HP ScanJet Plus as their "Best Buy."
only on user-selected chords. This is wonderful practice for recognizing 9th, 11th, and 13th chords.

The Practica Musica package also includes a book, *Windows on Music*, that — although no substitute for Piston (the bible of first-year music students) — provides a good introduction to music theory and supplemental material not covered in the program.

**HARMONY GRID** Every so often, someone tries to build a better mousetrap and, having failed, moves on to the other major dilemma facing a computer-driven society: how to make music theory interesting and entertaining. Harmony Grid provides a partial answer.

You can think of scales and chords in several ways. Keyboard players view specific keys as representing specific notes, woodwind and brass players associate combinations of pads and valves with certain notes, and string players tend to see notes as patterns and positions on the instrument. This latter way of thinking forms the basis of Harmony Grid.

Each grid is arranged so that scales can be viewed as repeating patterns. On a 2 x 1 grid (meaning that horizontal movements are whole steps and vertical movements are half steps), an ascending major scale in any key is always three dots right, one dot up, three right, and one up. The advantage is that you can easily see the whole- and half-step relationships in a scale, without having to deal with the vagaries of the piano keyboard (although a graphic keyboard is included at the bottom of the screen). When you choose a scale pattern, the program filters out nondiatonic tones so that only the notes in that particular scale are played. Using the grid, you can choose a wealth of different scales, including major, various minors, whole-tone, pentatonic, and jazz-altered. You can even define your own scales, if Locrian mode is more your style.

Harmony Grid also makes improvisation more fun by including several counterpoint options. As you move the...
Harmony Grid lets you view common musical concepts graphically, such as the circle of fifths shown here.

mouse, the program harmonizes your tune, again filtering out unwanted scale tones. You can change counterpoint modes along with the different scales during play by holding down combinations of the Shift and Caps Lock keys and pressing one of the Mac number keys.

Where Harmony Grid fails is in its apparent disdain for the conventions of music theory. Minor mode, as defined by the folks at Hip Software, is not the traditional Aeolian mode, as recognized by every musician since the birth of the Renaissance, but rather the alternative Melodic Minor. Where musical terms seem too archaic or trivial, the manual simply provides its own. It may be hip, but it’s also wrong. People attempting to further their musical education on the basis of the Harmony Grid manual will find themselves at a disadvantage.

THE BOTTOM LINE In the best of all worlds, you would use these two programs in conjunction with one another. For those who are just beginning their explorations in music, Harmony Grid provides a way to visualize the rudiments of scales and chords (albeit in a hazy way) while offering the pleasure of creating music in a safe and controlled environment. Having tested the limits of the Grid and desiring a taste of traditional music theory, you should find that Practica Musica is all you could want in a first-year harmony program. The ideal harmony teacher would be an integrated combination of both programs — until that comes, your best plan is to buy both. — Christopher Breen

Get Info

Practica Musica
Published by: Ars Nova Software, P.O. Box 637, Kirkland, WA 98083; (800) 445-4866.
Version: 2.2.
List Price: $125.

Harmony Grid
Published by: Hip Software, 117 Harvard St., #3, Cambridge, MA 02139; (617) 661-2447.
Version: 1.05.
List Price: $99.

With the PaintJet color printer from Hewlett-Packard.

Look at the possibilities. Instead of basic black and a few dull shades of gray look at the zip that color adds to graphs and charts. Overheads will command attention. And reports will have sparkling visual surprises tucked inside.

The PaintJet printer brings so
Rumor Manager

Gossip, Guesses, and Goings-On

The word from Einen, West Germany, is that Apple is working very hard on a speech-or voice-input device. To avoid further conflicts with Apple Corp., the Beatles' music company, this device will be limited to handling short commands (lasting ten seconds at most), which will be recorded and read into the Macintosh at a maximum quality of 5.5 kilohertz (or fairly low voice resolution).

Furthermore, as System 7.0 gets pushed back further and further, there is a good chance that this device, and its accompanying technology, will make it into one of the several System 7.0 incremental releases — probably not 7.0 but maybe 7.33 or 7.77. If all the gremlins can't be exorcised in time for 7.77, voice commands in the System software will appear in System 8.0 for sure (but that may be late 1991 or even 1992).

Current plans call for this technology to replace the keyboard as the text-entry device of choice, making the voice-recognition box and mouse (the two can be combined in one unit) standard. Once that happens, a Shut Up command will be added to the bottom of the Special menu in the Finder.

Some poking around in Cupertino also produced news about this voice commander. It has several problems. At the moment, the prototype is a serial device, and Macs are still perpetually short of serial ports (and that's not about to change anytime soon). The voice commander must be made to work on the Apple Desktop Bus (ADB), which is no trivial task.

Another major problem is finding a microphone of suitable sensitivity and directionality so that my telling my Mac to erase a disk doesn't wipe out your hard disk. Putting the microphone into the mouse actually helps.

Further digging about in Cupertino also turned up some news on the second Mac portable. The introduction will be very soon. The Mac Portable 2 will be about the same size as its cousin but will weigh in at a few pounds less. The newly redesigned keyboard will feature a row of function keys. The speed will most likely remain the same (16 megahertz) and the screen will remain the same. No backlighting yet. Finally, it will have an all-new case along the lines of the excellent Madson Portable case. Oh, yes, and the video-interface box will be available at launch.

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) and 72511,45 (on CompuServe). No calls, please.

Now you can milk your Macintosh for all it's worth.

much to your work: 256 colors for the Macintosh II and 8 colors for the Macintosh SE. For just $1,395. Plus $125 for an interface kit that connects cleanly and simply.

We'd like to hear from you. Just call 1-800-752-0900, Ext. 688C, for your nearest authorized HP dealer. We'll be happy to send you a sample color page. Complete with cows.
Do you have to avoid embarrass

The great technology lottery. You play it every time you buy computer products. Will your investment today make you look brilliant or foolish when tomorrow comes?

Enter the new MacIRMA family of connectivity products from DCA. This intelligently conceived product line provides an easy, risk-free migration path from standalone coax Mac to Mainframe connectivity to LAN gateway connectivity.

For starters the same MacIRMA WorkStation™ software that works on MacIRMA 3270 coax adapters works on MacIRMALAN™ Server Gateways, too. All you do is remove the coax board and add a LAN connection and a MacIRMALAN Gateway.

Now your Mac LANs can integrate with a mainframe, keeping your options open in terms of 802.2 or SDLC gateways for TokenTalk, EtherTalk.

MacIRMA WorkStation software and MacIRMA hardware provide DFT coax connections for the Macintosh™ SE, SE/30 and NuBus architectures.

*Or call 1-404-412-4500 ext. 612 © 1990 Digital Communications Associates, Inc. All rights reserved. DCA and MacIRMA are registered trademarks of Digital Communications Associates, Inc.
the foresight assing hindsight?

No matter what kind of environment you see in your future, you can feel very comfortable making a commitment to MacIRMA WorkStation today.

It’ll give you complete confidence that you’ll never have to second guess yourself or LocalTalk. And reliable, lower cost PCs or PS/2's are used as gateways.

Since the same workstation software is used, there’s a consistent user interface from standalone to LAN use, which results in reduced installation and training time. Also, MacIRMA API applications developed for coax work in the LAN gateway environment, so you walk away from none of your investment.

Please circle 37 on reader service card.
Accelerators

Faster than a speeding bullet!
More powerful than a locomotive!
We tested 30 ways to turn your mild-mannered Mac into a super performer.

BY WINN L. ROSCH AND THE MACUSER LABS STAFF

CHASING THE IIfx:
ACCELERATORS

houshalt not covet thy neighbor's computer — unless it's a Mac IIfx. Apple's new hyperfast flagship has redefined the peak of Mac performance. The instant the IIfx was announced, an epidemic of CPU envy infected thousands of formerly healthy Macintosh users. Speed greed is on the upswing, and no one is immune.

Fortunately, antidotes are available. A dozen manufacturers offer ways to improve your Mac's performance, whether you have a lowly Plus or the recently dethroned IIci. You can accelerate your Mac II so it will work almost as quickly as the enviable IIfx, and with a logic-board upgrade from Apple, you can even transform it into a full-fledged IIfx. Any Mac can find a new, faster life with an accelerator board or a logic-board upgrade to move it up the evolutionary ladder.
Chasing the IIfx: Accelerators

Figure 1: Real-World Performance

- Mac IIfx
- Siclone Si3050 (II)
- DayStar 50MHz PowerCard 030 II
- DayStar 40MHz PowerCard 030 II
- DayStar Fast Cache II
- Total Systems Voyager 030/33 (II)
- Siclone Si3033 (II)
- Total Systems Gemini 030 SE
- Total Systems Gemini 030 Plus
- Novy Quik30/Plus-33MHz
- DayStar 33MHz PowerCard 030 II
- MacProducts '030 RailGun (Plus)
- Mac IIc
- DayStar 25MHz PowerCard 030 II
- Dove MaraThon 030/SE30
- Total Systems Gemini 020 SE
- Dove MaraThon 030/II
- Total Systems Gemini 020 Plus
- Radius Accelerator 25 SE
- Mac SE/30
- Mac IIcx
- Mac IIx
- Dove MaraThon MSE3 (SE)
- Orchid MacSprint II (cache)
- Dove MaraThon Racer (II cache)
- Radius Accelerator 16 SE
- Mac II
- Radius Accelerator 16 Plus
- Siclone Turbo SE
- RasterOps ClearVue/SE
- Aox DoubleTime-16 (SE)
- Newer Technology MacSElerator
- Mac SE
- Mac Plus

Performance factor

High performance without the expense of special IIfx RAM.

IIfx power for the Plus or SE.

Performance equal to a IIfx upgrade for much less money.
Accelerator boards and upgrades are add-ins that can speed the pace of most Macs’ already quick microprocessors. No matter what Mac model you have, there’s something available to make it faster — you can improve even the speedy IIfx with a QuickDraw accelerator (see the “QuickDraw Accelerators” sidebar in “In Living Color,” May ’90, Buyer’s Guide, page 40). Accelerators can make your calculations quicker, screen changes speedier, and cut-and-paste jobs smoother.

Although the results of acceleration are easy to see, the technology is complex — in some cases involving an entire brain transplant for your Mac. Moreover, every Mac system is different, and so is every enhancement, and the results each combination delivers vary with the programs you run. Depending on what you have, what you do, and what you spend, your work can go anywhere from 20 to 600 percent faster with an accelerator or upgrade.

Putting together the right combination of accelerator and Mac can be a tough job, if only because of the large number of products available — we turned up a total of 30 accelerators and upgrades aimed at various Mac models. We put each through a battery of tests to help you find the best one for you. This report shows you what your acceleration options are, which ones best suit what you do with your Mac, and which products are the most cost-effective speed solutions for your system. Make the right choice, and your new accelerator board can mean not just creating a little extra free time but also perhaps changing the chore of working with your Mac into a veritable vacation.

Performance Options
Although a single concept, better Mac performance involves a variety of technologies and products. Endowing your Mac with an entirely new and faster microprocessor is only one of the options available. You can also add more memory to augment your system’s performance or slip in a memory enhancement called a cache board. More-specialized products such as QuickDraw accelerators and FPU boards (floating-point units) supercharge a single facet of your Mac’s operation. Moreover, most of these acceleration products are not mutually exclusive. You can add one or several to your system, depending on what you want to achieve — and what you can afford.

Deciding which to choose requires consideration of what Mac model you have and what you do with it. Some acceleration strategies are effective only for particular application types and are a waste of money if they are not targeted at the kind of work you do. Also, not all types of acceleration products are available for — or needed with — all Mac models.

The obvious enhancement is to replace your Mac’s microprocessor chip with a faster, more powerful one (see the “Chip’s Family History” sidebar). Unfortunately, replacing just this chip is more complex than most chores you normally face around your
Chasing the IIfx: Accelerators

**Figure 2: Raw Performance**

<table>
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<td>Mac SE</td>
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<td>Mac Plus</td>
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Cache card does little to help raw performance.

Whetstone performance takes off when math coprocessor joins the CPU.
Your SE/30’s performance can improve by 40 percent if you install a Dove Marathon 030/SE30.

home or office. Not only would you have to deal with the vagaries of a soldering iron, but you would also need to adapt the faster chip to mate with your Mac’s slower circuitry. This adaptation involves adding a few extra chips and circuits — which is how manufacturers create accelerator boards.

The most significant advantage of an accelerator that is based on a faster microprocessor is that it speeds up everything. No matter what sort of software you run regularly, you’ll see some improvement if you replace your system’s microprocessor with a faster, more powerful model (see Figure 1). Not every program speeds up equally, though, and some may not speed up enough to make your investment in an accelerator cost-effective. Other acceleration strategies may yield higher returns.

Outgunning QuickDraw

To your applications, your Mac’s circuitry is like a bramble patch. As instructions and data work their way through the tangle of chips, something always gets in the way to slow things down. Cut through the microprocessor slowdown, and something else will snag your sweater. The culprit, and thus the most effective speedup for your system, depends on the type of application that you’re running.

If you work with color images and 32-bit QuickDraw, for example, a QuickDraw accelerator can dramatically improve your Macintosh’s performance. Images that normally take eight seconds to paint on-screen can flash up in two seconds or less with an accelerator.

A QuickDraw accelerator can be a separate NuBus board, a daughter-card that attaches to a NuBus video board, or part of the video board itself. The accelerator incorporates its own high-speed microprocessor dedicated to handling your programs’ QuickDraw needs. It earns its big speedup by functioning as a true coprocessor, releasing your Mac’s main microprocessor from the video overhead. In addition, the QuickDraw accelerator is designed and optimized for a single purpose — speeding up QuickDraw — so it’s naturally faster than your Mac’s general-purpose microprocessor.

QuickDraw accelerators give the most noticeable improvement when you run programs that make heavy use of 24-bit color — programs such as Adobe Photoshop, Electronic Arts’ The Siclone Turbo SE (top) is a great buy for SE owners. The ClearVue/SE (center) includes a two-page monochrome monitor for $1,999. For all-round performance and features, Apple’s Mac SE/30 logic-board upgrade (bottom) is your best bet.
Consistently, people who work with numbers have some noticeable traits. They're intelligent, organized and thorough—buttoned up, if you will. Which explains why Microsoft Excel has been the spreadsheet standard for Macintosh ever since it was introduced in 1985. Today, 90% of Macintosh spreadsheet users do their calculating, manipulating, analyzing and presenting with it.

And while Microsoft Excel has always been easy to learn and use, it can now perform all the complex functions you perform, but with labor-saving benefits. You can easily build complex models, and conveniently link multiple sheets with a simple point and click.

So the left hand knows what the right is doing, we’ve added a feature that will tie your data into Microsoft Word documents. Then update that same data automatically, when

*With Microsoft Excel you can create impressive documents, choosing from 256 fonts and colors, variable row height and shading.*

### WinMark Copiers

#### Profitability by division

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| Gross Profit           | $6,552  | $9,102  | $10,425 | $6,438  | $10,140 | $21,300 |

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it's been changed in Microsoft Excel.

To insure data integrity, we've even built in alerts that will warn you of such grievous errors as circular references. In fact, Microsoft Excel is so bright, it will actually review your worksheet and flag any formulas that don't fit an established pattern.

Furthermore, the search and replace function can make corrections on a global scale. And customized number formatting lets you bend the rules, allowing you to create everything from a 3-digit account code to a 17-digit part number.

Now, we've left a lot out in this short discourse, but Microsoft Excel hasn't. So be sure to ask your dealer for a complete explanation of its capabilities. And you'll see how Microsoft Excel will make your job easier and better.

Or, if you look at it a different way, you'll become a more effective manipulator. And a more efficient calculator.

Microsoft
Making it all make sense

Then you can Paste Link those worksheets and charts into your Microsoft Word documents and update them automatically.

---

**MEMO:**

**TO:** Shannon Pitts  
**FR:** Peter Cohen  
**DT:** November 13th, 1989  
**RE:** Presentation to the Board

In preparation for the annual meeting, I've created a 20-minute slide presentation on our successful entry into the small printer market.

The presentation will explain to the shareholders that, on a basis of sound marketing strategy, reinforced with our knowledge of the printer business at other levels, we have been able to grow from a 2 percent share of market, to 9 percent in 18 short months.

To the right is an excerpt of the presentation which illustrates our growth. Anticipated concerns will probably center around quality of service and the ability to meet market demand over the next year.

We should be able to squelch any fears by explaining that our small printers have a very low (4%) field repair call requirement at present.

And our assembly resources here in the

---

**WinMark Copiers**

**WxC 2000**

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<td>140%</td>
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With a very respectable 9 percent share after only 18 months, we feel we can reach 15 percent by the end of the next fiscal year (see six month projection).

---

**FY90 REVENUE**
Chasing the IIfx: Accelerators

Figure 3: Disk-Intensive Performance

- Mac IIfx
- Siclone Si3050 (II)
- DayStar 50MHz PowerCard 030 II
- DayStar 40MHz PowerCard 030 II
- Total Systems Voyager 030/33 (II)
- DayStar Fast Cache IICi
- Siclone Si3033 (II)
- DayStar 33MHz PowerCard 030 II
- Dove MaraThon 030/SE30
- Total Systems Gemini 030 Plus
- Total Systems Gemini 030 SE
- Mac IIfx
- DayStar 25MHz PowerCard 030 II
- Dove MaraThon 030/II
- Dove MaraThon MSE9 (SE)
- Mac IIfx
- Dove MaraThon Racer (I I cache)
- Total Systems Gemini 020 Plus
- Mac IIfx
- Mac SE/30
- Orchid MacSprint II (cache)
- Radius Accelerator 25 SE
- Total Systems Gemini 020 SE
- Mac IIfx
- Radius Accelerator 16 SE
- Siclone Turbo SE
- Aox DoubleTime-16 (SE)
- Newer Technology MacSElerator
- RasterOps ClearVue/SE
- Novy Quik30/Plus-33MHz
- MacProducts '030 RailGun (Plus)
- MacSE
- Radius Accelerator 16 Plus
- Mac Plus

Performance factor

Cache card boosts the IICi into the big leagues.

In addition to speed, you get color QuickDraw, 3-megabyte RAM capability, and stereo sound.

Fast accelerators strangled by the Plus' slow SCSI port.
Studio/32, Letraset’s Color Studio, and SuperMac Technology’s PixelPaint Professional — although 8-bit color applications also benefit from accelerators that can accelerate 8-bit color. Don’t worry about accelerating your monochrome display, though, since an unadorned Mac can easily handle its simple pixel work.

Programs that work with PostScript are good candidates for a microprocessor accelerator because PostScript relies quite heavily on the number-crunching part of your Mac. PostScript graphics applications that benefit most from microprocessor acceleration include desktop-publishing and illustration programs such as Aldus PageMaker, Adobe Illustrator, and Aldus FreeHand. Three-dimensional-drawing and -rendering programs such as Paracomp’s Swivel 3D, Pixar’s Renderman, and Strata’s StrataVision 3D, for example — also benefit from a CPU accelerator.

Some programs combine 32-bit QuickDraw with PostScript images. In PageMaker, for example, you might flow text around a 24-bit-color photo. Such applications can benefit from QuickDraw and CPU acceleration individually or, even better, from both. Besides PageMaker, Letraset’s Design Studio and Quark’s QuarkXPress are likely to need to tap the powers of both of these acceleration techniques.

Further Improvements

A floating-point unit can also dramatically improve the performance of your Mac Plus or SE. If you own a Mac II or later, you already have an FPU (although you may want to upgrade to a faster version). Sometimes called a math or numeric coprocessor, a Motorola 68881 or 68882 FPU is optimized to handle floating-point operations (see Figure 2) in applications that draw on its abilities (see the “Inside SANE” sidebar). That is, it can calculate numbers with decimal fractions (it’s the decimal point that floats through its calculations) with lightning speed — an FPU can speed up the jobs for which it was designed by as much as 400 times!

Don’t be misled into believing that any program that uses math will accelerate if you add an FPU, though. The FPU is at its best crunching through math functions such as square roots and trigonometric operations (sines, cosines, tangents, and the like). It usually doesn’t speed up ordinary addition and subtraction, since these operations take place in the CPU. Moreover, most applications, even those that occasionally come up with decimal or fractional answers, use integer math.

The applications that can benefit are those that grind through tons of numerical grist — statistical analysis, scientific modeling programs, and applications that manipulate complex graphics and 3-D models. Examples of these include Spysglass’ Scientific Modeling, Odesta’s Data Desk, and SAS Institute’s JMP as well as most CAD packages (see “Mac CAD Takes Off” in this issue). Also, if your spreadsheet work involves elaborate financial modeling,
Chasing the llfx: Accelerators

Chip's Family History

In 1979, Motorola unveiled a new chip containing 68,000 transistors on a wafer no bigger than a few square millimeters. Dubbed the MC68000, the new chip began a line of microprocessors that were to become the major CPUs in the workstation market and — lucky for us — the brains of the Mac. In fact, the 68000 family has been so successful that posters warning “680XO: Just Say No” have appeared in the offices of Intel manufacturer of the microprocessors used in IBM PCs and their clones.

Although it was a modest performer at first, the 68000 family has improved over the years, with each descendant able to run software developed for earlier versions. Over the past 11 years, Motorola has added transistors, shortened the distances that signals travel, introduced more functions, and added parallel processing. The result has been an almost exponential growth in performance.

Although the original 68000 used a 32-bit data path internally, it communicated with the outside world only in 16-bit chunks. And Apple didn’t make use of the full 16-bit path until it developed the Mac SE; previous Macs employed 8-bit throughput. The first addition to the 68000 line was the little-known 68010. Although it added 32-bit input/output, it included little other improvement. Apple passed it over and opted instead for the next Motorola upgrade, the 68020, when it introduced the Mac II.

The 68020 almost tripled the number of transistors that the 68000 squeezed onto a chip and was three to four times faster than the 68000. Apple improved the speed of the Mac II by also including a Motorola 68881 floating-point coprocessor, which freed the CPU from math-intensive tasks. As an option, Mac II owners could also add a 68851 PMMU (Page Memory Management Unit) chip, which allowed software such as A/UX or Connectix’s Virtual to use virtual memory. The 68020 and 68851 were nice chips, but their use was short-lived in the Mac.

While Apple was busy rolling out the hot new Mac II in 1987, Motorola announced the next upgrade to the CPU line, the 68030. The 68030 included a memory-management unit built into the chip itself. Motorola also beefed up the chip’s performance by using a concept known as Harvard architecture, borrowed from the mainframe world, which allowed certain operations to be processed simultaneously. Performance was also greatly helped with built-in caches for data and instructions. With its 325,000 transistors, the 68030 is now the workhorse of the Mac line and is the brains of the SE/30, llfx, llci, llfx, and now-discontinued llx.

The latest in Motorola’s line is the 68040, unveiled last winter and expected in a Mac sometime next year. And what a Mac that will be — in addition to everything the 68030 has, the 68040 incorporates a built-in floating-point unit, making a math coprocessor unnecessary. Because signals don’t have to leave the chip, floating-point performance is an order of magnitude faster than that of the 68030. The caches are larger than those found in the 68030, and there is a much greater degree of concurrency (more operations are processed in parallel).

The result is a CPU with 1,200,000 transistors (more than 17 times the number in the original 68000) and with more than 27 times the raw performance of the 68000. In fact, Motorola claims that the 68040’s performance is as fast or faster than that of RISC workstation processors such as the Sun SPARC or Motorola’s own 68000.

Power users, start saving your pennies — lots and lots of pennies.

— John Rizzo

an FPU can be a godsend.

Disk-intensive applications — such as database management — often don’t benefit much from microprocessor-oriented acceleration (see Figure 3). If you’re a database developer, however, an accelerator can help you zip through time-consuming syntax checks and layout building. There’s one sure way to speed up all work with your favorite database program: a faster hard-disk drive.

ACIUS’ 4th Dimension, Blythe Software’s Omnis 5, Fox Software’s FoxBASE+/Mac, and HyperCard can all benefit when you upgrade to a superfast hard-disk drive.

Disk speedup is easy — just install a new, faster disk. As a side benefit, you’ll also get more storage space, because fast disks are typically larger than slower models. The bigger the disk, the more read-write heads it has and the faster it can access data. But the real reason for the big = fast equation is simple economics: Manufacturers use their fastest hardware on their biggest, most expensive drives.

The Mac Plus suffers from a singular problem with hard-disk performance — its SCSI controller lacks a handshaking connection, which means the Mac Plus microprocessor can never be certain whether its hard disk is ready to receive data. To avoid...
Inside SANE

Even Mac programmers, mathematicians, and rocket scientists (as well as average businessfolk) are happy to leave the serious number crunching to the computer. Instead of forcing programmers to write new, elaborate code for every math-intensive application, Apple has simplified their task by creating SANE (standard Apple numeric environment). This hidden industrial-strength arithmetic is the part of the Mac operating system that controls the 68881 and 68882 math coprocessors. Application developers make simple calls to SANE, which then handles the time-consuming details of floating-point math.

SANE is based on the IEEE (Institute of Electrical and Electronics Engineers) 754 standard. Apple chose to go beyond the requirements of this standard, however, and gave SANE increased precision (for a complete nuts-and-bolts programmers' reference, see the Apple Numerics Manual, second edition (Reading, Massachusetts: Addison-Wesley, 1988). Unfortunately, because it performs calculations to more decimal places, SANE is slower than the IEEE standard.

Several of the Mac accelerator boards we tested come with optional software replacements for SANE. These coprocessor drivers don't calculate to as many decimal places as SANE does and therefore can significantly speed up floating-point calculations. For example, Radius' SANE alternative, Radius Math, follows the IEEE standard more closely than does SANE — achieving faster performance.

Memory Matters

If your system has a lot of memory — that is, memory to spare — you can put it to work accelerating the performance of your system's disk as a RAM cache. A RAM cache stores disk data in memory, where it can be accessed electronically many times faster than through the mechanical facilities of the disk. The more memory in the cache, the more the disk can speed up.

You control the amount of memory that your Mac devotes to its RAM cache via the Control Panel. You can devote up to 4 megabytes to your RAM cache — providing, of course, that you've got at least that much memory in your system. That's one more reason for putting as much RAM into your Mac as you can.

Adding memory to your Mac also helps boost the speed of applications, such as Ashton-Tate's Full Impact and Adobe Photoshop, that take advantage of virtual-memory techniques. These programs are smart enough to break themselves into pieces and temporarily store chunks on your hard disk that won't fit into RAM. Of course, shuffling program parts from disk to RAM and back again slows down your Mac about as much as chaining an iron ball to your mouse. Add more RAM, and the programs zoom back up to RAM speed.

One problem all high-performance computers have to face is keeping up with the dizzying data-processing rates of their microprocessors. You can choose to enhance your system's memory by adding a memory cache, a block of blazingly fast RAM chips — usually expensive static-RAM chips rated at 25 nanoseconds (billionths of a second). (System RAM is relatively pokey, rated at 80 to 120 nanoseconds.) Caches temporarily store data or instructions that would otherwise have to be accessed from slower RAM. As with disk caches, the larger a memory cache is (all else
Chasing the Ilfx: Accelerators

On the Horizon

The Mac Ilfx is not the only new high-speed star in the Mac firmament. Apple has also announced its Macintosh IIcxi Cache Card, which features 32K of high-speed static RAM. For no software, this card simply drops into the Ilcsi's cache-card slot and configures itself when the Ilc is powered up. Other vendors are entering the cachecard field as well: UR-Micro (Williamsville, New York) is now shipping MacCache, a 64K static-RAM cache board with accompanying cde; and Micron Technology (Boise, Idaho) is offering the Xceed Ilcix128 cache card with 128K of static RAM.

Total Systems now offers the Voyager 030/50, manufactured by Siconne and similar to the Siconne tested in this lab report. With a 50-megahertz CPU and 64K static-RAM cache, the Voyager 030/50 lists for $4,995. Add a 50-megahertz FPU, and the price jumps to $5,995. Total Systems will also offer 33- to 40- and 50-megahertz versions of the Gemini 030 (FPU optional).

Newbridge Microsystems will offer its NewLife 25 accelerator for the Mac 128K or 512K (with "enhanced" 128K ROMs), 512KE, Plus, and SE. Featuring a 25-megahertz 68030 and a 68882, the NewLife 25 will list for $1,530. The NewLife 33 for the SE and SE/30 will feature a 33-megahertz 68030/68882 chip set and a 64K static-RAM cache; its faster performance will set you back $2,995. The NewLife 25 and 33 will both feature an optional video interface for popular multisync and full-page monitors. Newbridge Microsystems, 20 Edgewater St., Kanata, Ontario K2L 1V8, Canada; (613) 336-1014.

At press time, two low-cost accelerators were under development for earlier Macs. Both promise System 7 compatibility, thanks to their use of 16-megahertz 68030 processors. Dove's Marathox 030 for the Plus or SE will provide a 16-megahertz 68030 that clips onto the Plus' or SE's 68000 CPU. The Marathox 030 will list for $695 and come bundled with Symantec's SLIM II and SAM 2.0. Total Systems' Mercury 030 Accelerator Upgrade Card will feature a 16-megahertz 68030 and a modular design to allow future expansion. Sockets on the Mercury will allow the addition of a 68882 FPU and up to 4 megabytes of fast RAM. Plug-in modules will add high-speed SCSI or video capability. Compatible with the Mac 128K or 512K (with "enhanced" 128K ROMs), 512KE, Plus, and the Mac SE, the basic Mercury 030 will list for $695 for the SE and $845 for Mac 128K through Plus.

DayStar will have two products — the SCIS PowerCard and the RAM PowerCard — that can use the PowerPlane interface featured on the PowerCard accelerators for the Mac II, Ilx, and Ilcx. Although both PowerCards can install in NuBus slots, optimum performance will occur when they are connected to one of DayStar's PowerCard accelerators through the PowerPlane. The SCIS PowerCard will feature an NCR 5390 SCSI controller, a 16-megahertz 68000 processor, and 4 SIMM sockets that can accept up to 16 megabytes of 100-nanosecond RAM for buffering disk data. The SCIS PowerCard will list for $1,295 with any RAM, $1,495 with 1 megabyte, and $1,995 with 4 megabytes. The RAM PowerCard will contain 16 SIMM sockets that accept 256K, 1-megabyte, or 4-megabyte 100-nanosecond SIMMs to provide 1 megabyte to 64 megabytes of memory. This RAM may be configured as system RAM and/or as a RAM disk. The RAM PowerCard will list for $695 without any RAM, for $1,995 with 8 megabytes, and for $3,495 with 16 megabytes.

MicroNet Technology (Irvine, California) will soon offer its NuPORT SCSI DMA Card, featuring an NCR 5390 SCSI controller. The NuPORT will initially ship as a $600 option for MicroNet's faster hard-disk drives. The NuPORT is a high-throughput SCSI interface specifically designed for hard disk drives that can maintain sustained high rates of data transfer.

Novy Systems will offer a SCIS Interface for $79 that adds high-speed SCSI capability to Quik30-accelerated Macs, from the 128K through the Plus. Novy will also manufacture this interface for use in the RailGun line from MacProducts.

For the Mac SE and II series, Mobius Technologies (Emeryville, California) will offer components: accelerators for MicroNet's faster hard-disk drives. This component will maintain sustained high rates of data transfer.

— Jeffrey S. Pittelkau

being equal), the faster your system will usually perform.

The microprocessors used in more-advanced Macs have their own caches built right into the chip, but these caches are so tiny that they can’t do the work of add-on memory caches. The 68020 has a 256-byte cache that can hold only microprocessor instructions. The 68030 has two 256-byte caches: one for instructions and one for data. Most add-on memory caches start at 4K and stretch to 32K or 64K. Adding a cache to systems that support them (or increasing the size of the existing cache) is generally the most cost-effective speedup you can buy. Some of the accelerators we tested have caches built in (see Table 1). We also tested three cache-only cards: the DayStar Fast Cache IIcxi; and the Dove Marathox Racer and Orchid MacSprint II, both for the Mac II.

Some manufacturers use “smart” caching techniques (called set-associa
tive caches) that allow smaller smart caches to operate faster than larger dumb caches. The only way to find out how well a cache works is to test it, which is one reason MacUser Labs put all 30 accelerators and logicboard upgrades through such an exhaustive set of tests.

Although more RAM is usually better, simply adding faster memory won’t make a difference to your Mac’s
performance. But if you add slow memory to a Mac that requires the speedy stuff, your fast Mac won’t work — period. All RAM chips are speed-rated, and by convention, this rating is given in nanoseconds. A 100-nanosecond RAM chip can operate at speeds up to about 10 megahertz. Putting faster chips into your Mac — 80-nanosecond instead of 120-nanosecond chips, for example — won’t speed it up at all. The rated speed of memory chips indicates only how fast they can perform; your Mac determines how fast they actually do perform.

You need to worry about RAM-chip speed only when you want to move memory from one Mac to another or to an upgrade that you’ve made to your Mac, because you must ensure that the chips are capable of operating at the speed demanded by the system. For example, the 120-nanosecond chips used in Macs from the II to the IICx don’t work in the IIG, which requires 80-nanosecond chips. The hyperspeed IIfx complicates matters further, since it requires not only fast RAM but also an entirely different type of RAM-chip arrangement. This consideration is important if you’re contemplating Apple’s generous IIfx logic-board upgrade — you’ll have to purchase all-new RAM.

### Table 1: Features of Accelerators

<table>
<thead>
<tr>
<th>Features</th>
<th>MacProducts '83 Rail/Gan-25MHz</th>
<th>Novy Systems Quick30/Plus-33MHz</th>
<th>Radius Accelerator 16 Plus</th>
<th>Total Systems Gemini Q20</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>$999 with FPU</td>
<td>$1,994 with FPU</td>
<td>$1,095 with FPU</td>
<td>SE: $745 ($955 with FPU)</td>
</tr>
<tr>
<td>Options</td>
<td>$799 without FPU</td>
<td>$1,485 without FPU</td>
<td>$795 without FPU</td>
<td>Plus: $895 ($1,045 with FPU)</td>
</tr>
<tr>
<td>Comments</td>
<td>Manufactured by Novy and sold by MacProducts USA; Same basic design as Novy Quick30/Plus-33MHz; Limited SCSI throughput (upgrade planned).</td>
<td>Iili computing power in a Plus; Limited SCSI throughput (upgrade planned).</td>
<td>Complex installation, best left to dealer. Limited SCSI throughput, but SilverLining 5.2 software helps.</td>
<td>Complex installation, best left to dealer. Recommended GemKit option speeds SCSI throughput on Plus. Can be upgraded to 68030.</td>
</tr>
<tr>
<td>Hardware</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU and clock speed (megahertz)</td>
<td>68030, 25 MHz</td>
<td>68030, 33.3 MHz</td>
<td>68020, 16 MHz</td>
<td>68020, 16 MHz</td>
</tr>
<tr>
<td>FPU and clock speed (megahertz)</td>
<td>68882, 25 MHz</td>
<td>68882, 33.3 MHz</td>
<td>68881, 16 MHz</td>
<td>68881 (opt. 68882), 16 MHz</td>
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<tr>
<td>Static-RAM cache</td>
<td>no</td>
<td>no</td>
<td>32K direct map</td>
<td>no</td>
</tr>
<tr>
<td>Max. motherboard RAM</td>
<td>4 MB</td>
<td>4 MB</td>
<td>4 MB</td>
<td>512K</td>
</tr>
<tr>
<td>Max. accelerator RAM</td>
<td>4 MB</td>
<td>4 MB</td>
<td>NA</td>
<td>4 MB</td>
</tr>
<tr>
<td>Accelerator RAM wait states</td>
<td>0.1, 2</td>
<td>0.1, 2</td>
<td>NA</td>
<td>0.1, 2</td>
</tr>
<tr>
<td>Mac ROM placement</td>
<td>copied to fast RAM</td>
<td>copied to fast RAM</td>
<td>NA</td>
<td>copied to fast RAM</td>
</tr>
<tr>
<td>Expansion ports</td>
<td>SCSI port for 128K and 512K Macs ($69), video</td>
<td>SCSI port for 128K and 512K Macs ($99), video</td>
<td>Radius MagicBus (for TPD and FPD interfaces) for E-Machines monitor, fast SCSI</td>
<td></td>
</tr>
<tr>
<td>Power supply/fan</td>
<td>$99 option</td>
<td>$149 option</td>
<td>$149 option</td>
<td>$150</td>
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<tr>
<td>Software</td>
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<td></td>
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<tr>
<td>Accelerator disable</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Cache disabled</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>SANE patch</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>RAM disk</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Other software</td>
<td>Smart Cache</td>
<td>LocalTalk and sound patches, hard-disk cache</td>
<td>sound patch</td>
<td>XPROM INIT, Scroll Limit</td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year</td>
<td>6 months</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>MacProducts USA, Inc. 8303 Mapis Expresway Austin, TX 78759 (800) 622-3475 (512) 349-9441</td>
<td>Novy Systems, Inc. 1962 Fern Pains Drive Edgewater, FL 32141 (904) 427-2358</td>
<td>Radius, Inc. 1710 Fortune Drive San Jose, CA 95131 (800) 227-2795 (408) 434-1910</td>
<td>Total Systems 99 W. 10th Ave Eugene, OR 97401 (800) 874-2288 (503) 348-7335</td>
</tr>
</tbody>
</table>

### The Screwdriver Game

Even if you’re convinced that acceleration is the only thing that can make you truly happy with your Mac again, you face a troubling question: Can or should you install the accelerator yourself? The answer again depends on what Mac you have and what you want to install.

The most challenging project is upgrading a Mac Plus; things get easier as you move up the evolutionary ladder. With any non-NuBus Mac (the Plus, SE, and SE/30), you need special tools and must exercise special care. An “opening kit” usually includes a long-shafted T15 Torx screwdriver — Torx refers to the
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### Table 1: Features of Accelerators, continued

<table>
<thead>
<tr>
<th>List price</th>
<th>Total Systems Gemini 930</th>
<th>Apple Mac SE/30 upgrade</th>
<th>Aez DoubleTime-16</th>
<th>Dove MarathOn MSE3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ac tested</td>
<td>SE: $1,695 ($2,195 w/ FPU)</td>
<td>$2,298 with FDH upgrade</td>
<td>$395 without FPU</td>
<td>$999 with FPU</td>
</tr>
<tr>
<td>Options</td>
<td>Plus: $1,895 ($2,395 w/ FPU)</td>
<td>$1,699 logic board only</td>
<td>$545 with FPU</td>
<td>$599 without FPU</td>
</tr>
<tr>
<td>Comments</td>
<td>Like Gemini O20 but has faster 68020/68882 chips and higher clock speed. Complex installation. GemKit option speeds SCSI throughput on Plus.</td>
<td>Color QuickDraw; stereo sound; capability for 8 MB of RAM wins out over other SE accelerator options, except in maximum speed. FDH option recommended.</td>
<td>Low cost, modest increase in performance, simple installation. Good choice for tight budget.</td>
<td>Simple design with few components. Easy to install. Faster 68030 version should ship by the time you read this.</td>
</tr>
<tr>
<td>Macs supported</td>
<td>128K, 512K, Plus, SE</td>
<td>SE</td>
<td>SE</td>
<td>SE</td>
</tr>
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<td>Hardware</td>
<td>CPU and clock speed (megahertz) 68030, 25 MHz</td>
<td>68030, 16 MHz</td>
<td>68000, 16 MHz</td>
<td>68020, 16 MHz</td>
</tr>
<tr>
<td></td>
<td>FPU and clock speed (megahertz) 68882 (opt. 68881), 25 MHz</td>
<td>68882, 16 MHz</td>
<td>opt. 68881, 16 MHz</td>
<td>68881, 16 MHz (opt. 68882)</td>
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<tr>
<td>Static-RAM cache</td>
<td>no</td>
<td>no</td>
<td>4K direct map</td>
<td>no</td>
</tr>
<tr>
<td>Max. motherboard RAM</td>
<td>512K</td>
<td>8 MB</td>
<td>4 MB</td>
<td>1 MB</td>
</tr>
<tr>
<td>Max. accelerator RAM</td>
<td>4 MB</td>
<td>NA</td>
<td>NA</td>
<td>4 MB (120 nsec or faster)</td>
</tr>
<tr>
<td>Accelerator RAM wait states</td>
<td>0, 1, 2</td>
<td>NA</td>
<td>NA</td>
<td>0</td>
</tr>
<tr>
<td>Mac ROM placement</td>
<td>copied to fast RAM</td>
<td>NA</td>
<td>NA</td>
<td>copied to fast RAM</td>
</tr>
<tr>
<td>Expansion ports</td>
<td>video-card adapters for MegaGraphics, E-Machines</td>
<td>030 Direct Slot</td>
<td>E-Machines video</td>
<td>E-Machines video</td>
</tr>
<tr>
<td>Power supply/fan</td>
<td>GemKit (fan, power supply, fast SC31), $200</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<td>Software</td>
<td>Accelerator disable</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Cache disable</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>SANE patch</td>
<td>yes</td>
<td>NA</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>RAM disk</td>
<td>no</td>
<td>NA</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Other software</td>
<td>XPRAM INIT, Scroll Limit</td>
<td>none</td>
<td>none</td>
<td>MacWrite 4.5 patch</td>
</tr>
<tr>
<td>Other</td>
<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Total Systems 99 W. 10th Ave. Eugene, OR 97401 (800) 874-2288 (503) 345-7395</td>
<td>Apple Computer, Inc. 30255 Mariani Ave. Cupertino, CA 95014 (408) 996-1010</td>
<td>Arce, Inc. 486 Totten Pond Road Waltham, MA 02154 (800) 232-1269 (617) 892-4402</td>
<td>Dove Computer Corp. 1230 N. 23rd St. Wilmingon, NC 28405 (800) 622-7627 (919) 763-7918</td>
</tr>
</tbody>
</table>

star-shaped pattern in the screw heads; the long shaft is needed to get at the two screws hiding down inside the handle of the Mac. Most opening kits also include a case cracker to help you pry open the cabinet of your Mac without breaking it and a static strap to aid in avoiding static damage to the delicate circuitry inside. Although Apple dealers are forbidden to sell these kits (priesthoods must protect their sacraments), a little snooping around supply shops or user groups should uncover what you need.

Besides static zaps and cabinet cracks, there are other ways to damage your Mac — that’s where the special care comes in. For example, when you try to loosen the wires on your Mac’s logic board, they’re almost guaranteed to pop off suddenly — and make your hand fly into the neck of the picture tube. The result (snap, crackle, ka-boom) will likely damage you as much as your Mac. Little wonder that opening your Mac’s case voids the Apple warranty. Then again, if you’re thinking about an accelerator, you’ve had your Mac long enough to fall out of love with it — long enough that your warranty has probably expired.

Some sage advice: If you’re upgrading a Mac Plus, buy — don’t borrow — the tools needed to open it. Most Mac Plus accelerators simply clip onto the microprocessor inside and are about as secure as walking on a newly waxed floor in a ball-bearing factory with a banana peel stuck under your shoe. Unless you never move your Mac, the clip will pop off and your accelerator will screech to a halt. If you tote your Plus around, the clip will be likely to work its way off — probably when you need your system most. Don’t just buy the opening kit — pack it in your sack when you travel.

If you’re in doubt about your system-engineering skills, have your dealer do the dirty work of accelerator installation and cross your fingers when you travel with your Plus.
You don’t have to be a big spender to have a good image.

In fact, you can have the sharpest image around for a lot less than you’d expect to pay. With the Magnavox Analog Color (MAC) display, specifically designed to complement your Macintosh II system.

And the 14" MAC display is superior to others for a very good reason: it works better.

For superb on-screen resolution, the MAC display is equipped with our fine pitch 0.29mm CRT.

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Not to mention protecting your purchase with a solid, two-year limited warranty instead of the usual 90 days. All of which adds up to quite a value.

Improving your image is smart. Improving it while saving money, that’s very smart.

Macintosh IIx, IIcx, and IIci compatible.

Apple Macintosh II is a registered trademark of Apple Computer, Inc.
## Table 1: Features of Accelerators, continued

<table>
<thead>
<tr>
<th>Features</th>
<th>Newer Technology MacSEelerator</th>
<th>Radius Accelerator 16 SE</th>
<th>Radius Accelerator 25 SE</th>
<th>RasterOps ClearVu/SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>As tested $595 with FPU</td>
<td>$1,895 with FPU</td>
<td>$1,895 with FPU</td>
<td>$1,995 with two-page display</td>
</tr>
<tr>
<td>Options</td>
<td>$295 without FPU</td>
<td>$795 without FPU</td>
<td>$1,395 without FPU</td>
<td>$795 with APD interface</td>
</tr>
<tr>
<td>Comments</td>
<td>Manufactured by Aox. Good price/performance</td>
<td>Simple installation via Control Panel or startup dialog box</td>
<td>Like Radius' 16-MHz board, 25-MHz version also has 68882 FPU for faster performance. Easy configuration via Control Panel or startup dialog box.</td>
<td>Mac RAM and ROM must be moved to accelerator. Includes video interface for two-page monitor or Apple Portrait Display (see April '90, page 184).</td>
</tr>
<tr>
<td>Macs supported</td>
<td>SE</td>
<td>SE</td>
<td>SE</td>
<td>SE</td>
</tr>
<tr>
<td>Hardware</td>
<td>CPU and clock speed (megahertz) 68000, 16 MHz</td>
<td>68020, 16 MHz</td>
<td>68020, 25 MHz</td>
<td>68000, 16 MHz</td>
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<td>CPU and clock speed (megahertz)</td>
<td>68000, 16 MHz</td>
<td>68020, 16 MHz</td>
<td>68020, 25 MHz</td>
<td>68000, 16 MHz</td>
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<td>FPU and clock speed (megahertz)</td>
<td>68881, 16 MHz</td>
<td>68881, 16 MHz</td>
<td>68882, 25 MHz</td>
<td>opt. 68881, 16 MHz</td>
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<td>Static-RAM cache</td>
<td>4K direct map</td>
<td>32K direct map</td>
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<td>NA</td>
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<tr>
<td>Max. accelerator RAM</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>4 MB</td>
</tr>
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<td>Max. accelerator RAM placement</td>
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<td>Accelerator RAM wall states</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>on accelerator</td>
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<tr>
<td>Mac ROM placement</td>
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<td>NA</td>
<td>NA</td>
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<td>Expansion ports</td>
<td>E-Machines video</td>
<td>Radius MagicBus (for TPD and FPD interfaces)</td>
<td>Radius MagicBus (for TPD and FPD interfaces)</td>
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<td>NA</td>
<td>NA</td>
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<td>Software</td>
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<td>Cache disable</td>
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<td>yes</td>
<td>no</td>
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<td>SANE patch</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>incl. with FPU option</td>
</tr>
<tr>
<td>RAM disk</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
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<td>Other software</td>
<td>none</td>
<td>sound patch</td>
<td>sound patch</td>
<td>video software, sound patch</td>
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<tr>
<td>Other</td>
<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Newer Technology</td>
<td>Radius, Inc.</td>
<td>Radius, Inc.</td>
<td>RasterOps Corp.</td>
</tr>
<tr>
<td></td>
<td>1117 S. Rock Road</td>
<td>1710 Fortune Drive</td>
<td>1710 Fortune Drive</td>
<td>2500 Walsh Ave.</td>
</tr>
<tr>
<td></td>
<td>Wichita, KS 67207</td>
<td>San Jose, CA 95131</td>
<td>San Jose, CA 95131</td>
<td>Santa Clara, CA 95051</td>
</tr>
<tr>
<td></td>
<td>(316) 685-4004</td>
<td>(408) 227-2796</td>
<td>(408) 227-2765</td>
<td>(408) 562-4200</td>
</tr>
</tbody>
</table>

Adding an accelerator to a Macintosh SE, SE/30, or a member of the Macintosh II family is an easier — and safer — chore. Circuit surgery, however, even (or especially) in a Macintosh, is somewhat like skydiving — it really isn’t hard to do, but a simple mistake can have troubling consequences. If you’re worried about it, have a professional do the work for you.

If you choose an official Apple upgrade, you won’t have a choice anymore. In that case, your dealer is not only obligated to do the work but will also claim your old logic board and its ROMs as part of the price of the upgrade.

### Mac Plus Power

Mac Plus accelerators spread across the entire microprocessor power spectrum. You can upgrade the standard-equipment 8-megahertz 68000 microprocessor to a double-speed 16-megahertz 68000; a 68020 running at 16 megahertz; or a 68030 at 16, 25, or even 33 megahertz. The best choices are the 68020-based accelerators that have sockets available for an add-on PMMU (Paged Memory Management Unit, a Motorola 68851 chip that costs about $195) or those based on the 68030 chip, which has a PMMU built in. The PMMU is required if you plan to use virtual memory, one promised feature of Apple’s highly touted System 7.

Add-on accelerators for the Mac Plus are inherently problematic. Because the Plus lacks SCSI hand-shaking, most accelerators make its hard-disk performance worse. For example, MacProducts ‘030 RailGun-25MHz ($1,099) gave the most CPU speedup at the lowest cost, but our DiskBasher test showed its SCSI Achilles’ heel. The RailGun dragged down hard-disk performance to less than half the unaccelerated Mac Plus rate. Nyve’s $1,994 Quik30/Plus-33MHz suffers from the same problem, although an upgrade is in the works (see the “On the Horizon” sidebar).
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Chasing the llfx: Accelerators

Table 1: Features of Accelerators, continued

<table>
<thead>
<tr>
<th></th>
<th>Slclone Turbo SE</th>
<th>Dove Marathon 030/SE30</th>
<th>Apple Mac llx upgrade</th>
<th>Apple Mac llx upgrade</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>$398</td>
<td>$399</td>
<td>$2,199</td>
<td>$3,998 with 4 MB of RAM</td>
</tr>
<tr>
<td>As tested</td>
<td>$398 without FPU</td>
<td>$399</td>
<td>$2,199</td>
<td>$3,998 with 4 MB of RAM</td>
</tr>
<tr>
<td>Options</td>
<td>$796 with FPU</td>
<td>NA</td>
<td>NA</td>
<td>$2,999 without RAM</td>
</tr>
<tr>
<td>Comments</td>
<td>A best buy. Low price, average acceleration. Mac RAM and ROM must be moved to accelerator.</td>
<td>Simple, small, low-cost. Features 68030 with twice SE/30 clock speed. Memory cache must be disabled when you format floppy disks.</td>
<td>Unlike llfx, uses normal Mac II RAM. Pricey 68030 and 68882 upgrade offers small speed increase and PMMU capability; consider instead cache card, PMMU.</td>
<td>Apple's new 40-MHz CPU outperforms add-ons at reasonable cost. SRAM cache, fast DMA SCSI. Special llfx RAM must be purchased (min. 4 MB).</td>
</tr>
<tr>
<td>Macs supported</td>
<td>SE, Turbo SE</td>
<td>SE/30, llx</td>
<td>llx</td>
<td>llx</td>
</tr>
<tr>
<td>Hardware</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU and clock speed</td>
<td>68000, 16 MHz</td>
<td>68030, 32 MHz</td>
<td>68030, 16 MHz</td>
<td>68030, 40 MHz</td>
</tr>
<tr>
<td>FPU and clock speed</td>
<td>opt. 68881, 16 MHz</td>
<td>NA</td>
<td>68882, 16 MHz</td>
<td>68882, 40 MHz</td>
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<tr>
<td>Static-RAM cache</td>
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<td>no</td>
<td>32K direct map</td>
</tr>
<tr>
<td>Max. motherboard RAM</td>
<td>512K</td>
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<td>8 MB</td>
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<tr>
<td>Max. accelerator RAM</td>
<td>4 MB</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Accelerator RAM wait states</td>
<td>0, 1</td>
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<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Mac ROM placement</td>
<td>on accelerator</td>
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<td>NA</td>
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<tr>
<td>Expansion ports</td>
<td>E-Machines video</td>
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<td>none</td>
<td>Processor Direct Slot</td>
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<tr>
<td>Power supply/fan</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Software</td>
<td></td>
<td></td>
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<tr>
<td>Accelerator disable</td>
<td>no</td>
<td>no</td>
<td>NA</td>
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<td>Cache disable</td>
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<td>SAHE patch</td>
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<td>NA</td>
</tr>
<tr>
<td>Other software</td>
<td>sound patch</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Slclone Sales &amp; Engineering Corp. 1515 Centre Pointe Drive Milpitas, CA 95035 (800) 632-2638 (408) 263-6207</td>
<td>Dove Computer Corp. 1200 N. 22nd St. Wilmington, NC 26405 (800) 622-1827 (810) 763-7918</td>
<td>Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010</td>
<td>Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010</td>
</tr>
</tbody>
</table>

You can sidestep the slowdown in two ways. One is to choose your accelerator wisely. The Total System Gemini series offers a welcome extra — a new SCSI controller with handshaking support. After you've plugged in a Gemini board, you need only install a connector, replacing the battery door on the back of your Plus to provide a new high-speed SCSI connector that can double the speed of your hard-disk drive compared with that of a standard Mac Plus.

The Gemini series is a single design that hosts several configurations, thanks to its separate sockets for 68020 and 68030 microprocessors and affiliated FPU. For $1,045, the Gemini 020 with a 16-megahertz 68020 and a 68881 FPU can give your Plus a performance increase of more than 300 percent. For $2,395, you can get the Gemini 030, which is loaded with a 25-megahertz 68030 and a 68882 FPU, yielding a performance increase of nearly 500 percent and providing the built-in PMMU you'll need for System 7's virtual-memory feature. Another nice touch: On-board jumpers let you change memory wait states. Or you can up the speed simply by swapping the crystal and the programmable gate array and replacing the CPU with a faster version. An optional power supply and fan can help your Plus keep its cool.

SE Special Equipment

The Mac SE takes more kindly to acceleration because it has fewer problems to begin with. There's no insufferable SCSI system holding it back, so nearly every accelerator can deliver decent performance enhancement. The best SE speedup strategy is to balance your dreams with your budget — buy the fastest accelerator you can afford.

The overall best choice is Apple's Mac SE/30 upgrade for the SE. A quick trip to your Apple dealer and $1,699 give you guaranteed Apple
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Chasing the IIfx: Accelerators

Table 1: Features of Accelerators, continued

<table>
<thead>
<tr>
<th></th>
<th>DayStar 25MHz PowerCard 030 II</th>
<th>DayStar 33MHz PowerCard 030 II</th>
<th>DayStar 40MHz PowerCard 030 II</th>
<th>DayStar 50MHz PowerCard 030 II</th>
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</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>As tested</td>
<td>$1,495 with FPU</td>
<td>$1,995 with FPU</td>
<td>$2,495 with FPU</td>
<td>$2,995 with FPU</td>
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<tr>
<td>Options</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
<td>Speedy upgrade for II, Ix, and Ilx, Ilc requires $49 CPU-socket upgrade for soldered-in CPUs.</td>
<td>Faster-model PowerCard for a little more money. Same design and features as 23-MHz version. Very attractive price.</td>
<td>Even faster PowerCard for even more money. Same design and features as 25-MHz version.</td>
<td>Fastest PowerCard has same design and features as 25-MHz version. Almost as fast as IIfx and uses standard Mac II RAM SIMMs.</td>
</tr>
<tr>
<td><strong>Macs supported</strong></td>
<td>II, Ix, Ilc</td>
<td>II, Ix, Ilc</td>
<td>II, Ix, Ilc</td>
<td>II, Ix, Ilc</td>
</tr>
<tr>
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<tr>
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<td>Max. motherboard RAM</td>
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<td>Mac ROM placement</td>
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<td>RAM disk</td>
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<td>Yes</td>
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<tr>
<td>Warranty</td>
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<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>DayStar Digital, Inc. 5556 Atlanta Highway 5054, GA 30542 (604) 982-2077</td>
<td>DayStar Digital, Inc. 5556 Atlanta Highway 5054, GA 30542 (604) 982-2077</td>
<td>DayStar Digital, Inc. 5556 Atlanta Highway 5054, GA 30542 (604) 982-2077</td>
<td>DayStar Digital, Inc. 5556 Atlanta Highway 5054, GA 30542 (604) 982-2077</td>
</tr>
</tbody>
</table>

compatibility, a 16-megahertz 68030 with a 25-MHz PowerCard (which yields about a 200-percent performance increase), 8 megabytes of RAM capability, stereo sound, and color QuickDraw. In effect, you get a little Mac IIx lacking only NuBus expansion.

If you’re content with all of your SE’s resources except its speed, you can beat Apple’s best by plugging in Total Systems’ $935 Gemini 020 (with FPU), upping the SE’s performance by more than 300 percent. Total Systems’ Gemini 030 model — although quite a bit pricier at $2,195 with FPU — screams along at nearly five times the SE’s best. In fact, our tests showed that the Gemini 030s for both the Plus and the SE beat the next-to-top-of-the-line Mac IIci in nearly every test!

For the most cost-effective speedup, take a look at Siclone’s $398 Turbo SE, which delivers a solid 60-percent improvement with its 16-megahertz 68000 and optional 68881. Besides plugging in the board, installation means moving your SE’s RAM and ROM to the accelerator — a tiny bit of trouble that gives good gains in performance. Siclone even silk-screens board jumper settings so you can upgrade the Turbo’s memory even if you lose the instructions.

Other companies provide the same one-two performance punch of a 16-megahertz 68000 and 68881 FPU at similar or greater list prices — for example, the $395 Aox DoubleTime-16 and the $505 Newer Technology MacSEletrator (actually it’s the Aox board with a different nameplate and software icon). And if you want to improve the view as you dash down the fast lane, consider the RasterOps ClearVue/SE. RasterOps uses the same 16-megahertz 68000/68881 combination, adds extra RAM and a Texas Instruments 34010 video coprocessor, and throws in a 19-inch 1.024-x-768-pixel two-page monochrome display — all for $1,995.

The Macintosh SE/30 already has a great CPU, so there’s little room for...
Dreaming of better output from your laser printer? Discover...
Each month, thousands of laser printers are purchased by business people all over the world—people, like you, who realize the importance of sophisticated, high-quality output for success.

But, without advanced tools to enhance the capabilities of these laser printers, attaining the promise of high quality output can be just a dream. Which is why more and more people are turning to Pacific Data Products.

We develop quality, affordable products, including PostScript™ language and HP-GL™ emulation cartridges, memory boards, font cartridges and networking programs, for HP LaserJet and compatible printers.

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Please circle 32 on reader service card.
Chasing the Ilfx: Accelerators

Table 1: Features of Accelerators, continued

<table>
<thead>
<tr>
<th>List Price</th>
<th>Dove</th>
<th>Marathón 030/Il</th>
<th>Si3033</th>
<th>Si3050</th>
<th>Total Systems Voyager 030/33</th>
</tr>
</thead>
<tbody>
<tr>
<td>As tested</td>
<td>$699</td>
<td>$1,999 with FPU</td>
<td>$4,295 with FPU</td>
<td>$1,999 with FPU</td>
<td></td>
</tr>
<tr>
<td>Options</td>
<td>NA</td>
<td>$1,799 without FPU</td>
<td>$3,795 without FPU</td>
<td>$1,795 without FPU</td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td>Simple, small board has 68030 with twice Mac Il's normal speed. Memory cache must be disabled when you format floppy disks.</td>
<td>Speedy upgrade for Il or Ilx. Retains older CPU to allow downshift to native unaccelerated mode. INIT provided enables proper floppy operation.</td>
<td>Similar to Si3033, much faster, more expensive. INIT provided enables proper floppy operation.</td>
<td>Manufactured by Siclone, identical to Si3033. A 50-MHz version with 50-MHz FPU also available ($4,295).</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Macs supported</th>
<th>II, Ilx</th>
<th>II, Ilx</th>
<th>II, Ilx</th>
<th>II, Ilx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU and clock speed (megahertz)</td>
<td>68030, 32 MHz</td>
<td>68030, 33.3 MHz</td>
<td>68030, 50 MHz</td>
<td>68030, 33.3 MHz</td>
</tr>
<tr>
<td>FPU and clock speed (megahertz)</td>
<td>NA</td>
<td>68882, 33.3 MHz</td>
<td>68882, 50 MHz</td>
<td>68882, 33.3 MHz</td>
</tr>
<tr>
<td>Static-RAM cache</td>
<td>no</td>
<td>64K direct map</td>
<td>64K direct map</td>
<td>64K direct map</td>
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<tr>
<td>Max. motherboard RAM</td>
<td>8 MB</td>
<td>8 MB</td>
<td>8 MB</td>
<td>8 MB</td>
</tr>
<tr>
<td>Max. accelerator RAM</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Accelerator RAM wait states</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Mac ROM placement</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Expansion ports</td>
<td>none</td>
<td>none</td>
<td>none</td>
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<tr>
<td>Power supply/fan</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Software</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accelerator disable</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Cache disable</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>SAFE patch</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>RAM disk</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Other software</td>
<td>none</td>
<td>floppy-drive patch</td>
<td>floppy-drive patch</td>
<td>floppy-drive patch</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Dove Computer Corp. 1200 N. 23rd St. Wilmington, NC 28405 (800) 652-7627 (919) 763-7918</td>
<td>Siclone Sales &amp; Engineering Corp. 1515 Centre Pointe Drive Milpitas, CA 95035 (800) 682-2636 (408) 263-8207</td>
<td>Siclone Sales &amp; Engineering Corp. 1515 Centre Pointe Drive Milpitas, CA 95035 (800) 682-2636 (408) 263-8207</td>
<td>Total Systems 99 West 10th Ave. Eugene, OR 97401 (800) 874-2298 (503) 345-7395</td>
</tr>
</tbody>
</table>

Improvement. By plugging the tiny $699 Dove Marathón 030/SE30 into the SE/30's CPU socket, however, you can squeeze out cache-enhanced 32-megahertz performance. We found some compatibility problems when formatting high-density floppy drives, but you can work around them by turning off the cache.

Tuning Your Mac Il

A steady hand and $300 is all it takes to tweak 20 percent more performance from your Mac Il. Carefully pry out the 68020 microprocessor, pop in a $259 Dove Marathón Racer (see StartUp, May '90, page 59) or $299 Orchid MacSprint Il cache card, slide the microprocessor on top, and click in the Control Panel a couple of times. For a few hundred dollars more, the Dove Marathón 030/Il accelerator card turns in decent performance (about a 40-percent increase) at a modest price.

For quite a few more dollars, you can plug a top-notch accelerator board into your Il, Ilx, or Ilcx. DayStar offers several CPU upgrades, from the 25MHz PowerCard 030 Il ($1,495), which can speed up your Mac Il by 60 percent, to the 50MHz PowerCard 030 Il ($2,995), which pushes up Mac Il performance by 130 percent. Siclone offers two entries in the Il and Ilx high-end sweepstakes: the $1,999 33-megahertz Si3033 and the budget-busting $4,295 50-megahertz Si3050, which was surpassed in our tests only by Apple's Ilfx — the all-round champ.

As long as you're spending real money, you might as well opt for the best. Apple's $2,999 Ilfx logic-board upgrade can push your Mac Il or Ilx to the state of the Macintosh art — in effect, you get Apple's newest CPU packed into your old case. When you're making out your budget, however, don't forget that you'll need the special Ilfx RAM. (Apple charges $999 for 4 megabytes; third-party vendors can help you out for a few hundred dollars less.)
We developed Pacific MacPage because affordable PostScript® printers are just a dream.

Imagine buying an Apple LaserWriter IINT or IINTX. The price tag can cause nightmares.

So, consider Pacific MacPage. It brings the quality output of a PostScript printer within reach. Just plug one of our cartridges into a HP LaserJet II, IIP, IID* or III printer with 2 megabytes of additional memory.

The results are beautiful. Pacific MacPage supports Adobe Type 1 fonts and is compatible with Adobe Type Manager. Plus, it has 35 LaserWriter IINT equivalent font families. You’ll get quality output with every character. And you’ll get it fast.

Benchmarks show Pacific MacPage on the IIP prints an average of 10% faster than the LaserWriter IINT with most applications.

Pacific MacPage can help make your dream of the affordable printer a reality. To learn more, call or write: Pacific Data Products, 9125 Rehco Road, San Diego, CA 92121, (619) 552-0880. Fax (619) 552-0889.
## Table 1: Features of Accelerators, continued

<table>
<thead>
<tr>
<th></th>
<th>Apple Mac Ile upgrade</th>
<th>DayStar Fast Cache Ile*</th>
<th>DayStar Marath0n Racer*</th>
<th>Orchid MacSprint II*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>As tested</td>
<td>$3,369 with 4 MB of RAM</td>
<td>$995</td>
<td>$259</td>
<td>$799</td>
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<tr>
<td>Options</td>
<td>$2,369 without RAM</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td><strong>Comments</strong></td>
<td>A significant performance booster over Ile, but requires 80-nsec or faster RAM SIMMs.</td>
<td>Speedy upgrade requiring no software, SANE patch provided for extra speed, INIT/cdev provided disables cache.</td>
<td>A best buy. Simple upgrade offers moderate increase for little money. cdev disables cache for incompatible software.</td>
<td>A best buy. Simple upgrade offers moderate increase for little money. cdev disables cache for incompatible software.</td>
</tr>
<tr>
<td>Macs supported</td>
<td>Ilcx</td>
<td>Ilci</td>
<td>II</td>
<td>II</td>
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<td><strong>Hardware</strong></td>
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<td></td>
<td></td>
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<td>Static-RAM cache</td>
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<td>64K direct map</td>
<td>32K dir. map/set-assoc.</td>
<td>32K direct map</td>
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<tr>
<td>Max. motherboard RAM</td>
<td>8 MB</td>
<td>8 MB</td>
<td>8 MB</td>
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<tr>
<td>Mac ROM placement</td>
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<td>Expansion ports cache-card slot</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td><strong>Software</strong></td>
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<td>Accelerator disable</td>
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<td>NA</td>
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<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>SANE patch</td>
<td>NA</td>
<td>yes</td>
<td>no</td>
<td>no</td>
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<td>RAM disk</td>
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<tr>
<td>Other software</td>
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<td>none</td>
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<td><strong>Other</strong></td>
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<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>4 years</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Apple Computer, Inc. 20520 Mariposa Ave. Cupertino, CA 95014 (408) 996-1010</td>
<td>DayStar Digital, Inc. 5556 Atlantic Highway Flowery Branch, GA 30542 (800) 962-2077 (404) 567-2077</td>
<td>Dove Computer Corp. 1200 N. 23rd St. Wilmington, NC 29405 (800) 622-7627 (919) 763-7818</td>
<td>Orchid Technology 45365 Northport Loop W. Fremont, CA 94538 (415) 683-0300</td>
</tr>
</tbody>
</table>

*Cache card

If you want to upgrade your Ilcx to a Ile, Apple will be happy to help for $2,399 (more if you figure in the cost of the 80-nanosecond RAM the Ilci needs). This brain transplant can boost your Ilcx’s performance by about a third. You’ll probably notice the change more in your bank account than on your screen, so we advise you to pass on this upgrade and enjoy your Ilcx in its pristine state.

If you’re not satisfied with your Ilcx’s speed, you can get a more pronounced increase in performance with one of the DayStar accelerators. Because the microprocessors of most Ilcx’s are soldered down, however, you’ll have to send your CPU board to DayStar along with $49 to have the company install a socket so you can plug in one of its boards. As you might guess, the pricey DayStar 50MHz PowerCard 030 II provides the biggest speed improvement.

If you have a Ile, you can accelerate it by plugging a $999 DayStar Fast Cache Ileci into the waiting socket in the Ileci’s logic board. The 25-percent improvement in performance is noticeable and makes the Ileci an even smoother operator.

### Time Is Money

Not everybody needs a superspeed Mac. If your Mac spends most of its day helping you compose letters, query databases, or handle simple spreadsheet calculations, an accelerator is a luxury, not a necessity. On the other hand, if you spend precious time waiting for complex graphics to appear on your screen or if you tend to nod off during lengthy spreadsheet recalculations, run — do not walk — to your neighborhood dealer and invest in your future. Whether you simply add a cache card or go all out with a Ilfx upgrade, you’re buying the one precious commodity that’s always in short supply — time.

Winn L. Rosch is a veteran MacUser contributor and the author of The Winn Rosch Hardware Bible.
The Bottom Line

To find the best way to speed your day-to-day work, follow the path that most closely describes your situation.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you use database-management applications?</td>
<td>A: YES</td>
<td>Buy a bigger, faster hard-disk drive.</td>
</tr>
<tr>
<td>Do you use 24-bit-color applications?</td>
<td>A: YES</td>
<td>Buy a QuickDraw accelerator.</td>
</tr>
<tr>
<td>Do you do statistical analysis or complex financial modeling?</td>
<td>A: YES</td>
<td>Get an accelerator with a fast (or faster) FPU.</td>
</tr>
<tr>
<td>Do all your applications run as fast as you would like?</td>
<td>A: YES</td>
<td>You will live a life of quiet contentment.</td>
</tr>
<tr>
<td>What kind of Macintosh do you have?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mac Plus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your best bet is the Total Systems Gemini line of accelerators. The Gemini O20 Plus ($395; $1,045 with FPU) is both cost-effective and speedy, and the Gemini O30 Plus ($1,895; $2,395 with FPU) can boost your Plus' performance well past that of a Iici. As an added — and very important — benefit, Gemini accelerators also solve the Plus' SCSI handshaking problems when you add Total Systems' highly recommended GemKit option ($150).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mac SE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The most cost-effective speedup is a 16-megahertz 68000, and the best buy among these is the Siclone Turbo SE ($995; $796 with FPU). We also recommend the RasterOps ClearVue/SE ($795; $1,995 with two-page monochrome display) for its good acceleration and built-in video support. For maximum compatibility (at a price), try the Apple Mac SE/30 upgrade ($1,699; $2,298 with high-density floppy-disk drive).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mac SE/30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>We've always liked the SE/30 just as it is. Even if you can't use it on an airliner, it's still Apple's most powerful &quot;portable&quot; — and for just a dozen extra pounds, you get a readable screen. But if you want to squeeze even more power from a good machine, investigate the Dove Marathon SE30 ($590). For a very modest investment, you can increase performance by up to 40 percent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mac II, IIx, or IIcx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The most cost-effective accelerators are the Dove Marathon Racer ($259) and Orchid MacSprint II ($299) cache cards. For even more of a speedup, try something in the DayStar line, the most cost-effective choice being the 25MHz PowerCard 030 II ($1,495 with FPU). For all-around best performance, however, the clear choice for Mac II and IIx owners is the Apple Mac IIx upgrade ($3,998 with 4 megabytes of RAM; $2,999 without RAM).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mac Iici or IIfx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The DayStar Fast Cache Iici ($995) is a fast, easy, and relatively inexpensive way to increase your Iici's performance by 25 percent. But even when a cache-equipped Iici is screaming along at top speed, a Macintosh IIx still leaves the Iici in its wake. You can't do better than a IIx. If you're fortunate enough to have one and you still think you need more speed, consider a workstation, a Cray supercomputer, or psychotherapy.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MacUser August 1990 111
“Editors And Customers Love It!”

The technology behind our RM42 is the first that editors unanimously rallied around. Editors, concerned about reliability, torture tested the cartridges (one even survived an accidental flight of stairs). Our RM42 delivers infinite storage on 42Mb cartridges, and it does it faster than most hard drives (20ms).

Editors also love our M series drives.

“If I could choose from all three manufacturers . . . I’d prefer the Mirror” — MacUser

Customers are using our RM42 removable drives everywhere and for everything:

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- Designers in Sioux Falls are archiving entire clip art libraries
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“Your [RM42] appears to be better built . . . and most importantly, it was quiet. Even better was your service. You have a product and personnel to be proud of.”

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It’s because of our direct strategy that we can deliver all this product and service at a great price. We eliminate the confusion and expense of middlemen. It’s just you and us — the folks who build them.

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You’re not buying bookends. These are mechanical devices that spin at 3600 RPM for their entire life. That’s why we created MirrorLoan, an overnight program that speeds a loaner to you. It’s just one of the essential services you shouldn’t be without.

We Hand Test Each M Series Drive

While most companies sample test, we test every drive so the drive you receive is hand tested. It arrives pre-formatted, and loaded with 10Mb of software. Inside are the best and fastest components available (Quantum, Imprimis, Seagate), an international power supply, SCSI switching, fan, and cables.

Our #1 Removable: The RM42

Here’s what you get for $697: Proven Syquest technology, full steel chassis, international power supply, convenience outlet, SCSI selection, RFI/EMI filtering, ultra-quiet fan, gold plated contacts, and all necessary cables. And it’s backed with the longest supported warranty in the industry. It’s everything you’d expect from a $1,500 removable for $697.

Remember, order today, it’s on your desk tomorrow.”
"It Took Time To Build A $1,700 Display System For $897"
We sourced tubes from the same folks as Apple. We chose the same phosphor. We tuned the system to 78hz vertical refresh rate to eliminate annoying flicker. And we built in enhancements like pop-up menus, sizable cursor and menu bar, screen saver, screen copy and more! With all this for $897, what'll you do with the $800 difference? (hint: check out our RM42)

From Plus To Portable; We've Got You Covered
We have a PixelView I and II system for every Macintosh being made: Mac Plus, SE, SE30, Mac II, Ilx, Ilcx, Ilci, Ilfx, and portable. Each PixelView system comes with everything you need: monitor, card, cables, manual, and software!

"I want you to test drive one for 30 days: Love it or Return it!"

"I Used To Think That Large Screens Were A Luxury. Now I Can't Live Without One."
Until now, large screen displays cost more than the computer (and yet even at those high prices, I found them to be the top productivity tool on my Macintosh). PixelView delivers that same productivity, but at prices anyone can afford.

Take One For A Test Spin (but don't say I didn't warn you)
Take my modem. Take my (gulp) hard drive, but leave me my monitor. I feel that strongly and believe you will too. Don't go another week squinting and scrolling — here's my personal guarantee to you — try either Pixelview for 30 days. If it isn't exactly what you expected, I want it back. Period.

COMPARE!

<table>
<thead>
<tr>
<th>Feature</th>
<th>PixelView I</th>
<th>PixelView II</th>
</tr>
</thead>
<tbody>
<tr>
<td>19&quot; Monitor</td>
<td>Anti-glare</td>
<td>yes</td>
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<tr>
<td></td>
<td>Both screens active</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>WYSIWYG</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>78hz vertical refresh rate</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>Tear-off/Pop-up menus</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Cursor sizing</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Menu sizing</td>
<td>yes</td>
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<td></td>
<td>Screen saver</td>
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<td></td>
<td>Screen copy</td>
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<td>Full year warranty</td>
<td>yes</td>
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<td></td>
<td>Dealer Markup</td>
<td>no</td>
</tr>
</tbody>
</table>

(Best Street Price 4/1/90) *Mac II, SE/30

$897
PixelView II
Includes Video Card

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PixelView I
Includes Video Card

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Please circle 368 on reader service card.
Mac CAD takes off into the jet stream with some exciting new ideas in design, drafting, and 3-D modeling.

Mac CAD Takes Off

The time has passed when the Mac could be dismissed as a design and engineering lightweight. The potent processing speed of the Mac II line was one key to the change. Another key was the general acceptance of graphical user interfaces. Although some users of CAD (computer-aided design) systems turned to the Mac for its own merits, others — more wedded to IBM compatibility — hesitated at first but finally switched to the Mac after PC and workstation CAD heavyweights such as
Autodesk, Versacad, Schlumberger, and Intergraph introduced Mac products. Couple this with the wide variety of midrange choices such as Claris CAD — the most popular Mac CAD package — and it’s clearly time for the next generation of Mac CAD software to take off.

And it has. Mac programs that look like yesterday’s workstation or PC stuff are obsolete. Old and new CAD developers are busy making CAD easier to use and more comprehensive, extending its reach back to conceptualization and forward to manufacturing, testing, and presentation. They’re linking CAD to other programs, stretching it to fit work groups, and customizing it for particular industries. In a world obsessed with “time to market” and “design for manufacturability” (creating products that are easy to manufacture efficiently), Mac-wielding designers and engineers need to squeeze every gram of power from their CAD packages. Five trends in Macintosh CAD that will save you design time and prevent redesign headaches are intelligent interfaces, integration with other products,
Mac CAD Takes Off

multiuser and multiplatform capabilities, specialty CAD, and 3-D drawing. You'll find these trends both in new versions of old favorites and in some new programs that are charting previously unexplored CAD territory.

**Intelligent Drafting**

The Mac's interface of windows, icons, and cut-and-paste graphics is central to its CAD success. Some early programs didn't stick to the Mac interface standard, but now most do, building on a MacDraw-style foundation with palettes of basic drawing shapes accompanying pull-down menus of commands and options. (Auto-desk's AutoCAD is a clear exception, persisting with the very un-Mac-like menus and conventions that it sports on the PC.) But even the Mac interface can get confusing when you must choose from among a couple of dozen basic objects, half a dozen drawing methods for each object, ten or more snapping options for each combination of object and method. The welter of pull-down, pull-out, and pull-up menus; icons; palettes; Command-key combinations; and mouse clicks can hinder, instead of help, the movement of ideas from mind to screen.

But Mac CAD programs are getting smarter. Several new programs fight complexity by adding intelligence to the interface. Instead of making you find the right combination of object, method, and position, these programs anticipate intentions and offer suggestions. Engineered Software's PowerDraw 3.0 has a Dynamic Snap Indicator - a small strip of letters on the drawing window's title bar that indicates when a particular dynamic snap point has been located. (A snap point is a location at which the software completes or fine-tunes a drawing or relationship that hasn't yet been completely or precisely drawn, based on its assumptions about the user's intentions.) For example, a C indicates a center snap, an E an end snap, and a % a percentage of distance along a line-segment snap.

Ashlar's Vellum goes beyond this, setting the pace for interface intelligence with an ever-vigilant Drafting Assistant that watches the active tool, the geometry already on-screen, and the cursor's location. It then processes these observations and its own knowledge base of common constructions through a "geometric inference engine" to determine what you might want to do next. Messages such as "endpoint," "intersect," "align," and "quadrant" appear beside the cursor as it approaches such points on the drawing. You can either draw to these points or ignore the messages. Ashlar is patenting this technology, which could also be used in other applications, such as desktop publishing.

Vellum also features another exciting trend in Mac CAD: parametric drawing. A parametric feature can automatically "resolve" a drawing by resizing and positioning objects to fit a set of constraints. For instance, you...
can draw a rectangle in Vellum, label one side A and an adjacent side B, give A a length of 2 inches, enter the equation \( B = A \times 1.5 \), and choose the Resolve command. Vellum will redraw the rectangle by retaining its 90-degree corners, keeping A at 2 inches, and stretching B and the opposite side to 7 inches (see Figure 1). Parametric constraints can include a variety of other object attributes as well. Parametric technology is already popular in workstation and PC CAD programs for quickly creating families of parts from a fundamental design, for exploring what-if possibilities while sketching a part, and for keeping a design within certain boundaries determined by space and material demands. Vellum is the first program to bring parametrics to the Mac, and along with its intelligent assistant, Vellum has taken the CAD interface to a new level of ease of use.

Claris CAD 2.0, which should be out by the time you read this, takes assistance a step further. Its “graphic guide” not only anticipates probable drawing operations but also automatically chooses a modifier (drawing method) that makes sense for the cursor’s present position within a drawing. The Guide has a Preview function that changes the cursor to show which modifier is active and how an object will be drawn. It also has a Guidelinier function that displays alignment marks when the cursor is between objects. Unlike Vellum’s assistant, this Guide doesn’t display text messages about the cursor position, instead relying on icon messages. It also differs from Vellum in that it’s sensitive to cursor speed: The Guide ignores the cursor when it’s moving quickly because it assumes that a fast cursor motion is a move across the screen rather than a search for a drawing point.

### Integrated CAD

Mac CAD software is reaching out to other Mac software to share information. Design doesn’t mean just drawing pictures; it means organizing and directing all the geometric and textual information that describes a component or product. Sophisticated CAD packages link a database of textual information to the drawing image—information such as materials properties, parts costs, and assembly processes. Historically this approach has appeared as a report or BOM (bill of materials) in mechanical and architectural CAD programs. A BOM details the parts that make up a drawing; changes in the drawing are reflected in the next BOM extraction.

But textual information can also be linked in the other direction, with changes in the text affecting the drawing. (This is how parametric drawing works, as in Vellum’s Resolve command.) Currently, there are several ways to create this link — through a built-in database, through an external database, or through HyperCard. When System 7 appears, another way will open: the new IAC (interapplication communication) capability that will provide for

![Figure 2: Aperture combines a database manager with a drawing program, letting you search through and report on a design from an associated database.](image-url)
direct links between numerous different programs. Claris, for example, is planning to use the IAC ability of System 7 to integrate a variety of its programs, from MacWrite II and MacProject II to FileMaker II and Claris CAD.

Intersgraph's MicroStation works not only with other Macintosh programs but also with minicomputer and mainframe data through built-in routines that link to Oracle's database manager. You must buy Oracle separately and then link the two programs to see the MicroStation database commands. Any object in MicroStation can be attached to a database field. You can use SQL commands or Oracle's HyperCard front end to query the database.

Versacad took the HyperCard route with its CAD program, linking an object-oriented database to the drawing through stacks and HyperTalk scripts. Graphsoft added an integrated database — in the form of a spreadsheet — to its venerable MiniCAD drafting package. The spreadsheet contains object size, along with hierarchical class and name identities that MiniCAD+ assigns to objects. There are built-in formulas for engineering calculations as well as commands for manipulating, formatting, and printing cell information. MiniCAD+ also has a macro language, MiniPascal, for more-complex analyses.

Aperture from Aperture Technologies is touted as a "visual-information manager" that does more than draw. This emphasis on teamwork between drawing and database management shows up immediately when you start the program: After the File and Edit menus comes a menu for graphics (Drawing) and another for database management (Data). Any object within a drawing may have an attached database record (see Figure 2). Aperture can search through a drawing via the database, highlighting the corresponding graphic parts or labeling drawing elements from database records. There is a complete list of database commands, from searching and sorting to reporting. Aperture also lets you assign Link Buttons to any object in a drawing: Click on the button, and a specified view of another drawing appears in its own window.

**CAD Groupware**

Mac CAD is also becoming more social. Design is sometimes a group process in which drawings and information must be shared over a network, but most Macintosh CAD programs still don't make any special provisions for networked design groups. These programs can run on a network, but they don't let you serve drawing information up to more than one Mac simultaneously.

Few CAD programs can freely and transparently provide information to many computers — Macs, PCs, and workstations — on the same network. VersaCAD, on the other hand, uses the same database for its Mac, PC, and workstation versions. The VersaLINK translator moves read-only drawing images can be viewed and used as a background for design details simultaneously by many designers working on a mix of PCs, Macs, and workstations on a network.

<table>
<thead>
<tr>
<th>MULTUSER/MULTIPRINT</th>
<th>PARAMETRICS</th>
<th>SPECIALTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PC workstations</td>
<td>FaroCAD</td>
<td>• Architecture</td>
</tr>
<tr>
<td>AutoCAD</td>
<td>RELATIONAL OBJECTS</td>
<td>Add-ons</td>
</tr>
<tr>
<td>MicroStation</td>
<td>VELLUM</td>
<td>ADS MGMSATION</td>
</tr>
<tr>
<td>VersaCAD</td>
<td>vPOWER (VersaCAD)</td>
<td>ARCHITECTURE</td>
</tr>
<tr>
<td>VAX</td>
<td></td>
<td>VERSACAD ARCHITECT</td>
</tr>
<tr>
<td>MacBRAVO!</td>
<td></td>
<td>ADS PROFESSIONAL CAD</td>
</tr>
<tr>
<td>MicroStation</td>
<td></td>
<td>ARCHITECTURE</td>
</tr>
<tr>
<td>• File compatibility</td>
<td></td>
<td>Symbol Library</td>
</tr>
<tr>
<td>DXF Binary compatibility</td>
<td></td>
<td>AutoArchitect (AutoCAD)</td>
</tr>
<tr>
<td>AutoCAD</td>
<td></td>
<td>DCA ARCHITECTURAL ELECTRIC</td>
</tr>
<tr>
<td>MicroStation</td>
<td></td>
<td>DCA HVAC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DCA PLUMBING</td>
</tr>
</tbody>
</table>

Figure 3: MicroStation Mac represents several trends in Mac CAD, from its built-in links to Oracle database information to its full 3-D drafting and rendering abilities and promised MacRenderMan support. One unique feature that suits MicroStation Mac for use by groups of designers is "reference" files. These
VersaCAD and other CAD files among these platforms. Schlumberger’s MacBRAVO! can integrate with Bravo3 running on a VAX. Several users on a network can share CAD database files in MacBRAVO!, using different modules to create their own designs on separate layers. Similarly, AutoCAD’s popularity has made its DXF file format a de facto industry standard on the PC, alongside the more official IGES file format. VersaCAD, AutoCAD, and MicroStation run on PCs, Macs, and workstations, allowing different computers on a network to access each other’s files. And AutoCAD and MicroStation files don’t need any translation to move from one system to the next because they are binary-compatible across all the platforms.

MicroStation is the front-runner for designers working in groups (see Figure 3). It can swap files with MicroStation running on PCs or UNIX workstations and can communicate with Intergraph’s VAX-based IGDS (Interactive Graphics Design Software). MicroStation also employs read-only “reference” files as background layers that can be used by all work groups on a network. Up to 32 reference files — which can be viewed but not altered by anyone else on the network — can be attached to each of the 63 levels in a design. These files can show design changes as they occur on every participating platform. Reference files save storage space and allow parallel and cooperative design efforts on a network.

Specialty CAD
General-purpose Mac CAD packages have been pressed into every conceivable design pursuit, including architectural, electrical, mechanical, and organizational applications. If a CAD program is popular enough, it may even attract its own marketplace of add-on templates, routines, extensions, and parts libraries. But a general-purpose program cannot contain all the features and commands demanded by different disciplines without becoming a monstrous lumber room of menus and icons. Even with templates and extensions, a general-purpose program can’t match the specialized interface, terminology, and style of the common practice of a particular field.

Specialized programs are often more expensive, however, because they cater to a smaller market. Instead of paying $700 for a general-purpose package that does 80 to 90 percent of what you want, you may have to drop $3,000 or more for a specialty program that can go the extra 5 or 10 percent. There are many from which to choose. The Mac is home to a growing variety of specialized CAD programs for every sort of design, from buildings to boats to boxes to circuit boards, many of which are reflected in the product directory at the end of this article.

Since architects make up approximately 40 percent of Mac CAD users, architecture has prompted the creation of the most specialty tools, ranging from overall-design

Figure 4: Archilrion II is a color 3-D program that lets you cast shadows from a light source (shown here), calculate sequential views, and work in sections and elevations.
tools to structural-analysis, landscape-layout, and rendering packages. Add-ons, such as AutoArchitect from DCA Engineering Software and Architosh from E.T. Vermurren & Associates, can tailor a general-purpose program for architectural work. AutoArchitect extends AutoCAD, adding tools for editing in plan, elevation, and three dimensions; programs for automating the design of walls, roofs, windows, foundations, and stairs; symbol libraries with plumbing, electrical, furniture, and other appropriate symbols; and a project-scheduling program. Architosh is a set of 2,000 architectural symbols for VersaCAD, grouped in libraries for landscaping; floor plans; elevations; and mechanical, electrical, and other purposes. Versacad offers its own add-on, VersaCAD Architect, that tailors that general-purpose program for architecture. Engineered Software sells Landscape and Residential Construction symbol libraries for PowerDraw. MiniReporter from Valle Anderson Associates generates design-project reports from MiniCAD+ drawings. The Engineering Symbols Library from Northstar Engineering Design works with any Mac CAD package that handles PICT or MacDraw images.

There are also programs built from the ground up for architecture. Gimeor's Architrion II is a 3-D-CAD package for every phase of architectural design, from creating the schematic through planning and designing working drawings to obtaining building permits. It offers a different metaphor for conceptualization than do most CAD programs. Where general-purpose design programs create and place drawing primitives, Architrion creates and angles volumes — an approach that attracts some and baffles others (see Figure 4). Architrion also offers features that are limited or lacking in general-purpose packages, such as the ability to generate 3-D perspectives and cross sections, calculate building and room areas, and simulate shading (shadow-casting) and lighting from a light source. Gimeor's separate ArchiMovie program can animate scenes from Architrion for presentations.

ArchicAD from Graphisoft offers a nearly identical set of features, working with plans, elevations, and sections in the terms architects expect from a palette of slabs, roofs, and walls. Like Architrion, it has a comprehensive BOM feature — a database connection that's vital in architecture — for managing materials and analyzing the cost of a design. Unlike with Architrion, however, you work in two dimensions and extrude for 3-D effects, although ArchicAD models solids and produces true cross sections.

Electrical and electronic engineering is another big slice of the Mac CAD pie. There are specialized programs for sketching, detailing, analyzing, simulating, and manufacturing electrical and electronic circuits and devices. The sketching and detailing can be done with general-purpose programs, and there are symbol libraries and

![Figure 5: The Douglas CAD/CAM System is a family of software modules that can capture and analyze a circuit and then translate the design into a PCB (printed circuit board) layout, shown here.](image)

Douglas can also make prototype PCBs for you directly from your finished disk files.

**CAD DIRECTORY**

The range of Macintosh CAD and related products has grown wider, deeper, and more diverse than you might imagine. The 60 companies listed here represent a comprehensive sampling of what's out there, but the number of vertical applications available could easily have extended our list to more than 200 companies. The range of products listed includes mechanical, structural, and electronic-design software; products for visualization and modeling; plotter utilities; symbol libraries; simulation packages; file translators for CAD and non-CAD translation; and products for other specialty areas such as gene modeling and apparel design.

The CAD universe includes everything from simple 2-D drawing tools with basic CAD features to full-blown 3-D design and modeling packages that have features rivaling those found on any other platform. In the 3-D world, visualization products unique to the Mac often provide full animation capability and are beginning to support Pixar's RenderMan 3D scene description language. That bodes well for the continued vitality of 3-D CAD on the Mac.

Additional CAD listings for more-specialized products are available in a longer catalog of CAD options called *The Apple Engineering/Scientific Solutions Guide* (Winter 1989-90), available from your local Apple Engineering Reseller for $9.95 (to find the number for your local reseller, call (800) 538-9696, ext. 900).

— David Peitz
add-ons for electronics work, just as there are for architectural tasks. For example, Imagine That's Extend can simulate many different types of systems, including electrical circuits. It lets you link logical boxes with defined behavior (such as A/D converters and amplifiers) into block diagrams on-screen and then tells you how the entire diagrammed system will act. And Compu-Arch's ADS-MGMStation — Electronics, for instance, offers 15 libraries of electromechanical and electronic symbols for MGMStation. But for all the steps from analysis to manufacture, only the dedicated programs will do.

BV Engineering makes a dozen circuit-analysis programs; Capilano Computing's DesignWorks is an integrated schematic-diagram and digital-logic simulator; San Juan Software's MacAC is an analog-circuit simulator; Nedrad Data System's DragonWave helps analyze and optimize microwave circuits. Both Vamp and Douglas Electronics offer software for translating finished logical-circuit designs into physical designs — as layouts for printed circuit boards (see Figure 5). Douglas can even manufacture prototype boards directly from Mac files.

Some other fields don't have the number of CAD programs you'll find for architects or electronic engineers, but they still possess Mac specialties. Textco sells The DNA Inspector Ile for people who work with biochemistry and DNA sequencing. Cambridge Scientific Computing's ChemDraw helps chemists create and manipulate molecular models. ModaCAD sells a powerful series of fashion-design programs.

Innovative Design Systems' Ovation CAD/CAM is a packaging CAD program. It opens with a design interface that offers the standard configurations of line styles and bridging patterns for packaging. Its CAM portion can send the result to plotters, routers, or commercial laser systems. Graphic Magic's MacSurf is a 3-D surface-modeling program for marine design. MacSurf offers modules for designing and analyzing the hull on anything from a supertanker to a dinghy. Neither its commands nor its links to other marine-analysis programs can be found in any general-purpose package. MacSurf is also used for aerospace and automotive design.

3-D Surfaces and Solids

Many new and old Mac CAD programs are showing another side — reaching to three dimensions. Most CAD is two-dimensional, and most Mac users still work in 2-D — even though real-world objects are 3-D. Few Mac design programs have catered directly to 3-D design until recently because 2-D programs can tackle many problems and the complexity of 3-D calculations slows processing considerably. But the arrival of the Mac IIci and IIfx has decongested the processing bottleneck. (If you don't have a high-end CPU, check out the MacUser Labs report on accelerators in this issue.) And the push in industry toward "design for manufacturability" is making 3-D more necessary. Seeing the model in the most realistic form as soon as possible reduces the number of late changes and fixes needed in a design.

The world of three dimensions includes programs aimed at 3-D drafting (MiniCAD+, MacBRAVO!, and MicroStation Mac), 3-D conceptualization (such as Super 3D from Silicon Beach and Paracomp's Swivel 3D), 3-D surface modeling (such as DynaWare's DynaPerspective, shown in Figure 6), and solids modeling (such as DesignCAD — formerly called Origins — from the company of the same new name, and Infinite Graphics' INCAD). Some of the drafting packages include surface- and solids-rendering features. Some modeling programs — such as DesignCAD — contain many drafting features. There are even specialized 3-D packages for architecture, such as ArchiCAD and Architron. Paracomp's Model Shop is a 3-D surface modeler for architectural conceptualization. MacInteriors, from Microspot, is an interior-design and space-planning tool. DynaPerspective is a 3-D conceptualizing program that not only offers primitives and editing tools for creating static models but can also animate models for fly-by or walk-through sequences. VIDI's Dimensions 3DProducer has similar features for animation.

DesignCAD Macintosh is compatible with A/UX and includes real-time rotation ability and sophisticated shading for a lower price than that of many 2-D drafting programs. Swivel 3D can constrain the motion of 3-D
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models to simulate real mechanical models more accurately. For example, a model of a robot arm can be restricted to those motions that the arm’s joints allow.

IN-CAD, from Infinite Graphics, builds its solid modeling on CSG (Constructive Solid Geometry). Where 3-D surface-modeling software doesn’t understand the volume that objects occupy, CSG does. This means, for instance, that IN-CAD can quickly calculate the mass properties of a design, such as the center of gravity and the moment of inertia. IN-CAD models are also in great shape to transfer to CAM (computer-aided manufacturing) programs because they already contain information about volume. Infinite Graphics is the first Mac CAD supplier to promise a direct connection to its Desktop Manufacturing module, a link from IN-CAD to one of the new machines that can directly cut, laser-cure, or sinter (melt) a 3-D prototype part from the Macintosh CAD file. Also, with IN-CAD the designer can check for interference between parts and for the fit between them, something surface modeling does not easily allow.

But solids modeling demands more work from the processor than does surface modeling, so anyone interested in a quick animation of a model might prefer DynaPerspective to IN-CAD. The rendering abilities of surface- and solids-modeling packages may be standardized in accordance with the new Pixar MacRenderMan specification. Intergraph’s MicroStation Mac and Parametric’s Swivel 3D will support MacRenderMan, for example. Standardization will make it easier to move rendered images from one program to another, as in multimedia presentations created in programs such as MacroMind Director Interactive.

Choice CAD Choices
You may not get all you want in a single CAD package. Architects, for instance, might like the third-party market around AutoCAD; appreciate the architectural foundation and focus of Architrio II; lust after the intelligent interface of Vellum; thrill to the animations of DynaPerspective; and dream of the seamless network with PCs, Macs, and workstations that MicroStation Mac offers.

Other disciplines will have similar wish lists — wanting the best of mainstream packages and innovative programs. For now you can either stick with one program or cobble together a system from several components — such as using Vellum for initial sketching, MicroStation Mac for final drafting, and DynaPerspective for animating a presentation. Vellum and MicroStation also make a good team, embodying most of the cutting-edge trends in Macintosh CAD. Look to see these ideas take flight in the next version of your favorite CAD programs.

Phillip Robinson is a former technician and engineer who has been reviewing and consulting on CAD for the past ten years.
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ChemDraw is a drawing program for chemists that uses a freehand spline tool as well as specialized tools for showing chemical structures, such as cyclohexane and benzoic rings and orbitals. ChemD3D is a molecular-modelling system that lets you build and view models in three dimensions and animate them. ChemD3D Plus adds color and energy minimization using MM2.

• Capilano Computing Systems Ltd.
  1168 Hamilton St., Suite 501
  Vancouver, BC V6C 2S2
  (604) 669-6343
  DesignWorks 2.5, $905

MacAvel 1.0, $2,350

DesignWorks is a product for electronics engineers that provides schematic capture and interactive digital simulation. MacAvel is a compiler that converts a high-level-language description of a circuit into a code for a programmable logic device.

• Claris Corp.
  5201 Patrick Henry Drive
  P.O. Box 58168
  Santa Clara, CA 95052
  (408) 967-7000
  MacDraw II 1.1, $395
  Claris CAD 2.0, $395
  Claris Graphic Translators (CGT) 1.0, $299

MacDraw II is a 2-D drawing program sometimes used for basic CAD applications in business, design, and engineering. Claris CAD is a 2-D professional CAD tool with extensive features and an intelligent front end. CGT provides translators for importing and exporting among Claris CAD, PICT, DXF, and IGES formats.

• ComGraph, Inc.
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ADS MGMSStation — Architecture 1.1, $195
ADS MGMSStation — Interiors 1.1, $195
ADS MGMSStation — Mechanical 1.1, $195
ADS MGMSStation — Electronics 1.1, $195

Add-on symbol libraries containing 400 to 600 symbols per library, all created to ANSI standards, that work with MGMSStation.

• D.C.A. Engineering Software, Inc.
  7 Liberty Hill Road
  Henniker, NH 03242
  (603) 426-3159
  Auto-Arch 18.10, $395
  DCA HVAC (heating, ventilation, and air conditioning) 10.30, $395
  DCA ArchitecturalElectric 10.30, $395
  DCA Plumbing 10.30, $395

MacCivil 10.21, $1,995

Auto-Architect: tailors AutoCAD for professionals in architecture, architectural engineering, facilities management, space planning, and construction. The DCA modules handle specific mechanical applications. MacCivil is a program with tools for coordinate geometry, road design, sewer and drainage design, and topography. All require AutoCAD.

• DesignCAD Inc.
  327 S. Mill
  Prior, OR 74361
  (918) 825-4848
  DesignCAD 2D/3D 1.0, $699

Formerly called Origin, this updated product is a general-purpose CAD package with 2-D drafting, 3-D rendering, and complex-surface geometry for aerodynamic designs. Makes an excellent front end for animation.

• Douglas Electronics
  718 Marina Blvd.
  San Leandro, CA 94577
  (415) 493-9770
  Douglas CAD/CAM Professional 6.5, $3,195

A CAD program for the design of printed circuit boards. It includes modules for schematic capture, circuitboard layout and manufacturing, and auto-routing.

• Dynaware
  1163 Chess Drive, Suite J
  Foster City, CA 94404
  (650) 444-5662
  (415) 595-5701

DynaPerspective 2.0, $595

A 3-D conceptualization and visualization program with animation capability, primarily for architecture, engineering, and construction.

• Electric Image
  9690 Telstar Ave., Suite 225
  El Monte, CA 91731
  (818) 444-1819

Electric Image Animation System (beta), $7,495

A 3-D rendering and animation package that includes reflection and texture mapping.

• Engineered Software
  615 Guilford-Jamestown Road
  P.O. Box 18344
  Greensboro, NC 27419
  (919) 299-4843

PowerDraw 3.0, $795
PowerDraw 3.0 Translator 1.0, $275

MacPlots II 2.21, $259

Landscape Library, $79
Residential Library, $199

PowerDraw is a 2-D CAD program with a host of features, including an interactive snap function that aids in geometry creation. PowerDraw 3.0 Translator provides import/export and file-type conversion among many formats. MacPlots II is a comprehensive pen-plottting program. The libraries work with PowerDraw.

• E.T. Vermuul & Associates
  2111 Burton St. S.E.
  Grand Rapids, MI 49506
  (616) 247-6697

Architect Land 1.0, $995

ArchitectsLand 2.1, $795

ArchitectsLand is a design package for landscape architects. Architect is a comprehensive symbol-library package for architects, with more than 2,000 symbols.

• Farb Systems, Inc.
  7120 Windsor Lake Parkway
  Loves Park, IL 61111
  (815) 922-1112

FarbCAD 2D 1.0, $249
FarbCAD 3D 1.0, $495
FarbCAD 2D/3D with DXF translator 1.0, $995
FarbCAD 2D/3D with Parasemetrics 1.0, $2,495
FarbCAD 2D/3D with Parasemetrics and DXF translator, $2,995

FarbCAD is a general-purpose professional-level CAD system. Its parametric capability is its key feature.
In seven minutes you'll know the future of CAD.

On November 22, 1989 there was a radical shift in the future of design. Ashlar released Vellum, the first CAD software that thinks—a breakthrough technology dubbed the Drafting Assistant.

Praise flew. Reviews raved. The Anderson Report predicted Vellum “will set a user interface standard for the 1990’s.”

Is it hype? Or has Vellum on the Macintosh redefined the power and simplicity of industrial-strength CAD? Send for this free 7-minute video to see it in action—and decide for yourself.

It won't require a moment more of your time. Because after 7 minutes, you'll know.

Call now, 1-800-736-5454, extension VIDEO.

Call or send for this free video now.

Only a limited number of copies are available, so order promptly. Call 1-800-736-5454, extension VIDEO. Or attach your business card to this coupon and send to: Ashlar, 1290 Oakmead Parkway, Sunnyvale, California 94086

Do you have a personal computer/technical workstation now?

No Yes: Macintosh Dos Unix Other

Are you considering purchasing a Macintosh in:

<3 mos. 3-6 mos. 6-9 mos. 9-12 mos. Other

System Requirements: 4 MB RAM, Apple Macintosh SE/30, II, IIX, IIXx or IICI

Please circle 3 on reader service card.
Mac CAD Takes Off

- **Forth Worth, Inc.**
  P.O. Box 32
  Sunset, SC 29685
  (803) 876-7494

- **SNAP! 3.1, $695**
  SNAP!/Intergraph Translator 3.1, $105
  SNAP/DXF 1.0, $195
  This general-purpose 2-D CAD program with file transfer to and from Intergraph CAD is primarily for AEC applications, but it can also be used for mechanical design and facilities management as well as other functions.

- **Generic Software, Inc.**
  11911 North Creek Parkway S.
  Bothell, WA 98011
  (800) 228-3601
  (206) 487-2233
  Mac Level 1.1, $149.95
  Generic CADD 1.0, $395
  Symbol Libraries, $24.95 to $74.95
  Mac Level 1 is an inexpensive low-end CAD program with a floating-point precision database. Generic CADD is Generic’s new full-featured general-purpose 2-D CAD program that can be used from initial sketches to output of production-quality drawings. The libraries are used with Mac Level 1.

- **Gibbs & Associates**
  9320 Deering Ave.
  Chatsworth, CA 91311
  (800) 654-3999
  (800) 345-9811 (in CA)
  Gibbs System (inCAD, ncAM, ncPost, ncSurfaces, ncExchange) 3.2, approximately $7,000
  A three-axis CAM package developed for machinists and numerical-control programmers.

- **Gimme, Inc.**
  420 10th St.
  Washington, DC 20003
  (202) 545-8775
  MacArchitect 4.0 (black-and-white), $995
  ArchiPlot II, series 5.3, $400
  ArchiMovie 3.1, price unavailable at press time
  MacArchitect is a black-and-white architectural 3-D CAD package. ArchiPlot II adds color and shadow casting, calculates sequential views, and lets you work in sections and elevations. ArchiMovie lets you animate scenes from ArchiPlot for presentations.

- **Graphic Magic Pty Ltd.**
  P.O. Box 185
  Cotissello 6011
  Perth, Western Australia
  (09) 383-2114
  MacSurf 4.4, $4,500
  This 3-D CAD program for boat-hull design has aerospace- and automobile-industry applications as well.

- **Graphisoft**
  400 Oyster Point Blvd., Suite 517A
  South San Francisco, CA 94080
  (800) 344-5468
  (415) 286-6720
  ArchiCAD 3.4, $3,950
  topCAD 1.3, $1,000 (with ArchiCAD); $4,800 alone (European prices)
  PlotMaker 1.0, $495
  ArchiCAD is a solids-based architectural 3-D CAD program with rendering, sectioning, and quantitative features.
  topCAD is a customizable 2-D CAD development environment with the most features available in a Mac CAD product (it will not be marketed in the U.S. until 1991). PlotMaker is a stand-alone program for editing, laying out, and scaling CAD files on all standard architectural and engineering plotter sheet sizes.

- **Graphisoft, Inc.**
  8370 Court Ave., Suite 202
  Ellicott City, MD 21043
  (301) 461-9848
  Blueprint 1.0, $295
  MiniCAD+ 2.0, $695
  Blueprint is a 2-D CAD package whose files are compatible with MiniCAD+. MiniCAD+ is a 2-D/3-D CAD package that has spreadsheet and database capabilities.

- **IGC Technology Corp.**
  3555 Jackson St., Suite 200
  San Francisco, CA 94118
  (415) 563-2612
  Pegasus II 3.2.4, $695
  Pegasus II 3.2.3, $1,795
  Pegasus I is a general-purpose 2-D CAD package. Pegasus II is a general-purpose 2-D/3-D CAD package with macros and a bill of materials.

- **Imagine That, Inc.**
  151 Bernal Road, Suite 5
  San Jose, CA 95119
  (408) 365-0350
  Extend 1.1J, $495
  Extend Manufacturing Library, $295
  Extend is a performance-simulation application that can be used to do what-if analysis on electronic, mechanical, physical, and mathematical systems. The manufacturing library contains blocks geared toward the manufacturing process.

- **Infinite Graphics, Inc.**
  4611 E. Lake St.
  Minneapolis, MN 55406
  (612) 721-6283
  IN-CAD 1.1, $2,495
  This 3-D CAD system with workstation roots uses solids modeling and produces fully rendered views as well as working drawings. Future versions will have stereolithographic capabilities.

- **Innovative Data Design, Inc.**
  2260 Bates Ave., Suite A
  Concord, CA 94520
  (415) 680-9618
  MacDraft 2.0, $299
  Dreams 1.1, $595
  MacDraft is a low-end 2-D drafting system with a host of features for transferring images to non-CAD applications. Dreams is a 2-D drawing and drafting system with additional features.

- **Innovative Design Systems Corp.**
  150 N. Miller Road, Building 250B
  Akron, OH 44313
  (216) 836-0006
  Ovation CAD/CAM 5.0, $10,000 to $30,000
  Ovation Graphics 5.0, $2,500
  Ovation is a 2-D CAD system primarily for packaging design. Ovation Graphics lets you import or create PostScript-compatible images in your design and import DXF files.

- **Innovative Systems, Inc.**
  171 Interstate Drive
  West Springfield, MA 01089
  (800) 222-1648
  (413) 737-3993
  Precision 1.2, $295
  A 2-D/3-D CAD product derived from Summadraft, which has been available if analyses on electronic, mechanical, and manufacturing processes.

- **Intergraph**
  1 Madison Industrial Park
  Huntsville, AL 35807
  (800) 345-4656
  MacPlot OMA
  MicroStation Mac 3.5.1, $3,300
  An extensive, multiuser, 3-D CAD system with rendering facilities, reference files, and file compatibility with versions on other platforms. Will support RenderMan interface.

- **Kandy Software Corp.**
  2305 N. Kentucky St.
  Arlington, VA 22205
  (703) 332-0231
  CADOVIEW 3.01, $495
  Ability for exchanging/converting CAD data in numerous formats.

- **Klex Software, Inc.**
  25633 Branchester
  Farmington Hills, MI 48018
  (313) 477-6800
  CompuGraph 1.0, $19, 3-D visualization product, $40 (shareware)
  MacConcept 3.8, $1,995, $1,495 for Claris CAD and CAM/OVER owners
  CompuGraph is the shareware precursor to MacConcept, a 3-D wire-frame CAD/visualization system used primarily in the automotive industry.

- **Knack Drafting**
  175 S. Patrick Drive, Suite P
  Satellite Beach, FL 32937
  (407) 777-0275
  MacPerspective 4.0, $295
  A 3-D wire-frame drawing package.

- **LANDCAD, Inc.**
  7519 E. Highway 86
  Franktown, CO 80116
  (303) 663-8160
  LANDCAD 10.0, $595 to $2,995
  LANDCAD Light 1.0, $695
  Modular, specialized add-ons to AutoCAD for landscape designers. LANDCAD Light is a version for site planning, landscape design, and irrigation design that is blended from the various modules and that includes a symbol library containing 350 images.

- **LAPCAD Engineering**
  1568 Diablo Point Court
  Chula Vista, CA 92011
  (619) 421-1238
  LAPCAD 4.6, $495
  A graphic 3-D CAD-like front end for MSC Finite Element Analysis-model creation. One version exists for the MSC/pal on the Mac and one for MSC/NASTRAN on the VAX, IBM, Cray, and other computers.

- **Microspot**
  21421 Stevens Creek Blvd., Suite 240
  Cupertino, CA 95014
  (800) 622-7568
  (408) 253-2300
  MacPlot Pen Plotter Standard 3.6.2/A & B, $159
  MacPlot Pen Plotter Professional 3.6.2 (page sizes A through E), $399
  MacPlot Color Thermal 3.6.2, $495
  MacPlot DMA Color Thermal 2.0, $1,995
  MacPlot Electrostatic 3.6.2, $295
  MacPlot DMA Electrostatic 2.0, $2,495
  MacInteriors 1.0, $995
  MacInteriors Professional 1.0 (color), $595
  MacPlot is a series of drivers for pen plotters, color thermal printers, and electrostatic plotters. MacInteriors is a 3-D interior-design and space-planning program.
Mac CAD Takes Off

- Planit West
  1670 F Las Plumas
  San Jose, CA 95133
  (408) 927-0744
  Planit 1.5, $3,995
  A 3-D CAD system for kitchen design
  that operates in full color, with more
  than 60 major kitchen-cabinet catalogs
  on file.

- ModaCAD, Inc.
  1954 Cotner Ave.
  Los Angeles, CA 90025
  (213) 312-6632
  ModaCAD Design: ModaSKETCH,
  ModaDRAW, $5,000 to $10,000.
  Textile Design: ModaWEAVE, Moda-
  WEAVE Dobby, ModaWEAVE
  Jacquard, $5,000 to $10,000.
  Patternmaking, Grading, and Marking,
  $5,000 to $10,000
  Data Management and ModaPLAN,
  $6,000.
  Computer-aided design and
  manufacturing systems for the
  sewn-product industries. Specializing in fabric,
  textiles, garments, surface design,
  production, data communication, and
  interior and industrial design.

- Medrud Data Systems
  P.O. Box 27020
  Las Vegas, NV 89126
  (702) 737-7725
  DragonWave 1.131, $1,380
  A microwave analysis and design
  program with integrated schematic
  capture for creating microwave circuits.

- Northstar Engineering Design
  1704 Chatham Ave.
  Arden Hills, MN 55112
  (612) 636-1216
  Engineering Symbols Library 1.6, $49
  Design and drafting library for Mac-
  based CAD systems and drafting
  programs, with more than 1,500 symbols
  for mechanical, chemical, and electrical
  engineers.

- Palomar Software
  2984 Oceanside Blvd., Suite D
  Oceanside, CA 92054
  (619) 721-7000
  PLOTTERgize 1.0, $395
  A pen-planning program that allows
  background plotting from CAD and PICT files.
  Price includes RS-232 cable.

- Paracomp, Inc.
  123 Townsend St., Suite 310
  San Francisco, CA 94107
  (415) 439-3848
  ModelShop 1.1, $595
  Swivel 3D 1.1, $495
  Swivel 3D Professional 1.0, $595
  ModelShop is a 3-D visualization product
  primarily for space planning. Swivel
  3D is a 3-D visualization/rendering/animation
  system with extensive modeling features. The
  professional version supports 24-bit color and other
  enhancements such as DXF export to AutoCAD and
  RenderMan.

- San Juan Software Co.
  P.O. Box 27620
  Seattle, WA 98125-2620
  (206) 367-4189
  MacAC 1.4, $149.95
  MacAC II 1.0, $595
  MacAC is an integrated linear-circuit
  simulation and schematic-capture program.
  MacAC II is a full SPICE professional
circuit-simulation package.

- Schumlerhouse Technologies,
  CAD/CAM Division
  4251 Plymouth Road
  Ann Arbor, MI 48106-0986
  (800) 366-0060
  (313) 995-6000
  MacBRAVO! Module 2.0, $1,495
  MacBRAVO! Detailer 2.0, $1,995
  MacBRAVO! Facilities 1.0, $4,900
  MacBRAVO! Electronics 1.0, $1,950
  IGEN (translator), $495
  PlanPrint Library, $495
  Electronics Component Library, $1,950
  MacBRAVO! is a full-featured 2-D/3-D CAD
  system. Module 2.0 is a 3-D modeling system.
  Detailer 2.0 is a 2-D drafting program that integrates
  with Module 2.0. It is a full-featured 2-D/3-D CAD
  system. Facility 1.0 is an extensive 3-D facilities-
  management and design system. Electronics
  adds EDA (computer-aided engineering) tools
to popular ECAD systems.

- Silicon Beach Software, Inc.
  9770 Carroll Center Road, Suite J
  San Diego, CA 92126
  (619) 698-6666
  Super 3D 2.1, $495
  A 3-D viewing, rendering, and animation
  system.

- Softstream International
  19 White Chapel Drive
  Mount Laurel, NJ 08054
  (609) 866-1187
  Relational Objects 1.5, $240
  Formerly known as Paradigm by Acu-
  ity, this relational drawing package lets you
  reposition points in a drawing according to user-specified equations.

- Strata, Inc.
  249 E. Tabernelle, Suite 201
  St. George, UT 84770
  (800) 869-6655
  (801) 629-5218
  StrataVision 3D 1.4, $495
  StrataFlight 1.0, $199
  StrataVision Attributes Library Series:
  Decorative Stone and Wood Grain,
  $139 each
  StrataVision is a 3-D visualization and
  rendering system that can be animated
  with StrataFlight. Each library contains
  20 attributes.

- Textco, Inc.
  27 Gilson Road
  West Lebanon, NH 03784
  (603) 643-1471
  DNA Inspector Kit 1.14, $345 plus
  shipping
  Gene Construction Kit 1.0, $895;
  academic discount, $495
  DNA Inspector Kit is an easy-to-use
  DNA-analysis program that can handle
  most common analyses. Gene Construc-
tion Kit is a tool for displaying and
  manipulating recombinant DNAs.

- Veristar, Inc.
  2112 Runland Drive
  Austin, TX 78758
  (512) 339-0070
  MiniReporter 2.01, $129.95 plus
  shipping
  A report generator for use with Mini-
  CAD 2.0 that creates tab-delimited
  external text files of the symbols and
  their attributes in a MiniCAD+ drawing.

- Vamp, Inc.
  6753 Selma Ave.
  Los Angeles, CA 90028
  (213) 466-5533
  McCAD PCB-1 3.2 (printed-circuit-board layout), $395
  McCAD PCB-ST 1.1 (professional layout/lsiout) , $995
  McCAD 32 Schematics 3.2 (complete schematic-capture environment), $495
  McCAD Schematics 32.12 (schematic capture with digital simulation), $895
  McCAD "Classic" SPICE 2.0 (analog simulation), $745

McCAD PCB-to-Gerber Translator 1.1, $175
McCAD Gerber View/Translator 1.1
McCAD Trailblazer 3.05 (high-performance interactive auto-router), $4,995
McCAD Tracker 3.0 (intermediate two-
signal-layer auto-router), $1,995
McCAD EDS 1 (software bundle), $1,495
McCAD EDS 2 (software bundle), $1,895
This modular family of products for
printed-circuit-board design consists of
layout, schematic-capture, EDA, and
auto-routing modules.

- Versacad Corp.
  2124 Main St.
  Huntington Beach, CA 92648
  (714) 960-7723
  VersaCAD/Macintosh Edition 2.2, $1,995
  VersaCAD Drafter 2.2, $995
  VersaCAD Architect 1.0, $295
  VersaCAD Mechanical 1.0, $195
  VersaCAD is a 2-5-D CAD system available
  on several platforms. The Mac edition is a general-purpose 2-D and
  3-D CAD package with additional utilities and translation capabilities. Drafter
  is a low-cost version that retains all the CAD features of the full system. Architect
  is a module with numerous AEC facilities. Mechanical is a module that
  has specific features for mechanical design.

- VIDI
  16308 Doublegove
  La Puente, CA 91744
  (818) 918-8834
  Dimensions 3DMolder 1.0, $595
  Dimensions 3DMolder 1.0, $695
  Dimensions RayTracer 1.0, $595
  Dimensions Materials Modèle, $99
  Each a family of 3-D visualization, render-

August 1990 MacUser
MiniCad+™

Computer-Aided Design and Analysis comes of Age

MiniCad+ rises on the foundations of a groundbreaking Macintosh CAD program, MiniCad 2D/3D. Universal in aim, MiniCad Plus is a total design and analysis solution, the answer to time-consuming transfers between applications. This professional CAD system offers the following easy-to-use components:

- High precision 2D drafting environment which includes complex duplication with arrays, hierarchical symbol editing with both external and internal libraries, fillets, bezier & cubic splines, auto-join, auto-dimensioning, continuously variable zoom up to 1000x, double-line tools with auto-clean up, 256 user-definable attributes, 8 line types, unlimited layers, full use of Mac II, and more...

- Active spreadsheet inside drafting area which can be hot linked with objects to perform area calculations, parts schedules, cost estimation and more. As easy-to-use as the spreadsheet you're using now.

- All new integrated 3D that is so powerful and user-friendly we may change your mind about micro 3D.

- Minipascal, a programmable macro language, will allow advanced users and 3rd party vendors to create reports, macros, and powerful extensions to MiniCad Plus's capabilities.

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MiniCad+ $695 • Demo Available for only $19.00
MiniCad Plotter Drivers: $300 Stand, $150
U.S.: 1 (301) 461-9488 • Canada: 1 (604) 384-2131 • Australia: 61-7-369-1204
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PostScript® laser printers used to be expensive, large and shared by the entire office.

Until now.
Finally, for less than $3,000, you can have a PostScript laser printer right at your desk. TI introduces its new microLaser, with the features you want — now and in the future.

**Small size. Lots of value.**

At only 13.4 inches wide and 14.2 inches deep, microLaser may be the small kid on the block, but it packs plenty of punch. This printer takes full advantage of the advanced software that runs on your PC. That’s because it uses the Adobe® PostScript printer language and is compatible with the HP LaserJet® Series II — allowing you to switch between them easily. With that kind of flexibility, the six-page-per-minute microLaser is ideal for word processing, spreadsheet and desktop publishing applications.

Because microLaser features the PostScript language, you can print fonts in a variety of typestyles and sizes. Plus, you can print them tall-ways, long-ways, all kinds of ways. You can even print complex pages of integrated text and graphics.

**Capabilities that grow as your needs grow.**

One of the best things about microLaser is that you only buy what you need. So if you’re not ready for PostScript language, you can buy the standard microLaser for less than $2,000 and add PostScript software and other powerful features later.

You can upgrade microLaser without tools or technicians by simply adding upgrade boards. These boards include up to four 1Mb increments of memory, serial and AppleTalk® interfaces and a PostScript interpreter. All you have to do is get additional fonts or emulations is plug optional microCartridges into two credit card-size slots.

**Superior paper handling.**

Part of what makes microLaser a truly personal desktop laser printer that takes up so little room is its paper drawer, which slides inside. Because microLaser holds 250 sheets standard (it holds 500 when you add an optional paper drawer), you spend less time refilling paper and more time creating superb-looking documents.

**New! PostScript printing just got more affordable — now only $2,499**

How do you enter the world of PostScript with its high-quality scalable fonts, integrated text and graphics, and broad software support? Buy TI’s new microLaser PS17 — the laser printer that offers you more scalable fonts and other features, proving that great things come in small packages.

At just half the footprint of the HP LaserJet III, microLaser PS17 not only offers 17 scalable fonts (LaserJet III offers eight), they’re PostScript fonts — the industry’s standard for high quality. That means more than 4,000 software programs take advantage of microLaser’s PostScript font capabilities.

Plus, microLaser PS17 offers the same superior paper handling as other microLaser models, is easily upgradeable and comes at a desktop price.

**Why would you consider anything else?**

Call TI at 1-800-527-3500 to find out more!

The printer also handles a variety of paper sizes and types — from letter, legal and executive to transparencies, labels and envelopes. For those times when you’re facing a large mail merge task, just plug in an optional envelope feeder to easily alternate between letters and envelopes.

*Your own PostScript printer is a call away.*

To find out more about how you can have affordable PostScript printing right at your own desk, call TI today.

**1-800-527-3500.**

© 1990 TI 66635

Standard microLaser is HP LaserJet II compatible, prints six pages per minute and comes with 3 Mb of RAM. microLaser PS17 and PS35 have the same features as the standard microLaser plus an Adobe PostScript interpreter with 17 scalable fonts, and an extra 1 Mb of RAM. microLaser is a trademark of Texas Instruments Incorporated. Adobe and PostScript are registered trademarks of Adobe Systems, Inc. LaserJet is a registered trademark of Hewlett-Packard, Inc. AppleTalk and Macintosh are registered trademarks of Apple Computer, Inc. *TI suggested list price for microLaser model PS17*

Please circle 40 on reader service card.
Introducing Applied Engineering’s new 3.5 drive. We’ll stack this drive up against Apple’s any day. Because we designed in all the reliability and performance of the Apple drive at a price more like that of the cheap imports.

We also added performance features like an inexpensive, user-upgrade path from the 800K base model to 1.44 MEG FDHD (MS-DOS compatible) SuperDrive capacity. And an exclusive 2-way LED indicator that displays green for reading, red for writing. The AE 3.5 drive also incorporates the same, top-quality SONY mechanism used in Apple’s drive.

1.44 MEG capacity means you can stop playing diskette roulette. Simply store your large 2-disk application programs on one, high density disk and forget about fumbling for “sets” of disks. And storing files just became twice as easy too, because you’ll only need half the number of disks.

Aesthetically, the AE Drive is every bit as handsome as the Apple drive. We designed a thick, high-impact ABS case to stack with, daisy-chain with, and exactly match the footprint of Apple’s drive.

Other features include: auto eject, complete daisy-chain capacity (from AE to another drive or vice versa), FDHD SuperDrive compatibility, MS-DOS compatibility, Apple II compatibility, a full one-year warranty.

Compare the two drives. Consider the difference between Apple’s suggested retail prices of $429 for 800K and $629 for FDHD SuperDrive versus our $279. You’ll see that our upgradeable drive stacks up quite well.

Other fine Macintosh peripherals from AE include the DataLink series of modems. DataLinkMac™ is a 2400 baud internal for Mac IIs featuring an upgrade path for the addition of send-fax and MNP-5. $299. DataLink Express™ is our 2400 baud external with the same upgrade capabilities. $249. DataLink/Mac Portable™ is a 2400 baud internal modem complete with send-fax and MNP-5 in a design that helps save the Portable’s battery life. $299. MacRam Portable™ is an internal memory expansion card for the Mac Portable that boosts available RAM from 1 to 8 MEGs. Call for current prices.

How does AE’s 3.5 drive stack up?

Quite well

AE 3.5 Drive™ (800K base model)...........$279.
Order today! To order or for more information, see your dealer or call (214) 241-6060 today, 9 am to 11 pm, 7 days. Or send check or money order to Applied Engineering, MasterCard, VISA and C.O.D. welcome. Texas residents add 7% sales tax. Add $10 outside U.S.A.

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MINIFINDERS
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PRODUCTS
REVIEWED AND RATED

Whether you're researching a major Macintosh product investment or just window-shopping, turn to MacUser's MiniFinders — the most comprehensive and reliable source of Mac hardware and software reviews. This month's guide of the most significant products in 18 categories is our biggest ever. You can find a detailed product review in the issue cited in parentheses at the end of each MiniFinder. For added convenience, a HyperCard stack of the entire MiniFinder database is available on Zmac, our new on-line service. You can also obtain the full text of the articles in back issues through Zmac.

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Welcome to MiniFinders, your personal buyer's guide. MacUser editors carefully select and evaluate each product, assigning ratings from one to five mice, in half-mouse increments. All of the ratings are relative within a category, and because the market is constantly changing, our ratings change too, reflecting the most current conditions. We've indicated all our Eddy (Editors' Choice) Award winners with a *, along with the year in which they were recognized for their excellence.

**MiniFinder INDEX**

- Communications ........................................... 3
- **Databases.................................................. 5
- Desktop Publishing ......................................... 6
- Education .................................................. 8
- Entertainment ............................................. 9
- Financial Management ...................................... 12
- Freeware & Shareware ...................................... 15
- Graphics & Design ......................................... 15
- **Hardware & Accessories... ............................... 21
- Hypermedia ................................................. 28
- Multimedia ................................................ 32
- Music ....................................................... 32
- **Number Crunching........................................... 36
- **Organizational Tools................................. 40
- **0110 Programming.................................... 44
- **Utilities.................................................. 46
- **Video..................................................... 58
- **Word Processing........................................... 58

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**Communications**

- **pcMACK**/pcANYWHERE II
- **pcMACK**/pcANYWHERE I

These programs work together to take control of an MS-DOS machine from the Mac keyboard. Allows DOS files to be printed through the Mac, etc. Features compatible with IBM, Mac II, or later, System 4.1 or later, 128K IBM PC compatible, and MS-DOS 2.1 or later, pcM Dynamic Microprocessor Associates, 1776 E. Jericho Turnpike, Huntington, NY 11743. (516) 462-0440. (Jan '89)

**Connectivity**

- **Apple PC 5.25**
- **Apple Mac 5.25**
- **Apple Mac SE**
- **Apple Macintosh**

Unlike most Mac drives, it doesn't appear on the desktop. Access to DOS files through Apple File Exchange. Requires Mac SE or NuBus slot and a board that occupies an expansion slot in your Mac. Drive: $399; board: $129. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. (Oct '89)

**DaynaFile**

DaynaFile is a drive that reads 3.5- or 5.25-inch DOS floppy disks. The drive connects to a Mac SCSI port and appears on the desktop. Version 3.1 (drive), version 2.3 (INIT). Requires System 3.2 or later, DP0104 Dual 3.5/5.25-inch, $1,005; single drives start at $650. MacLinkPlus/Dayna, $125; DOS Mounter (for use with Apple FDHD drives), $89. Dayna Communications, 50 S. Main St., Fifth Floor, Salt Lake City, UT 84144. (801) 531-0600. (Oct '89) * 87 Eddy

**LapLink Mac III**

LapLink Mac III isn't just for Mac-to-DOS anymore; it's also a Mac-to-Mac program with a full Mac interface and a special cable capable of 750-Kbps transfers between Macs. (By comparison, AppleTalk speed is only 230 Kbps per second.) LapLink Mac III is all new and comes with an INIT that gives you background access to your Mac's files even when LapLink isn't running (similar to Timbuktu/Remote's file-transfer functions). LapLink Mac III deserves a second look. Version 3.0, $189.59. Apple Software, 18702 North Creek Parkway, Bothell, WA 98011. (800) 662-2652. (Sept '90)

**MacLinkPlus/PC**

MacLinkPlus/PC offers more translations between more PC and Mac applications than does any other application. Its interface is friendly, and translations are clean. In addition to translating locally or over a network, the package can connect to a PC serially and via modem. Translators also work with Apple File Exchange. Version 4.1, MacLinkPlus/PC (with telecommunications), $159; MacLinkPlus/Translators (desktop version only), $159; MacLinkPlus/Wang VS and MacLinkPlus/Wang OIS, $395 to $895. DataViz, 35 Corporate Drive, Trumbull, CT 06611. (203) 268-0030. (Oct '89)

**QuickShare 2.0**

QuickShare 2.0 connects your Mac to a PC via SCsi, enabling a Mac to access files on a PC or PC network. Also allows the Mac disk space on PCs, which can be mounted on the Mac's desktop and used as Mac disks. File-transfer software provides generic text and graphic translations. Requires DOS 3.0 or later, talkable Systems, P.O. Drawer 17220, 2900 Center Green Court, Boulder, CO 80308. (303) 444-9532. (Oct '89)

**Rapport/Drive 2.4**

Rapport/Drive 2.4 is a connector/drive combination. When the Rapport connector is attached to the external drive port of a Mac Plus or SE, it allows MS-DOS 3.5-inch disks to be inserted into the Mac's internal drive and read through Apple File Exchange. Drive 2.4 is a 2.4-megabyte external drive that can be used with Rapport. Rapport, $295; Drive 2.4, $495. Kenner Technology, 120A Albright Way, Los Gatos, CA 95030. (800) 552-1232. (408) 370-2686. (July '89)

**SoftPC**

SoftPC runs an IBM PC XT or AT inside your Mac without making you crack the case to add any special cards or boards. The emulation of an MS-DOS machine is done entirely in the software. Version 1.3 Requires Mac II or SE equipped with 68020 accelerator card and 2 megabytes of RAM. $399. Insignia Solutions, 254 San Geronimo Way, Sunnyvale, CA 94086. (408) 522-7600. (Nov '88)

**VersaTerm-PRO**

VersaTerm-PRO is a very powerful terminal program with several special features. Does one of the best VT100 emulations available and has true feature set. Requires Mac 512K or larger. Tektronix 4014 and 4105 emulation. A pro's tool. Version 4.0. Requires Mac 512K or larger. Tektronix Software, 2457 Perkiman Ave., Reading, PA 19606. (215) 779-0522. (Apr '87)
Affordable Solutions

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BMUG (Berkeley Macintosh User Group) Newsletters Choice Product section says... "It's fast, reliable and trouble-free; the best of all Syquest removable drives available". (Winter/Spring 89) DPI has been listed in this category for the last three bi-yearly issues.

800-825-1850

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**NETWORKING**

**AppleShare**
AppleShare is Apple's own file server. Software-based AppleShare lets network users protect files from other users on the file system. Version 2.0. Requires a dedicated Mac and a hard-disk drive. $799; AppleShare Print Server, version 2.0, $295; AppleShare PC, version 2.0, $149, Apple Computer, 20252 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. (May '87) ★ 85 Eddy

**FAXst**
FAXst is an early entrant in the fax-modem race. Adequate but slower than most fax machines, and using it as a normal modem requires changing plugs. Version 3.0. Requires a parallel interface and a hard-disk drive. $445. STF Technologies, Inc., P.O. Box 81, Concordia, MO 64020. (800) 426-1679. (Feb '89)

**HyperDialler**
HyperDialler provides an interface between a phone and your Mac so you can dial a number using your modem-type program such as SideKick, Focal Point, or QuickDex. Connects between the Mac's sound port and a telephone handset. Requires Mac with 128K. $39.95. DataDeskInternational, 7651 Haskell Ave., Van Nuys, CA 91406. (818) 780-1674. (Sept '88)

**inBox**
inBox is an easy-to-use mail system with a very slick interface. It customizes Macintosh mail requirements. Starter set includes one Administrator disk and three Connection disks. $249; additional personal connections, $69 each; additional DOS personal connections, $99 each. TOPS, 950 Marina Village Parkway, Alameda, CA 94501. (800) 445-8077. (May '87) ★ 85 Eddy

**Liaison**
Liaison is a software-based AppleTalk bridge for connecting two LocalTalk networks or a LocalTalk and an EthernetTalk network. Using Liaison you can connect remotely to an AppleTalk network, or two networks can be connected to form a wide-area network. Serialized. Version 2.06. $295. Infosphere, 4730 S.W. Macadam Ave., Portland, OR 97201. (800) 443-7085 or (503) 225-3151. (April '89) ★ 88 Eddy

**MicroPhone II**
MicroPhone II is the leader in the high-end telecommunications programs, with more options and more features than its competition. Virtually all protocols and modems are supported. Complexity and a very busy interface are drawbacks. Version 3.0. Requires Mac Plus or later. $295. Software Ventures, 2907 Claremont Ave., Berkeley, CA 94704. (510) 644-3232. (June '90) ★ 86 Eddy

**NetWare for Macintosh**
NetWare for Macintosh allows Macintoshes on LocalTalk or Ethernet networks to connect to a NetWare file server, using AppleTalk or client software. Difficult PC-based setup and administration. This is not recommended for Mac-only networks. For users with non-AppleTalk PC networks already attached to NetWare servers: 4 mice. Version 1.1. Requires 80286- or 80386-based PC for server, PC for administration, PC LocalTalk cards, two PC Ethernet cards. NetWare version 3.15 or later, and AppleShare client software. $200. Novell, 122 E. 1700 S., Provo, UT 84606. (800) 526-5463. (Sept '89) ★ 88 Eddy

**Phone Line Manager 165**
Phone Line Manager 103 lets you connect a phone, fax, and modem to the same phone line. It's intelligent enough to route incoming calls correctly. Outside callers can be given codes to override it, which saves time. No software needed. Requires any Mac. $199.95. La Cie Ltd., 16285 S.W. 85th, Suite 306, Tigard, OR 97224. (800) 999-0143 or (503) 684-0143. (Mar '90)

**Portable Pack**
Portable Pack is a tool kit for remote communication. It includes a customized Swiss army knife for clipping and crimping wires, two PhoneNET StarConnectors, two RJ-11 modular phone cables, two modular cable extenders, two modular Y-splitters, a screwdriver, alligator clips, a PhoneNET-to-LocalTalk adapter cable, and even a 3-to-1 power strip, all in a handy carrying case, plus Timbuktu and AutoShutDown. The price is steep, especially if you already have the Timbuktu products. $495. Farallon Computing, 200 Powell St., Suite 600, Emeryville, CA 94608. (415) 596-9000. (Sept '90)

**Remote Access Pack**
Remote Access Pack is a bundle of Farallon communications products for remote communication. The package includes a V.32 9,600-bps modem, a WakeUp cable with Auto ShutDown software, Timbuktu, and Timbuktu-Remote. You need two Remote Access Packs to communicate. The modem is a V.32 full-duplex unit and is very sensitive to line quality. Because the modem is the weak link, consider buying Timbuktu, Timbuktu-Remote, and the WakeUp cable separately, and provide your own modems. Version 2.0.5. $1,295. Farallon Computing, 200 Powell St., Suite 600, Emeryville, CA 94608. (415) 596-9000. (Sept '90)

**Remote/WakeUp**
Remote/WakeUp is a slick hardware/software solution that lets you turn an ADP-compatible Mac on from any modem and also lets you shut down the Mac after a specified period of inactivity. Uses a special modem cable that plugs into the modem serial port and an ADB-compatible cable. AutoShutDown is a tool that provides a powerful command language. The fastest screen updating available can keep up even at 9,600 bps. The large-screen editor can easily be archived. Version 3.1C. $149. Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348. (404) 441-1617. (Jan '89) ★ 85 Eddy

**V-series Smartmodem 9600**
V-series Smartmodem 9600 is one of the fastest modems for the Mac. To achieve high speeds, you need a special cable and software that supports the format. Requires Mac II or later, Mac-to-modem cable, and communications software. $999. (V.42 and X.25 available). Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348. (404) 441-1617. (Jan '89)

**WhiteKnight**
White Knight is the new name for Red Ryder. Although the program is more powerful, the interface has taken a step backward in this complete rewrite. The manual is new and much improved. Extensions, called RCMDs (similar to HyperCard XCMDs), are now supported. You get a lot for a low price. Version 1.10. Requires Mac Plus or later. $139. FreeSoft Co., 150 Hickory Drive, Beaver Falls, PA 15010. (412) 846-2700. (May '90)

**DATABASES**

**Databases**
Databases is a flat-file manager in a DA. Handles pictures, text, ASCII, WAV, and QuickDex and other files. Version 1.5. Requires Mac 512K or later. $129.95. Pre-Finders, 518 Hamilton Ave., Suite 706, Memphis, TN 38137. (800) 423-0276 or (901) 683-3383. (Jan '90)

**dBASE Mac**
dBASE Mac is a relational database-management system that includes a structured programming language to develop stand-alone applications. Pal­let­u­te icons as alternatives to menu commands can help novice users. Version 1.01. Requires Mac Plus or later. $495. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90409-9972. (213) 329-0086. Feb '90

**Double Helix II**
Double Helix II is a relational database that can work in a stand-alone environment or as an icon-based development system for easy creation of databases. Version 3.0. $595. Odesta Corp., 4084 Commercial Ave., Northbrook, IL
Microsoft File
Microsoft File is a basic flat-file manager. It has 100 forms that work with standard preprinted business forms. Version 2.0. Requires Mac Plus or later. $395. Microsoft Corp., One Microsoft Way, Redmond, WA 98052-6399. (800) 426-9400 or (in WA) 206-882-8080. (Nov '89)

FileMaker II
FileMaker II is a solid flat-file/database manager with multiuser capability that is ideal for businesses. Has flexible layouts and good searching, data entry, and reporting capabilities. Version 1.1. Requires Mac Plus or later and two 80K drives or a hard disk drive. $299. Claris Corp., 5201 Patrick Henry Drive, Santa Clara, CA 95052. (408) 987-7000. (Nov '89)

Filevision IV
Filevision IV is a picture-oriented flat-file manager. Still the only software that supports graphics/text integration projects. Doesn’t stack up well in straightforward uses. Version 1.0.6. Requires Mac Plus or later. $495. Marvien, 3420 Ocean Park Blvd., Suite 3020, Santa Monica, CA 90405. (213) 459-0813. (Nov '89)

4th Dimension
4th Dimension is a versatile relational database that can create stand-alone applications. Has a Pascal-like procedural language. Design and layout environments allow easy information linking. New version is faster and more robust. Version 2.0.10. Requires Mac Plus or later. $695. ACUS, 10351 Bubb Road, Cupertino, CA 95014. (408) 252-4444, ext. 324. (Feb ’90) * 87, ’89 Eddy

FoxBASE+/Mac
FoxBASE+/Mac is a relational database manager with integrated report and query capabilities. Fox Software, 134 W. South Boundary, Perrysburg, OH 43541. (419) 874-662. (Sept ’88) * 87, ’88 Eddy

MBA Clients
MBA Clients is a set of 11 multiuser business applications that run under ACUS’ 4th Dimension. It’s also an automated programming environment for developing additional 4th Dimension applications. Version 2.0.2. Requires Mac Plus or later and 4th Dimension. $189 per application, unless specified otherwise. Infusion Corporation, Four 10701 Lomas Blvd.N.E., Suite 110, Albuquerque, NM 87123. (505) 294-3210. (May ’89)

Omnis 5
Omnis 5 is Blyth’s major upgrade of Omnis 3. Primarily a developer’s tool, it’s a powerful graphics-oriented multiuser relational/hierarchical database. Improved interface still isn’t entirely Mac-like. Comes with HyperCard external for creating HyperCard front ends. Version 1.1. Requires Mac Plus or later and hard disk drive. $695. EXcelsoft Software, 1065 E. Hillsdale, #300, Foster City, CA 94040. (800) 223-8500. (Sept ’89)

Panorama
Panorama is a very powerful and classy flat-file manager. Keeps databases in RAM for speed. Spreadsheet-like data entry. Supports text, numbers, graphics, and dates as data types. Also offers powerful charting function and macros. Version 1.5. Requires Mac Plus or later. $395. ProVE Development, 15180 Islander Lane, Huntington Beach, CA 92649. (714) 892-8199. (Nov ’89) * 87, ’88 Eddy

RecordHolderPlus
RecordHolderPlus is a middle-of-the-road flat-file manager with above-average functionality. Has the best edit functions on the market. Good choice for a high-volume application where editing can make all the difference. Version 3.1. Requires Mac 512K or later. $995. Software Discoveries, 137 Krawski Drive, South Windsor, CT 06074, (203) 872-1024. (Nov ’89)

ReFlex Plus: The Database Manager
ReFlex Plus: The Database Manager is a relational database with “smart” entry and report design but no overall programming facility. Simple to use, it offers limited relational capabilities. Version 1.01. Requires Mac 512K or later. $995. Software Discoveries, 137 Krawski Drive, South Windsor, CT 06074, (203) 872-1024. (Nov ’89)

Retriever
Retriever is a spreadsheet-oriented data flat-file manager that has solid reporting and uses icons instead of menus for many functions. Has fast sorting and capable visual sorting capability, and HyperCard-like interface. Version 1.03. Requires Mac 512K or later. $995. EXcelsoft Software, 8620 Winton Road, Suite 304, Cincinnati, OH 45231. (513) 522-0011. (Nov ’89)

DTP Advisor

Font and Typography
Adobe Type Manager
Adobe Type Manager makes your fonts better almost magically. It creates smooth images of any size and improves output of most QuickDraw printers. Not quite perfect (there are some problems with Word and smaller point sizes) and slow on 68000 Macs, but improvement in quality is usually worth the effort. Version 1.2. Requires Mac Plus or later. $995 (includes Times, Helvetica, Courier, and Symbol fonts); other fonts additional. Adobe Vision, 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94039-7900. (800) 447-5777. (Feb ’90) * 89, Eddy

The Art Importer
The Art Importer creates PostScript fonts containing up to 256 graphic characters. Accepts logos, clip art and PICT and EPSF graphics. As fonts, graphics can be used in programs that don’t normally accept them, and resizing is as easy as changing the point size. Supports any color art. Math composer version available. Version 2.0. Requires Mac Plus or later. $179. Altys Corp., 720 Ave. F, Suite 109, Palo Alto, TX 70574. (214) 424-4888. (Apr ’90)

Expressionist
Expressionist is a powerful DA that lets you create complex mathematical equations within applications. Equation manipulation has never been easier. Version 2.03. $1295. Precise, 814 Castro St., San Francisco, CA 94114. (415) 282-5864. (July ’89)

FONTastic Plus

Fontographer 3.0
Fontographer 3.0 is an upgrade of the top PostScript-font editor/generator. New features include an integrated screen-font editor, auto-tracing, and a pen tool. This is a professional tool that also includes PostScript hints within your fonts. Screen-font editor automatically generates bit-mapped fonts but is strictly bare bones. Can also be used for creating logos but needs better drawing tools for this purpose. Version 3.0. Requires Mac Plus or later and System 4.2 or later. $495. Altys, 720 Ave. F, Suite 109, Palo Alto, TX 70574. (214) 424-4888. (Jan ’90)

FontLine
FontLine converts Fontographer-created bit-mapped interfaces into PostScript outline fonts that can be edited in Illustrator and FreeHand. Version 1.0. Requires Mac with 1 megabyte. $295. FontLine, 11837 Yonge St, Graphics, P.O. Box 1900, Freedom, CA 93019. (408) 761-2481. (July ’89)

Fontizer
Fontizer creates high-quality screen fonts of any downloadable PostScript typeface in sizes up to 96 points. Excellent utility for producing large fonts in sizes with true WYSIWYG. Version 2.0. Requires Mac Plus or later, PostScript printer, and PostScript printer driver (in 8-bit or 16-bit color). $1295. Specialty Software Development, 110 Wild Basin Road, Suite 270, Austin, TX 78746. (512) 327-8621. (July ’89)

Fontographer 2.1
Fontographer 2.1 is a font editor that provides morphing of bit fonts and character sets. It also provides true WYSIWYG as well as “regular” format. Version 1.1. Requires Macintosh 512K or later and runs only with U.S. system software (International version available from Icon Technologies, Leicester, England.) $395. ICOM Simulations, Inc., 648 S. Wheeling Road, Wheeling, IL 60090, (708) 520-4440. (Oct ’89)

Hermes & Tribune Fonts
Hermes & Tribune Fonts are specially designed fonts that come in sizes up to 120 points. Optimized for the ImageWriter LQ, the HP LaserJet and other fax modems. These fonts look better than Apple’s fonts and can replace Helvetica and Times, $400 for a 704 N. Water, #1, Ellensburg, WA 98925. (509) 925-5280. (Sept ’89)

KernEdit
KernEdit is a basic kerning program with a rather un-Mac-like interface. Word View is a nice feature that greatly simplifies kerning. kernEdit is a solid program. The maximum resolution possible is 1/1000 em. There are 17 kerning-table packages, each containing 25 tables. Version 1.1. Requires Mac Plus or later. $149; additional kerning tables, $95 per package. Pairs Software, 160 Vanier Blvd., Brantford, Ontario M4G 4B8, Canada. (416) 467-8784. (Apr ’89)

KeyCap Fonts
KeyCap Fonts contains three typefaces designed specifically for writing computer documentation. Version 1.0. $149.55.
Paperback Software International, 2830 Ninth St., Berkeley, CA 94710. (415) 642-9860 (Apr '89)

**LetraTack**

LetraTack is a type-customization program for creating headlines, logos, signs, and other small typeform envelopes that let you create unique distortion effects. Works only with LetraFonts, which are accessible only through the program. Version 1.5. Requires Mac Plus or later and hard-disk drive. $495, $75 per font. Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07652. (201) 845-6100. (May '89)

**Eddy LetraTack**

LetraTack lets you add, delete, or modify the kern pairs for any installed font. Version 2.2. Requires Mac Plus or later, 5512KE or later, $39.95; 5512KS or later, $140. Letraset, Inc., N. Dale Mabry Highway, Tampa, FL 33618. (800) 523-8973. (June '89)

**MacTeX**


**PostScript Type Sampler and Type Listing Edition**

The PostScript Type Sampler and Type Listing Edition is classic art-director's typebook with samples of all the available laser fonts. It is also available and searchable on disk, but screen-resolution considerations make the printed version the more valuable part of this package. Type Listing reads SoftWorks (the text file is also provided). Type Sampler is in notebook form. Type Listing, $2000 (includes 3 to 4 updates); Type Sampler, $75; one year of printed updates, $80; Sampler, one year’s update service, and Listings, $555. MacTography, 324-492, St. Paul, Minn. 55102. (507) 292-5069. (May '90)

**Publishing Packs**

Publishing Packs bundles three Adobe typefaces that work well together for particular publishing projects. The packages offer substantial savings over purchasing the typefaces individually, and the documentation has useful information on typeface characteristics, Newsletters, $395; FormS and Schedules, $475; Presentations, $475. Adobe Systems, Inc., 1585 Charleston Road, P.O. Box 378, Mountain View, CA 94039-7900. (800) 344-8335. (Feb '89)

**Textures**

Textures is an implementation of TeX, the big daddy of type-setting programs. Good for people trained on mainframes in the early days. Otherwise, there’s little such as high learning curve. Version 1.2. Requires Mac Plus. $495; education, $395. Blue Sky Research, 534 S.W. Third Ave., Portland, OR 97204. (800) 622-8398. (Apr '88)

**TypeAlign**

TypeAlign is an INIT/DA combination that is essential for DTP work if you use AT. It lets you place text along circular, angled, or arbitrary paths. The program could use the Clipboard better, but the main drawback is that it has limited effects. Version 1.02. Requires Mac Plus or later, $99.95. Adobe Systems, 1890 Shoreline Blvd., Mountain View, CA 94033. (415) 324-8800. (May '90) • *89 Eddy LetraTack

**TypeStyle**

TypeStyle is a utility application that lets you distort regular type to create display type. It supports 8-bit color and can output files as process-free separations. Its performance is excellent except on low-end Macs where it might be unacceptable. Includes 10 fonts. Version 1.0. Requires Mac Plus or later. $199.95. Broderbund Software, 17 Paul Dr., Petaluma, CA 94954. (800) 521-6263. (May '90)

**UltraSpec**


**World Class Fonts!**

World Class Fonts! comes in volumes that include three tons of utilities as well as all the Mac the Knife fonts and a lot more. Volumes 1 — 8 are now available. $79.95 per double volume. Dribbble-Click Software, Inc., 9316 Deer Ave., Chatsworth, CA 91311. (818) 700-9525. (Dec '86)

**World Class Laser Type**

World Class Laser Type is a six-volume collection of PostScript fonts that are a good alternative to more expensive fonts. Each volume comes on two 800K disks and includes screen fonts and PostScript printer fonts. An excellent value. Requires PostScript printer. $79.95 per volume. Dribbble-Click Software, Inc., 9316 Deer Ave., Chatsworth, CA 91311. (818) 700-9525. (Dec '86)

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**Page Layout**

**Design Studio**

Design Studio is based on Ready, Set, Go! but is more than just a beefed-up version of that program. It has new layout-management features, and its handling of text, graphics, and color is wonderful. It shows many of RSG’s drawbacks, however. Performance needs to be improved considerably, and a totally new manual would be very helpful. Version 1.0. Requires Mac II or later. $795. Letraset, Inc., 40 Eisenhower Drive, Paramus, NJ 07653. (800) 634-3463. (June '90)

**Fast Forms**

Fast Forms is a forms-design and management program that uses a DA for form fill-out. It has only basic calculation abilities and a limited design environment. Confusing interface. Version 1.2.1. Requires Mac IIKE, System 3.2, and Finder 3.5. $149.50. Power Up Software Corp., 2929 Campus Drive, San Mateo, CA 94403. (415) 345-5900. (Jan '90)

**FlexForm Business Templates**

FlexForm Business Templates are two volumes of prepackaged business forms. Includes SmartForm Assistant, Volumes I contains stockkeeping, production, sales, billing, and collection. Volume II has purchasing, receiving, accounting, disbursing, and personnel. $89.95 per volume. Antic Software, 544 Second St., San Francisco, CA 94107. (415) 957-0888. (Jan '90)

**FormSet: Business Forms Edition**

FormSet: Business Forms Edition provides a wealth of business forms, such as expense reports and profit/loss statements. Fields are automatically calculated. Can’t be customized beyond adding a logo. Version 1.4. Requires Mac IIKE or later. $95. SoftView, 4820 Aldor Lane, Suite F, Camarillo, CA 93010. (805) 385-5000. (Jan '89)

**Interleaf Publisher**

Interleaf Publisher is a speedy multiuser layout system for producing large, complicated documents. This version has an improved user interface, but it still suffers from poor font management. Version 3.5. Requires Mac II with 5 megabytes of RAM and a hard-disk drive. $995. Interleaf, 10 Canal Park, Cambridge, MA 02141. (617) 621-8080. (Apr '89)

**Layers**


**Multi-Ad Creator**

Multi-Ad Creator is a powerful tool that lets you create high-quality single-page ads. It is easy to use and is nearly fool-proof, creating Easy taste feature, however. Virtually every kind of graphic and most word-processor files can be incorporated into the ad itself. Get it. Version 2.1. Requires Mac Plus or later, $995. Multi-Ad Services, 1720 W. Detwiler Drive, Peoria, IL 61615. (309) 692-1530. (June '90)

**Page Designs Quick! (PDQ)**

Page Designs Quick! (PDQ) and Page Designs Quick! 5 (PDQ 5) are PageMaker templates aimed exclusively at newspaper publishing. The two sets contain many templates, including four-column, and 225 tabloid-sized five-column layouts. The quality is excellent, but the templates are bare bones, with no art. You can modify all layouts from within PageMaker. PDQ 1, $89.95; PDQ 5, $159.95. PAR Publishing, 6355 Topanga Canyon Blvd., Suite 307, Woodland Hills, CA 91367. (818) 340-8165. (Aug '90)

**PageMaker Portfolio**

PageMaker gives designers complete freedom over page layout. Uses pasteboard meta-data to link position of text and graphics relies on hand-eye coordination. Color Extension add-on lets you edit a color image’s CMYK values. Can’t be learned. Requires version 3.02. Requires Mac Plus or later and a hard-disk drive. $595; Color Extension available. 10 Canal Ave., S., Seattle, WA 98104-2871. (206) 622-5500. (Jan '90). • *85, 87, 88 Eddy LetraTack

**Designs for Newsletters**

PageMaker Portfolio: Designs for Newsletters is a complete package of newsletter templates with preset columns, headlines, graphics, and captions. Documentation provides excellent tutorial. PageMaker Manuals and Business Communications also available. Requires Mac Plus or later and PageMaker. $99 each. Aldus,
Publish It! is a moderately priced page-layout package designed for users with Pluses and Macintoshes who want to try their hand at desktop publishing and simple drawing and painting tools. Works using a frame metaphor. Can rotate text. Limited color support. Requires Mac Plus or later. Requires System 4.2 or later; System 6.0 or later preferred. $495. Timeworks, 444 Drake Cook Road, Deerfield, IL 60015-4919. (708) 948-9200. (Dec '89)

QuarkStyle

QuarkStyle is a collection of 72 plates for instant desktop publishing. The templates, which cover the gamut from business cards to newsletters, let you concentrate on the contents rather than its appearance. Version 1.01. Requires 1 megabyte and hard-disk drive. $1995. 300 S. Jackson St., Suite 100, Denver, CO 80209. (800) 543-7111 or (303) 934-0784. (Feb '89)

RagTime

RagTime is a page-layout program with extensive spreadsheets and powerful drawing tools. Spreadsheets and graphs can be linked so that they update each other dynamically. There are still some gaps (rotation of text is limited, for example) and lots of rough edges. The manual needs to be localized to America. Version 3.04. Requires Mac Plus or later. $599. RagTime USA, 702 Marshall St., Suite 322, Redwood City, CA 94063. (415) 780-1800. (June '90)

Ready, Set, Go!

Ready, Set, Go! combines an elegant interface with style sheets, fine-tuned typography, gray-scale editing, and spot color. The only program that provides a few detailed views of publications so you can rearrange pages. It's one of the first programs to store font information with documents, through a TrueType font database. Version 4.5a. Requires Mac Plus and a hard-disk drive. $495. Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07653. (201) 845-6100. (Jan '90).

SmartForm Designer

SmartForm Designer is a full-featured forms-design and -management program. Includes SmartForm Assistant for forms fill-out and handling. Easy-to-use design environment. Imports color graphics. Requires Mac Plus. Version 1.2 requires Mac Plus or later. $1,950. Patrick Henry Drive, Santa Clara, CA 95052. (408) 987-7800. (Jan '90)

Springboard Publisher II

Springboard Publisher II is a second try at a low-end template-based DTP package. It's unfortunately no better than the original program. The interface is poorly designed. Editing works only in the Actual Size view, making large changes awkward and difficult to review. The text editor is far too slow, even on fast Macs. There are better tools for low-end DTP. Version 2.0. Requires Mac Plus or later. $1,955. Springboard Software, 7808 Creekside Circle, Minneapolis, MN 55435. (612) 944-3912. (Apr '89)

TrueForm

TrueForm creates an electronic form by scanning a preexisting form or importing from another design environment. No design capabilities. Automatic field definition. Has form caching for faster printing. The only forms package with a database link. Version 2.0. Requires Mac Plus and System 6.0 or later. $395. Adobe Systems, 1385 Charleston Road, P.O. Box 7900, Mountain View, CA 94039-7900. (800) 922-3623, (800) 344-8335, or (415) 961-4400. (Jan '90)

Presentation

Aldus Persuasion

Persuasion is the premier desktop presentation program. Template and outlining abilities have been improved considerably, and slide shows are handled well. There are very few flaws in this package. Version 2.0. Requires Mac Plus or later, System 4.1 or later, and a hard-disk drive. $495. Aldus, 411 First Ave., Seattle, WA 98104. (206) 622-5500. (Apr '90) *87 Eddy

CA-Cricket Presets

CA-Cricket Presets is a presentation tool with a strong graphics emphasis. Good master template. Lacks import capability for text. Version 1.0. Requires System 4.2 or later. $495. Computer Associates, 10505 Sorrento Valley Rd., San Diego, CA 92121-1698. (619) 513-5236. (Dec '88)

PowerPoint

PowerPoint is an easy-to-use desktop-presentation tool. Good color schemes. Can send presentations to Genigraphics to produce color 35mm slides. Version 2.01. Requires System 4.1 or later, Mac Plus or later, $395. Microsoft Corp., One Microsoft Way, Redmond, WA 98052-6390. (800) 426-9400 or (206) 454-2030. (Aug '87) *87 Eddy

StandOut

StandOut! is a presentation program built like a publishing program, with strong print and graphics support. Automatic flow around graphic objects. Lacks good graphic examples. Version 1.0. Requires Mac Plus or later. $295. Letra-set USA, 40 Eisenhower Drive, Paramus, NJ 07653. (800) 343-8973 or (201) 845-6100. (Nov '89)

Visual Business No. 5

Visual Business No. 5 is a port of a DOS charting presentation package. Excellent charting capabilities, including 3-D. More difficult to learn and use than Persuasion and PowerPoint. Can't store a whole presentation. Output Manager is included to let you print to a slide maker. Includes only four LaserWriter fonts. Not a good choice unless you specifically need one of its features. Version 1.02. Requires Mac II and System 6.0 or later. 2 megabytes required for Output Manager. $395; set of additional LaserWriter Plus fonts, $195. Visual Business Systems, 700 Lake St., Suite H, Ramsey, NJ 07446. (201) 327-2526. (Oct '89)

Education

Alphabet Blocks

Alphabet Blocks teaches pre-readers the letters and sounds of the alphabet. The digitized voice of an on-screen elf is clear and pleasant. Very intuitive. Requires Mac Plus or later. $59.95. Bright Star Technology, 1450 114th Ave. S.E., Suite 200, Bellevue, WA 98004. (206) 451-3679. (May '88)

American Discovery

American Discovery is an interactive United States geography game that teaches geographic features; and, in a roundabout manner, postal codes. Version 2.3. Requires Mac II/SE. $49.95. Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. (408) 438-1990. (May '88)

Virtual Geography

American Discovery is an interactive United States geography game that teaches geographic features; and, in a roundabout manner, postal codes. Version 2.3. Requires Mac II/SE. $49.95. Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. (408) 438-1990. (May '88)

Physics

Physics is a capable, intelligent, well-designed study aid. Covers vectors to thermodynamics to the nature of light. Animated experiments let you try out concepts. Requires Mac II or later. $99.95. Broderbund Software, 5353 Scotts Valley Drive, San Rafael, CA 94903-2101. (415) 492-3200. CP (Jan '88)

Reader Rabbit

Reader Rabbit teaches four-to-eight-year-olds how to read with four elegant games that build on one another. Version 2.2. Requires Mac SE/30 or later. $59.95. The Learning

KidsMath

KidsMath is a set of eight educational applications for three-to-eight-year-old children. The quality varies, ranging from outstanding -- although it doesn't support color or large monitors. Version 1.1. Requires any Mac with 512K of RAM. $49.95. Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. (408) 438-1990. (May '88)

LXR+TEST

LXR+TEST generates tests from a database of questions. Makes it easy to modify and scramble questions and save an un­ available output. Version 4.0. Requires Mac Plus or later. $149. Logic eXtension Resources, 9651 C Business Center Drive, Rancho Cucamonga, CA 91730. (714) 980-0046. (May '88)

Mavis Beacon Teaches Typing

Mavis Beacon Teaches Typing has more features than a Selectric. Lots of diagnostics concerning typing. Incomplete documentation. Version 1.1. Requires Mac Plus or later. $49.95. The Software Toolworks, 19080 Nordhoff Place, Chatsworth, CA 91311. (818) 885-9000. CP (Nov '87)

NumberMaze

NumberMaze makes practicing basic math skills a game. Children ages 5 through 12 work their way through various mazes by solving numerical and word problems in counting and arithmetic, multiplication and division. Selectable problem types and difficulty. Games can be customized with familiar names and additional levels. Based on five major math-textbook series for grades one through six. Version 1.0. Requires Mac II or later. $49.95. Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. (408) 438-1990. (May '88)

Physics

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Reader Rabbit

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Co., 6493 Kaiser Drive, Fremont, CA 94555. (800) 852-2550, (415) 492-3200. (Nov '88)
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Our drive combines the fastest access times with the most versatile software and packaging. Compatible with Mac and DOS, the drive reads CD-ROMs in all standard formats and plays audio CDs too. Headphone, analog and digital audio output as well as external termination and SCSI ID switching are standard.

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Infinity Optical Drive
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For secure, high-capacity data storage, there is no better drive. This rewritable optical cartridge drive offers up to 650MB of storage per cartridge at very low cost. Its special technology ensures data safety (including immunity to magnetism). Surprisingly fast, the drives are ideal for backup, multimedia, archiving, databases and more!

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For the really big jobs, you need an Optical Jukebox, 36 gigabytes of reliable, rewritable optical storage at your fingertips. Each jukebox comes standard with 56 optical cartridges and two optical drives. Numerous additional hardware and software options are available. Let us help you satisfy your high-capacity storage requirements.

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Pipe Dream

Pipe Dream is an addictive game that demands a nearly perfect mixture of strategy and speed. You must build a pipeline fast enough to prevent the sea from overflowing. It has 36 levels of play. Requires Mac Plus or later. $39.95. LucasFilm Ltd., C-mail, P.O. Box 10307, San Rafael, CA 94912. (415) 662-1902. CP: must use an included decoding wheel. (Mar '90)

Puppy Love

Puppy Love is a combined game and teaching tool. As you teach your puppy tricks and routines, you learn the basics of programming logic. Great fun for all ages. Does not run from a hard-disk drive. Version 1.0.$29.95. Addison-Wesley, Route 128, Reading, MA 01867. (617) 944-3700, ext. 2504. CP. (Mar '90)

Quarterstaff

Quarterstaff is a fantasy adventure game of the typical good-versus-evil variety. Ability to use characters in other adventures is a plus. Offers a lot of potential for development. Version 1.2. Requires Mac Plus or later. $49.95. Simulated Environment Systems, 6110 Pacific Coast Highway, Redondo Beach, CA 90277. (Mar '88)

Seven Cities of Gold

Seven Cities of Gold is an educational program masquerading as an adventure game and is practically unique in both content and look. You are to land (not the easiest part) in the New World and attempt to plunk the natives, seek for missions, and collect gold. Version 1.0. $19.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94402. (415) 343-4232. CP. (June '87)

Shadowgate

Shadowgate is an icon-based graphic adventure game. You, as the seed of prophecy, must travel the world from the evil warlock. Far surpasses all others with great animated graphics, an eerie soundtrack, and adventure. $49.95. Mindscape, 3444 Dundee Road, Northbrook, IL 60062. (708) 480-7667. CP. (Dec '87)

Shangri-La

Shangri-La is a wonderful strategy game. The new version adds gorgeous color, good sound, and new intelligence. The game can now tell you when there are no more moves. Version 2.0. Requires any Mac. $29.95. Medigenic, 400 East Bohannon Drive, Midlo, VA 23645. (415) 329-0500. (June '90)

SimCity

SimCity is an animated game that is also a city-planning simulator. You can try one of any eight scenarios included in the package or build your own city from the ground up. Evaluation window gives you instant feedback on your efforts. Version 1.2. Requires Mac 12K or later. $49.95. New World Computing, 17 Paul Drive, San Rafael, CA 94903-2101. (415) 492-3200. CP. (Jan '90)

SimCity Supreme

SimCity Supreme is the color version of SimCity. Has all the advantages and virtues of the original, plus it's copy protected. Version 1.1. Requires Mac 12K or later. $69.95. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101. (415) 492-3200. CP. (June '89)

Solitaire Royale

Solitaire Royale is a collection of eight solitaire card games. The Tour mode cycles through each game. Tournament deals the same hand for several players. Monochrome, version 1.1: color, version 1.0. $34.95. Spectrum Holobyte, 2061 Challenger Drive, Alameda, CA 94501. (415) 522-3854. CP. (May '88)

Space Quest

Space Quest is a 3-D animated adventure in which you play a human in a dicey situation. You have to do is get off your ship before it explodes and save the Earman System. Version 1.0. Run on any Mac. $49.95. Sierra On-Line, P.O. Box 485, Coarsegold, CA 93614. (209) 683-4446. CP. (Aug '87)

Star Fleet I: The War Begins!

Star Fleet I: The War Begins! is a space opera of the Star Trek variety. Rise through the ranks from ensign to admiral in this serialized adventure. Version 2.1. Requires Mac 12K or later. $55. Interstellar Corp., P.O. Box 75825, Webster, TX 77598. (713) 486-4163. (May '88)

Strategic Conquest Plus

Strategic Conquest Plus challenges you to discover an unexplored world and conquer it by manufacturing and deploying armies, ships, and planes. A two-disc game that doesn't support an external drive. Version 2.055. Requires Mac 12K or later. $59.95. Premiere Technology, P.O. Box 11138, San Francisco, CA 94101. (415) 892-7766. CP. (Feb '88)

Synchoncity

Synchoncity is mood-control software. Based on the I-Ching, it can be used as a consultation or decision tool. Beautiful artwork and sounds. Even skeptics like it. Version 2.0. Requires Mac Plus or later. $49.95. Visionary Software, P.O. Box 69191, Portland, OR 97201. (503) 246-6200. (Mar '90)

The Vietnam War

The Vietnam War is a stack that uses HyperCard fully and brilliantly to present a fair view of the Vietnam conflict. It is so compelling that it's impossible to put down. Version 2.0. Requires Mac Plus or later, HyperCard, and a hard disk drive. $24.95. Regeneration Software, 377 Corleone Drive, Scotts Valley, CA 95066. (408) 438-5791. (Apr '90)

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Insight **Insight** is a high-powered accounting program for small-to-medium-sized businesses. Modules include Accounts Receivable, Accounts Payable, General Ledger, Inventory Control, Time Billing, and Payroll. Requires Mac 512k or later, and hard-disk drive, $69.95 per module. Layered, The Schraft Center, 529 Main St., Boston, MA 02129, (617) 242-7700, (Dec '86) $79 Edgy  

**Insight Payroll** $79  

Insight Payroll is part of the Insight series and is best used with the other modules. It features a form-based system for quick access to all parts of the program. The large manual is excellent. It has self-tax law updating capabilities (a must for businesses in a pay-roll program). Version 1.0. $695 (includes one free tax update). Layered, The Schraft Center, 529 Main St., Boston, MA 02129, (800) 622-4436 or (617) 242-7700, (Apr '90) 

**Macvoice**  

Macvoice is an invoicing system for small businesses. Limited formatting ability; excellent printing performance. Version 1.0. Requires Mac 512k or later. $60.95, Synex, 602 Ninth St., Brooklyn, NY 11215, (718) 455-1522, (Nov '89) 

**MultiLedger**  

MultiLedger is an integrated general ledger, accounts receivable, accounts payable, and inventory system. It does batch processing, handles multiple companies, tracks budgets, and has high-resolution-graphic statement printing. Double-entry bookkeeping is fully transparent. There are no transaction journals or customer credit limits. Version 1.3. Requires Mac Plus or later. $395, CheckMark Software, 1520 E. Mulberry, Suite 200, Fort Collins, CO 80524, (800) 444-9922 or (303) 484-3541, (Oct '90) 

**Multi-user Desktop Accounting**  

Multi-user Desktop Accounting is for the Omni 3 database. It sets the standards for multi-user performance and accounting functionality in the small to medium market. There are nine fully integrated and eight user-security classes. Version 2.05. Requires Mac Plus or later. Single-user $179; to five users, $2,795. Logisot, 1291 E. Hillsdale Blvd., Foster City, CA 94404, (415) 570-7811, (May '90) 

**Plains & Simple** Plains & Simple is an excellent one-write accounting system. Offers full general-ledger, accounts receivable, accounts payable, and reporting modules. Has 3-to-6-digit account numbers, 14 pre-defined account categories, full audit trail, and multiple checking accounts. Provides more than 20 comprehensive reports and handles multiple companies. It defaults to accrual-bas account. Version 1.05. Requires Mac Plus and a hard disk drive, Great Plains Software, 1701 S.W. 38th St., Fargo, ND 58103, (701) 281-0550, (May '90) *$79 Edgy* 

**Project Billing**  

Project Billing handles all aspects of client accounting. It produces professional-looking bills. It's good at batch entry and assigning different rates to various items. The interface is clumsy and "action" descriptions are too limited. It lacks a DA for recording data and entry. Version 1.5. Requires Mac 512k or later. $595, Sartor Software, 2815 Second Ave., Suite 560, Seattle, WA 98121, (206) 443-0765, (Oct '89)
The award-winning software package that transfers and translates files between Macintosh and DOS or OS/2 programs now does the same for Sun worshipping. And for the NeXT world.

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Mind Your Own Business is an excellent value. It has an integrated calculator, checkbook, accounts receivable, accounts payable, and inventory system. There’s no integrated payroll, but a participant, intuitive feel. MYOB is best for single-company use. It lacks departmental breakdowns. Version 1.2 requires Mac II, Mac Plus or later; $99. Teleware, The Rotunda, 22 Hill Road, Parsippany, NJ 07054; (800) 322-6962 or (201) 334-1154, (May ’90)

Quicken

Quicken is the best tool for home budgets, cash-flow management, and tax-record keeping. Mimics your checkbook, so tracking your finances is easy and intuitive. Provides detailed reports supporting tax deductions and sources of income. Features, in order, are: 1) Basic; 2) R.C.A; 3) E; Forms 1040 and 2160; and Canadian tax forms. Version 1.5. Requires Mac II or later, Hayes-compatible modem, and an L.P. Sharp account. $695. Pro Plus Software, 2150 E. Brown Road, Mesa, AZ 85213. (602) 461-3296. (Oct ’88)

Apple File Exchange (AFE)

Apple File Exchange (AFE) is one of the utilities that comes free with the Mac System Tools. AFE offers a simple interface and works with a wide variety of data-transfer methods. Its best feature is that it works with current and future MacLinkPlus translators. By itself, its translators are limited to the generic text. Free. Apple Computer, 20525 Mari­ ani Ave., Cupertino, CA 95014. (408) 996-1010. (Oct ’89)

INT disk editor

INT cdev is a no-frills free­ware INT manager that lets you turn INTs on and off simply by clicking on the names in the list. INT disk editor is also accessible at startup, but it cannot make temporary changes. Version 3.0. Requires Mac II or later. Free; available on GEnie and Compu­Serve. (Aug ’89)

Klondike

Klondike is simple to play and nearly impossible to stop play­ ing. This version of solitaire uses video-game-like scoring to create a superb, totally ad­dicting time game. Business Version 2.6. Shareware, $10. Union Soft­ware, 675 Almanor, Sun­nyvale, CA 94086. (415) 908-7511. (Dec ’87)

Mug Shot

Mug Shot is a simple program that looks inside your Mac and then tells you about it. But in ad­dition to the usual hardware data, Mug Shot lists all installed DAs, startup documents (IN­ Tis), cdevs, and RDEVs. This data is useful in conflicts or problems. Free. Mi Concepts, P.O. Box 8822, Kentwood, MI 49508. (Sept ’89)

Set Clock

Set Clock makes a ten-second phone call to Leitch Video’s tip of your cursor. Most useful if you cut and paste frequently to and from your Macworld. Version 1.1. Requires Mac Plus or later and System 6.0 or later. $59.95. Mainstay, 3311-B Derry Ave., Agoura Hills, CA 91301. (818) 991-6540. (Jan ’90)

ClickPaste

ClickPaste puts the function­ality of an ordered Scrollback sequence in the tip of your cursor. Most useful if you cut and paste frequently to and from your Macworld. Version 2.0. Requires System 5.0 or later. $59.95. Mainstay, 3311-B Derry Ave., Agoura Hills, CA 91301. (818) 991-6540. (Jan ’90)

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At last. A next-generation entry level graphics program that doesn’t limit its users to entry level performance. Or entry level results.

Fact is, UltraPaint does everything you want it to today. And tomorrow, too.

Run it on a MacPlus and SE, and experience the ultimate in high resolution black & white painting, with the help of just about every tool you can imagine. And then some.

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UltraPaint’s ultra-compatible, too, with import/export filters for MacPaint, PICT1/2, TIFF, Startup Screen & even MacDraw™ formats.

And thanks to its breakthrough Open Architecture design, UltraPaint lets you add new tools, filters and effects by simply dragging them into a special folder — which means you’ll never be stuck waiting for upgrades again!

UltraPaint. We’ve made it easy. Flexible. Powerful. Infinitely expandable. And, at $199 list, definitely underpriced.
It can be difficult to access, and many other powerful tools. Version 1.2 requires Mac Plus or later. $99.95. Solutions International, 30 Commerce St., Williston, VT 05495. (802) 658-2506. (July '87) *89 Eddy

SnapJob is a utility that lets you capture screens or parts of screens. Differences from similar products in that the captured window remains on-screen in a real window and you can use it as if you were copying it. Requires System 4.1 or later. $49.95. Wild Flower Software, 21W171 Coronet Road, Lombard, IL 60148. (708) 916-9266. (Oct '89)

Streamline is Adobe's dedicated PostScript auto-trace program for all platforms. Can produce 2-1/2 megabytes of output per page. Can produce full-page outputs in a single pass. Can produce output that is indistinguishable from Adobe PostScript output. Also includes a powerful feature set, however. Procedures not only differ from what you expect but often require too many steps. Version 1.2 requires Mac Plus or later and a hard-disc drive. $595. Paracom, 1725 Montgomery St., Second floor, San Francisco, CA 94111. (415) 956-4091. (Apr '90)

**Precision**

**Precision** is a 2-D CAD program with many quirks. The interface for Paste functions operates oddly, and many things don't work as expected. The program is powerful but slow. It freezes and crashes at times. When these problems are cleaned up, it should be superb. Version 1.2 requires Mac Plus or later. $995. Interactive Systems, 171 Interstate Drive, West Springfield, MA 01089. (800) 222-1648 or (413) 739999. (Apr '90)

**StrataVision 3D**

StrataVision 3D brings mainframe rendering power to the Mac, provided you have a lot of memory and a lot of patience. It's a modeling and visualization tool that can create photo-realistic 3-D images. Rendering is very slow — it can take hours. It can also be done in the background so you can do other work. Precision options are conspicuously lacking. Version 1.0 requires Mac Plus or later. $495. Strata, Inc., 249 E. Tabernacle, Suite 201, St. George, UT 84770. (801) 628-5218. (May '90)

**VersaCAD**

VersaCAD is a powerful CAD program that doesn't show any of its DOS roots. Excellent cursor manipulation, full plotter support. Library user interface is crude. Version 2.2 requires Mac Plus or later. $1,995. Versacad, 2124 Main St., Huntington Beach, CA 92648. (714) 960-7770. (July '88) *88 Eddy

**ClipArt**

**ClipArt** is a peculiarn collection of EPSF "artwork." Requires Mac Plus or later. First edition, $99; second edition, $129. Tacit Software, 11925 S.W. 128th St, Miami, FL 33186. (305) 378-4110. (Aug '89)

**Artwork Borders**

Artwork Borders lets you customize your own clip-art disk. The border collection is the best package in terms of art quality. Other packages are available. Requires a program that reads EPSF files. $129.95; graphics pack, $149.95. Artwork Systems, 6512 Six Forks Road, Suite 502A, Raleigh, NC 27615. (919) 870-9539. (Aug '88)

**Click & Clip**

Click & Clip offers seasonal graphics packages. Of the two quarterly editions released, the spring '88 package is the better collection. Requires a program that reads EPSF files. $39.95 per edition. Also available: C&C 500, $395; C&C Military Arts, $149; Road and Warning Signs, $99; Medical/Health, $149; Studio Advertising Art, 1355 E. Sahara, Suite 1, Las Vegas, NV 89104. (702) 641-7041. (Aug '88)

**Clip3D**

Clip3D is a series of 3-D, color clip-art collections bundled with a powerful editing program. Images are in Pro3D format and provide exceptional output quality. On a Mac II, DAs don't work while Clip3D is active. Version 1.0. Requires Mac Plus or later. $99 per package, including Clip3D editor. Enabling Technologies, 600 S. Dearborn, Suite 1304, Chicago, IL 60605. (312) 427-0408. (Aug '89)

**Cliputures**

Cliputures is a series of business-oriented EPSF clip-art packages. Volume 2, Business Images, is the best so far and can be cataloged with Curator. Requires Mac Plus or later. $129.95. Dream Maker Software, 7217 Ponder Blvd, Tujunga, CA 91041. (808) 867-5665 or (818) 353-2297. (Aug '89)

**Collector's Edition I**

Collector's Edition is a useful assortment of dingbats and borders and two editable alphabets, all saved in Illustrator format. Requires Mac Plus or later. $225. Adobe Systems, 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94043. (800) 344-8335. (Aug '89)

**Comic People, Volume 2: Kids Stuff**

Comic People, Volume 2: Kids Stuff is a set of Comic Strip Factory add-ons that were drawn by Trici Venola and Kurt Walliner. Extraordinary quality and range. Kids Stuff presents five children and two grown-ups of both sexes and various ethnic backgrounds. Also included are backgrounds, sound effects, a very sly cat, and some Little Extras. Best used from within Comic Strip Factory. $39.95. Foundation Publishing, 540 Eden Ave. Edina, MN 55436. (612) 925-6027. (Aug '90)

**DigitArt**

DigitArt is a revolving collection of EPSF clip art available on disk and on CD-ROM disc. Comes with a well-designed catalog. Requires Mac Plus or later. $99. Digital Stock, 9415 E. Hildan Ave., Alpine, CA 92106. (800) 661-9410. (Aug '88)
You might not think of using a word processor to reformat mainframe files but isn't it nice that Nisus® 3.0 can.

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Japanese Clip Art

Japanese Clip Art is extraordinary. Most MacPaint documents and separate fonts. Volume I, Heaven, covers mythological subjects; Volume II, Earth, has secular subject matter, $79.95 per volume; $149.95 per set. Also available: Year of the Dragon '88, $29.95; Borders-Scroll, $39.95. Order from: Planet Press, 6007 Norfolk Road, Berkeley, CA 94705. (415) 848-8080. (Apr '89)

MacGraphics

MacGraphics is a collection of bit-mapped clip art — 13 thematic disks containing 10 megabytes of art. Unfortunately, most pictures are full-page, and reproduction quality suffers when they are reduced. Version 3.0, $245. GoldMind Publishing, 12155 Magnolia Ave., Suite 3-B, Riverside, CA 92503. (714) 687-3815. (Jan '89)

Metro ImageBase

Metro ImageBase Electronic Art is a series of TIFF clip art from the grandparent of the clip-art industry. The traditional looking images are huge, so have a large hard disk drive handy. Requires Mac 512KE or later. Metro ImageBase, 18623 Ventura Blvd., Suite 210, Tarzana, CA 91356. (800) 525-1552. (Aug '89)

Vivid Impressions

Vivid Impressions is cartridge­ish EPSF clip art, some of it in color. Special Events contains 130 images, many of them slightly altered duplicates. Requires Mac Plus or later. $130. Casady & Greene, P.O. Box 223779, Carmel, CA 90230. (415) 624-8716. (Aug '89)

WetPaint

WetPaint is a series of three­ disk volumes of very high quality clip art. The program also includes the Art Roundup DA, a good art browser/editor. $79.95 per disk. Dahl-Click Software, 9316 Deering Ave., Chatsworth, CA 91311. (818) 700-9525. (Sept '87)

Works of Art Laser Art


• DRAWING AND PAINTING

Azimuth

Azimuth is a solid map­making program that lets you build maps of the earth based on a viewpoint in space. This program is similar to other clipping programs but has interface problems. Its selection of export formats is too limited, often rendering its niceties difficult to use. Version 1.0. Requires Mac Plus or later. $399. Graphsoft, 8370 Court Ave., Suite 202, Ellicott City, MD 21043. (301) 461-9489. (Oct '89)

Canvas 2.0

Canvas 2.0 is a rich drawing/painting program, featuring full Bézier curves, the cutting, joining of polygons, skewing, perspective and distortion, auto­dimensioning, area and perimeter calculation, and tracing of bit maps, and full color support. Creates and edits its high-resolution bit maps to 2,540 dpi. Slightly less powerful than DA version available. Version 2.0. Requires Mac Plus or later and System 6 or later. $299. Denova Software, 3305 N.W. 74th Ave., Miami, FL 33122. (305) 594-6965. (Apr '89) * 89 Eddy

CR-CR Color Paint

CR-CR Color Paint is an 8-bit­color painting program that retains Cricket Paint's FreshPaint feature and has only a few new tools. If you're looking for a 256-color program, stick with Studio/8 or Canvas 2.0. Version 1.0. Requires Mac Plus or later, and 2 megabytes, and System 6 or later. $595. Computer Associates, 10505 Sorrento Valley Road, San Diego, CA 92121-1698. (800) 531-5236. (Oct '89)

Drawing Table

Drawing Table is a low­price alternative to MacDraw II that has some nice tools, but its clumsy selection interface makes it frustrating to use. Comes with separate libraries of object­oriented clip art, including arrows, landscaping, and chart symbols. Can import MacPaint, PICT, and EPSF artifacts. Version 1.01. Requires Mac Plus or later and System 4 or later. $129. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101. (415) 492-3200. (Nov '89)

FreeHand

FreeHand 2.0 is a major upgrade. Greatly increased power includes up to 100 levels of undo, auto-trace, a Blend command for interpolating shapes and colors, and expanded text manipulation. Has a sleek looking curve but is relatively easy to use once you've gotten the hang of it. Version 2.0. Requires Mac Plus or later. $495. Aldus, 411 First Ave. S., Seattle, WA 98104-2871. (206) 622-5500. (June '89)

Adobe Illustrator

Adobe Illustrator 88 is a professional­level graphics program from the people who defined the PostScript language. Uses templates for precise drawing and detailed artwork. Version 1.83. Requires Mac Plus or later. $495. Adobe Systems, 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94039-7900. (800) 344-8335. (Oct '88) * 88 Eddy

MacCalligraphy

MacCalligraphy simulates brush painting. User­designed Seals and Touches enable you to design your own signature tool and the style of brush you use. Takes some getting used to. Version 2.01. $49.95. Quality Training, 1047 N. Wolfe Road, Berkeley, CA 94705. (415) 848-8080. (Feb '88)

MacDraft

MacDraft is an object­oriented graphics program. Has variable scaling, single-degree rotation, complex arcs, auto­dimensioning, and zoom/reduction. Version 1.2B. Requires Mac Plus or later. $269. Innovative Data Design, 2304 Bates Drive, Suite 10, Concord, CA 94520. (415) 680-6818. (Feb '86)

MacDraw II

MacDraw II updates the venerable object­oriented drawing program. Adds dithered and color patterns in its own documents but doesn't support color in PICT II format. 1.1v2. Requires Mac Plus. $395. Claris Corp., 5201 Patrick Henry Drive, Santa Clara, CA 95052. (408) 987-7000. (Nov '88)

MapMaker

MapMaker hasn't lost its shine after all these years. Supports multiple windows, different templates, and a magic eraser for corrections. It lacks free­rotation and distortion tools. Version 2.0. Requires Mac Plus or later. $125. Claris Corp., 5201 Patrick Henry Drive, Santa Clara, CA 95052. (408) 987-7000. (July '88)

Modern Artist II

Modern Artist II is still an interesting color painting program and has added a few new features, but there's not enough here to justify its substantial price increase. Requires Mac II. $295. Computer Friends, 14250 N.W. Science Park Drive, Portland, OR 97229. (503) 626-2291. (Feb '89)

Origins

Origins is a 2-D drafting and 3-D rendering program with lots of rough edges. Point­orientation method of drawing takes some getting used to. Both versions have very busy, nearly overwhelming screens with long menus and huge palettes. Version 2.0.5. Requires Mac Plus or later. $1,495. Macromedia, Mac II or later for color. Monochrome, $495; color, $595. Delsoft Corp., Box 55089, Dallas, TX 75354. (214) 508-0889. (Mar '90)
To Go Forward You Must Backup

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

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What began as a simple database for repair secrets became a detailed reference library of Macintosh anatomy. MicroRX will guide you through component level repair with just a few mouse clicks. And at $99, the software pays for itself with your first repair. MicroMat also stocks parts, tools and provides you with free technical support. We're sure we can show you how, but if you'd rather not repair it yourself, MicroMat also offers low-cost depot service for Mac boards, soft drives, hard drives and laser mechanisms.

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Super 3D

Super 3D is an update of an excellent 3-D object-oriented drawing program. Powerful features such as Sweep are easy to use. Can save your 3-D models in VersACAD format.
Version 2.0. Requires Mac Plus or later. $199.

SuperPaint

SuperPaint 2.0 is the first upgrade of the original painting/drawing program. Some of the new features are plug-in tools, auto-trace, Bezier curves, support for resolutions exceeding 300 dpi, and eight-color support. A good program but not particularly fast.
Version 2.0. Requires Mac Plus or later. $199.

Silicon Beach Software, 261430, San Diego, CA 92126.
(619) 695-6956 (July '89) * * * 89 Eddy

Swivel 3D

Swivel 3D quickly forms shaded solids in full color. Casts true shadows onto other objects and can project color graphics onto solids. Objects can be linked as jointed and sliding mechanisms that can be manipulated without accidental dismantling. It can tween-animate objects or fly your view through a scene, saving frames for playback.
Superb object-manipulation interface.
Version 1.1. Requires Mac Plus or later. $495.
ParaLogic, 1725 Montgomery St., Second Floor, San Francisco, CA 94111. (415) 956-4091. (Mar '89) * 89 Eddy

Macintosh Portable

Macintosh Portable is Apple's first portable. Considered by those who have not used one to be too big (it is), too heavy (16 pounds), too slow (68000 at 16 megahertz), and too expensive. Loved by all who have one or have used one for a while. A good beginning.
$757 including modem, extra megabyte of RAM, and hard-disk drive. Apple Computer, 20255 Mariani Ave., Cupertino, CA 95014. (408) 966-1010. (Mar '90) * 89 Eddy

TurboStar

The TurboStar distributes AppleTalk signals to devices on a network and provides some network-management and troubleshooting capabilities. Performance can be poor in certain wire configurations. Requires Mac Plus or later. $1,595.
Relistics, 320 S. Milpitas Blvd., Milpitas, CA 95035. (408) 945-9800. (June '90)

DISPLAY SYSTEMS

Apple Portable Display

The Apple Portable Display is a very high quality flat-page monitor. It has a screen resolution slightly below true WYSIWYG, so things appear a bit small. Can produce up to 256 gray scales, using the new 8-bit card. The case is odd; make sure it fits your card. Requires Mac Plus or later. $1,698. Apple Computer, 20255 Mariani Ave., Cupertino, CA 95014. (408) 966-1010. (Aug '89) * 89 Eddy

AppleColor High-Resolution RGB

The AppleColor High-Resolution RGB monitor is standard among designers. It is very bright with no built-in glare protection. Can support 24-bit color when used with the Apple Color Card. Its 69-dpi screen resolution gives a slightly larger-than-WYSIWYG image. Very reliable workhorse. Requires Mac II or later. $1,047 (including...
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Sorry. Death we can't do anything about. As for taxes, when you use our product you'll probably wind up paying more. But software piracy: there we offer some help. Our family of software protection devices (dongles) have improved unit sales for over 2,000 companies around the world. Our products can be used in the Macintosh, MS-DOS, and OS/2 environments.

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Macintosh, AppleTalk are trade marks of Apple Computer Inc., Activator, Motivator are trade marks of Software Security, Inc. illustration: detail from Michelangelo’s Last Judgement
MINIFINDERS

The Color Page T16 is consistently rated the best and brightest 8-bit color monitor by MacUser Labs. It’s a razor-sharp Sony Trinitron, and the video card is also excellent. Requires Mac II or later. $1,490. (Aug ’90)

Radius Pivot

The Radius Pivot is a landscape/portrait monitor. A four-gray monitor, it’s the same size as the Apple Portrait Display, and it’s also quarter 90 degrees into either orientation. Radius’ software and hardware perform a fast rotation of the pixels, and this takes just 0.008 seconds, automatically expanding to fill the new orientation. The only drawbacks are fuzziness around edges, slight distortion of the display, and no glare protection. A good monitor on the brink of being great. $1,690. Radius, 1710 Fortune Drive, San Jose, CA 95131. (408) 227-2795 or (408) 434-1010. (Aug ’90)

Apple Scanner

The Apple Scanner is not the state of the art but is adequate for scanner neophytes.

The 4-bit (16 gray level) scanner comes with AppleScan software and HyperScan, written by Bill Atkinson. Requires System 6.0 or later, hard-disk drive for full-page work, and SCSI connection cables. Available only. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. (Feb ’89)

The BitPad Plus offers basic drawing capabilities but no macro-making capability. Uses pens and pencils. Scaling of create-to-pad ratio must be entered in pixels per inch. Must use MultiFinder to change settings while in an application. $495. Summagraphics, 60 Silverman Road, Seym our, CT 06483. (203) 811-5377. (Oct ’89)

CalComp 2300A

The CalComp 2300A is a full-featured drawing tablet that lets you resize and reposition the drawing area. Three sizes, six different input devices (pens and pencils), and several software templates are available. AE Template Manager lets you perform all the System and HyperCard menu functions on the tablet. $1,995 to $2,495, depending on size. CalComp, 14553 N. 82nd St., Scottsdale, AZ 85260. (408) 948-6540. (Oct ’89)

Felix

Felix is a 5.75-inch-square optical-tracking mouse replacement. Space saver but awkward for lefties. It has a button on top of the pointer handle for mouse clicks. Drawing setting for absolute movement. Mac Plus and ADB versions available. $169. ALTRA Technology, 1200 Skyline Drive, Laramie, WY 82070. (307) 726-6153 or (307) 745-7538. (Oct ’89)

Focus 8000GS

The Focus 8000GS is a 400-dpi, 6-bit gray-scale scanner that simulates resolutions up to 800 dpi. It has superior resolution and good halftone quality. Professional-quality software has extensive editing features and printing options. $3,450; software, $495. Agfa Compugraphic, 200 Ballard Ave. St., Wilming ton, DE 19887. (302) 658-6500. (June ’89) $895. Eddy

FreeWheel Systems

The FreeWheel Pointer determines the user’s head position by bouncing infrared light off a small, lightweight mirror on the user’s forehead. Compare receiver unit and puff switch can be mounted wherever convenient. Standard keyboard arrangement on-screen, Mac II and SE versions, $1,395; ADB adapter, $150. Pointer Systems, One Mill St., Burlington, VT 05401. (802) 658-5260. (Oct ’89)

HeadMaster

The HeadMaster is designed for users with little or no use of the hands. It has been 30 years since signals emitted from a headset to determine the position of the user’s head. A push button for mouse buttons and mouse functions. A variety of on-screen keyboards are available for typing. Available for Mac II CS, Plus, SE, and II. $575. Pimtek, 1022 Heyl Road, Wooster, OH 44691. (800) 262-1984 or (216) 262-1984. (Oct ’89)

iS/ADB

The iS/ADB is a tablet that comes in three sizes with a choice of seven pointing devices, including multitabutton puck and multibutton style. Operates in either absolute or relative modes; active-area sizing on menu is handy for interactive drawing. Twelve function keys, good for creating macros. $395 to $695. Kunit, 3007 E. Chambers St., Tempe, AZ 85284. (408) 276-5533. (Jan ’89)

LynxTrackball

The LYNX Trackball has an enclosed trackball. Small size makes it easy to control. Requires some wrist movement to access the buttons. Comes in ADB and SE versions, $99.50. Asher Engineering, 120 Linden Ave., Long Beach, CA 90802. (310) 521-9596 or (213) 290-9990. (Oct ’89)

Mac ‘N Touch

Mac ‘N Touch is a touch screen recommended for applications requiring a lot of pointing and clicking: works less well for programs such as graphics packages that require fine control. Available as an add-on screen for Mac SE and II models and as a snap-on screen for the SE only. Mac ‘N Touch Add-In, $575 (SE), $895 (Mac II); Mac ‘N Touch Snap-On, $595 (SE only). MicroTouch Systems, 55 Jonskip Road, Wilmington, MA 01887. (508) 658-6400. (Oct ’89)

Mac 105 ADB

Extended Keyboard

The Mac 105 ADB Extended Keyboard is a good upgrade for Apple’s Extended Keyboard, with a larger Return key, larger and more-sculpted key tops, and a lower overall weight. Requires Mac SE or Mac II.
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The Art Importer (thé art im-por ter) n. 1. Create high resolution, full color PostScript fonts from your existing Macintosh artwork. 2. Produce typefaces from EPS and PICT formats. 3. Make special fonts full of company logos, symbols, signatures, and graphics.

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The right typeface can have impact – the wrong one can be a disaster. But how do you know what is your type? Don't worry about it. With Fontographer®, The Art Importer®, and Metamorphosis™ you can easily create and edit PostScript® fonts. And make them all your type.

Fontographer (fon-tog ra-for) n. 1. The Macintosh industry-standard for PostScript type design. 2. Draw from scratch, begin with a scanned image, or modify an existing font — it's easy to design your type. 3. ATMs-compatible, too!

The Art Importer (thé art im-por ter) n. 1. Create high resolution, full color PostScript fonts from your existing Macintosh artwork. 2. Produce typefaces from EPS and PICT formats. 3. Make special fonts full of company logos, symbols, signatures, and graphics.

Metamorphosis (me-tag-mor-fis-tis) n. 1. A unique utility for converting your PostScript fonts into outline formats. 2. Those outlines can then be edited in any PostScript Illustration program, like Aldus' FreeHand® or Adobe Illustrator® — or even Fontographer. 3. Since Metamorphosis can convert any PostScript font into outlines, consider the exciting things you could do to enhance your type.

So, what do you say? Are you ready to make it your type?

Suggested Retail Prices
Fontographer — $495
The Art Importer — $179
Metamorphosis — $295

Please circle 159 on reader service card.
Mac-101

The Mac-101 is a keyboard alternative that has a good feel to it. It has 15 function keys, and more. The 101-Keys DA lets you define macros. Also comes in an ADB version for the 5E and B. Requires additional memory later. $169.95. DataDesk International, 7651 Haskell Ave., Van Nuys, CA 91406. (818) 760-1646.

Mach IV Plus

The Mach IV Plus has buttons on either side of the stick and one atop the joystick. Can be used as a mouse emulator. Comes in ADB and non-ADB models. Also available is a peripheral called Mirage that adds ADB sticks to joystick devices. $129.95. Mirage, $54.95. CH Products, 970 Park Center Drive, Westminster, CA 92683. (800) 624-5804 or (619) 598-2518. (Oct '89)

Macintosh

The Macintosh compares favorably with other tablets in terms of mouse emulation and drawing but lacks some software features. No built-in capability for creating overlay templates. Provides developer stacks for HyperTalk and Pascal. Active area reduced through click for click.

HyperCard-stick documentation. $49.95. GTCO, 7125 Riverwood Drive, Columbia, MD 21046. (301) 381-6688. (Oct '89)

MacTablet

The MacTablet is a stylus-driven graphics tablet. Users cannot trace art using this absolute-positioning device. Has a working area the size of the Mac screen. Allows concurrent use of the mouse. $49.95. "The TableT," available for $99.50. Summographics, 60 Silver Mine Road, Seymour, CT 06483. (203) 881-5400. July '88

MacTRAC

The MacTRAC has three buttons — a lock and two clicks — like a joystick. Equal ease of use for right- and left-handed people. Light signals that the lock button has been pushed. $99.95. ADB version, $119. MicroSoft, 4400 Old Warm Springs Blvd., Fremont, CA 94538. (415) 490-1499. (Oct '87)

Mac

The McIntyre is a joystick for people who can’t use their hands. Can be mounted on a golf cart or wheelchair. Can manipulate the stick in your mouth to move the cursor while your tongue presses down on a button on the other side of the clicker. An image of the keyboard appears on the bottom of the screen. Users can select letters and carry out most keyboard functions, but not numbers. $350. McIntyre Computer Systems, 22809 Shagbark, Birmingham, MI 48101. (313) 645-5900. (Oct '89)

MouseStick

The MouseStick is useful where precise definition of movement is needed. The joystick has programmable settings; buttons can be programmed to carry out mouse-type functions or execute keyboard commands with single-, double-, or triple-clicking. $129.95. Advanced Graphics Computer Technology, 2033 Antrim Ave., Burnaby, British Columbia V5J 4M5, Canada. (604) 663-8558 or (604) 434-7274. (Oct '89)

MouseTouch

The MouseTouch is a touch screen for selecting screens, pulling down menus, and entering numeric information via an in- stick keypad. Can be installed by the user. $1,060. Information Strategies, 888 S. Greeneville Ave., Suite 121, Richardson, TX 75081. (214) 234-0176. (Jan '90)

PC Scan 2000

The PC Scan is an 8-bit scanner that saves images in up to 8 levels of grey. Can be configured for IBM PCs. Requires 1 megabyte, Scanner, $1,395. Publish Pac software, $395; OCR text-processing card, $795s. New Dest, 1015 E. Brokaw Road, San Jose, CA 95131. (408) 436-2700. (Dec '88)

ProPoint

The ProPoint has a click button and a small lock button on the lower left side of the trackball casing. Left-handed users may have to take their fingers off the ball to press the buttons. $140. Abaton Technology, 48431 Milpom Drive, Fremont, CA 94538. (415) 885-2226. (Oct '89)

PW10SL

The PW10SL is a drawing tablet that offers software that is compatible with Apple's Macintosh. The software is currently available for the Mac Plus. $650. ScreenSub, 5514-west B, Wilberough Ave., Tampa, FL 33634. (813) 882-8635. (Dec '89)

Output Devices

ColorPro Plotter

The ColorPro Plotter is an eight-pen desktop plotter that requires third-party software to drive it. Fonts are limited to an eight-pen desktop plotter that outputs images in up to 800 dots per inch at high or low resolution. $1,200. Hewlett-Packard, 1930 Prunedge Ave., Cupertino, CA 95014. (408) 725-6010. (Feb '89)

ColorQuick

The ColorQuick is a Desktop printer that has reasonsable-quality and produces vivid colors. The color range is excellent. It's fast and offers hand, roll, and cut-sheet paper feeds. $2,345. Tektronix Graphics Printing Division, Wilsonville, OR 97070. (503) 835-6160. (May '90)

CrystalPrinter

The CrystalPrinter is the first 300-dpi PostScript compatible printer. Based on a RISC microprocessor, it's faster and cheaper than the LaserWriter II. Requires Lishoftware to post or later and ImageWriter or ImageWriter II. $249. Thunderware, 21 Orinda Way, Orinda, CA 94563. (415) 234-6280. (Mar '90)

Turbo Mouse ADB

The Turbo Mouse ADB is a trackball that is a favorite mouse replacement. Moving the locking functions can be reversed for left-handed people. Has a "chording" feature for a user-specified key-board-command-equivalent function. $169.95. Kensington MicroLine Ltd., 251 Park Ave., S., New York, NY 10010. (800) 388-6242 or (212) 475-5200. (Oct '89)

Wacom SD-510 Cordless Digitizer

The SD-510 CordlessDigitizer is light and very thin. It uses a pressure-sensitive stylus that requires neither a cord nor a battery. The tablet connects to the modem port. Its sensing area is 6 x 9 inches (overall size is roughly 10 x 13 inches). The resolution is 770 dpi in linear, 210 in high accuracy. It is much more responsive than a mouse. When not in use, it makes an excellent mouse pad. $495. Wacom, W. Centennial Road, Paramus, NJ 07652. (801) 625-4226. (June '90)

Wrist Mac

The Wrist Mac is a small watch that hooks to your Mac. You can download and retrieve up to 80 screens of 12 characters each. Options allow two-way communications. Versions with straps are available. And it's a decent watch. Version 1.2. Requires Mac Plus or later and HyperCard. $260. MicroSofts, 7030 B W. Hillsborough Ave., Tampa, FL 33634. (813) 882-8635. (Dec '89)

Imagewriter Plus

Imagewriter Plus ships 35mm color slides directly from the Mac. Supports most presentation software. Uses patterns to represent colors. Requires Mac 128K or later. $1,989. Mac-Writer software, $149; font cartridge, $195; one-year warranty, $320. Presentation Technology, 743 N. Pastoria Ave., Sunnyvale, CA 94086. (408) 749-1959. (Feb '89)

Imagewriter LD

The Imagewriter LD outputs letter-quality text and graphics at 216 dpi. To do so, it reduces 72-dpi screen fonts to a third of their actual size. Takes a lot of memory. Printer driver, version 2.0. Requires 1 megabyte and large fonts. $1,400. Apple Computer, 2052 Mari­

LabelWriter

The LabelWriter is a small serial printer that thermally prints labels individually. Labels can include bar codes but can’t mix text and graphics. The interface needs some work, and a Chooser-selectable driver is promised for future versions. This is an addicting and time-saving device. Comes with two Casady & Greene programs. Requires Mac Plus or later. $249.95. CoStar, 22 Bridge St., Greenwich, CT 06830. (203) 869-2954. (Mar '90)

MacUser August 1990
**MiniFinders**

**LaserWriter INT**
The LaserWriter INT is Apple's mid-priced PostScript laser printer. The LaserWriter Plus, with blacker blacks. Gray scale is less even than that of Plus. Requires Mac 512K or later. $5,999. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. (May '88)

**LaserWriter INTX**
The LaserWriter INTX is Apple's top-of-the-line PostScript laser printer. The 68020 chip makes it very speedy; expect performance improvements from SCSI hard disk drive can be attached for fonts. Requires Mac 512K or later, $5,999. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. (May '88)

**LaserWriter IISC**
The LaserWriter IISC is Apple's high-end PostScript laser printer. Can be upgraded to INT or INTX; reasonably fast, Requires Mac Plus or later. $9,995. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. (May '88)

**MacDot-LQ**
The MacDot-LQ is a 24-pin dot-matrix printer that emulates the ImageWriter LQ. It uses the LQ driver for compatibility, is more versatile, and costs nearly $200 more. Bug-ridden emulation often loses touch with your Mac. Requires ImageWriter II or LQ drivers' jumbo fonts for 216-dpi printing. $1,395. Advanced Matrix Technology, 765 Flynn Road, Chico, CA 95928. (800) 992-2264. (Aug '89)

**PaintJet XL**
The PaintJet XL has low-resolution QuickDraw (180-dpi) output, but is a superb producer of good-looking output. Not all fonts can be reproduced. It's fast. Paper handling is good, and it comes standard with Hewlett-Packard, 19310 Pruneridge Ave., Cupertino, CA 95014. (800) 752-0900. (May '90)

**PLP II**
The PLP II is a bargain-priced 300-dpi QuickDraw laser printer. Excellent print performance; runs very slow. No PostScript support. Requires Mac Plus or later. $1,399. GCC Technologies, 580 Winter St., Walcha, MA 01254. (617) 890-0880. (Mar '90) $9,995. QMS ColorSorter 100. QMS ColorSorter 100 is the first color PostScript printer that uses a four-color thermal wax-transfer technology. Works on AppleTalk. Excellent performance; runs very slow. Currently supports only half the catalog of applications. Requires Mac Plus or later. $21,995. Mariani Plastics, 7852 Schillerwick St., Walcha, MA 01254. (617) 890-0880. (June '90)

**WriteMove**
The WriteMove is one of the smallest, lightest Macintosh printers. It's an inkjet unit that can produce resolutions of up to 192 dots per inch. It can run off rechargeable batteries or AC and weighs just 3 pounds. It comes with a good selection of Bitstream fonts. Printing quality varies widely, depending on the paper and ink used. Printer driver version 1.0. Requires Mac Plus or later and hard-disk drive. $599. GCC Technologies, 580 Winter St., Walcha, MA 01254. (617) 890-0880. (Apr '89)

**Performance Enhancers**

**Fast Cache III**
The Fast Cache III is a card that fits the IIC processor Direct Slot. It has ext. CIO or 24-bit ISA bus. $795. QMS ColorSorter 100. QMS-PS 820 turbo. QMS-PS 820 turbo is a good substitute for the LaserWriter INTX. It is slightly faster and much cheaper than the INTX. It also has two paper trays, each capable of holding 200 sheets. The 820 uses a Canon TX engine. A hard-disk drive can be attached for fonts. $6,995. QMS Electronic Publishing Group, One Magnum Pass, Mobile, AL 36689. (205) 673-4500. (Oct '88) $9,995. QMS-PS 820 turbo

**Smart Label Printer**
The Smart Label Printer is a serial printer that thermally prints labels one at a time. Labels can include bar codes but can't mix text and graphics. The interface needs improvement: Emulates Mac Plus or later. $249.95. Seiko Instruments USA, PC Products Div., 1144 Kingwood Court, San Jose, CA 95131. (800) 888-0817, ext. 1044, or (408) 922-5900. (May '90)

**Tektronix 4695D Color Image Printer**
The Tektronix 4695D Color Image Printer is a 300-dpi bit-mapped color printer. Colors look smooth and rich. Uses bitmapped screen fonts: most have noticeable jagging. Requires Mac II with color monitor. Recommended 8-megabyte memory. $3,985. Tektronix, F.O. Box 1000, MS 63583, Wilsonville, OR 97077. (800) 335-6150. (Oct '88)

**WriteImpact**
The WriteImpact is a near-letter-quality dot-matrix printer. It has 25-to-400 percent enlargement and reduction, print both sides, and has a hard-disk drive. $1,895. Radius, Inc., 1710 Fortune Drive, San Jose, CA 95131. (800) 227-2790 or (408) 434-1011. (Oct '88)

**Radius QuickCAD Graphics Engine**
The Radius QuickCAD Graphics Engine is a NuBus card for accelerated screen-redraw speed in CAD applications that use display-list technology. Currently only AutoCAD and VersaCAD do so, but Visions 1.1 will be modified to support QuickCAD as well. Radius monitors and video cards, QuickCAD can also accelerate standard QuickDraw graphics. Redraw speed can increase by 10 to 30 times over that of a standard Mac II. $1,495. Radius, 1710 Fortune Drive, San Jose, CA 95131. (408) 434-1010. (Aug '90)

**SpeedCard**
The SpeedCard is an accelerator board for the Mac SE that more than doubles the speed of most applications. The board uses the speed of the Mac SE and an optional floating-point 68881 chip for number crunching. Requires Mac SE. $399; with coprocessor, $599. SuperSpool, 20525 Mariani Ave., Sunnyvale, CA 94086. (408) 245-2202. (Nov '88)

**Storage Media and Memory**

**AppleCD SC**
The AppleCD SC reads CD-ROM optical discs that contain up to 600 megabytes of data. Also plays audio compact discs. Reads High Sierra (an industry standard for CD-ROM) and Mac formats. $899. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (408) 986-1010. (Dec '88)

**Cirrus**
The Cirrus 84 is a sleek, quiet 84-megabyte hard-disk drive. Has a five-year warranty. It comes with SuperLining formatting software. There are no physical activity indicators, but there is a software indicator in the corner of the screen. Requires Mac II or later. $595. La Cie, 16285 S.W. 85th St., Suite 306, Tigard, OR 97224. (800) 999-0143 or (503) 684-0143. (Feb '90)

**DataFrame XP600**
The DataFrame XP600 is a solidly built 60-megabyte hard-disk drive designed to sit next to the Mac. It's bundled with some of the best software in the business, including DiskFit, SuperlaserSpool, and SuperSpool. It tends to run noisily and has internal temperature. It's also a bit expensive in this class. Requires Mac Plus or later. $1,399. SuperMac Technologies, 580 Winter St., Walcha, MA 01254. (800) 245-2202. (Feb '90)

**DataPack**
The DataPack is a 45-megabyte removable Winchester hard-disk drive. Great for backing up your man-hard disk drive or transporting large amounts of data between office and home. Requires SCSI connector and System 4.1 or later. Drive, $1,799.93; cartridges, $199.50 each. MASS Microsystems, 550 Del Rey Ave., Sunnyvale, CA 94086. (408) 552-7979. (Jan '89)

**Ehman 60**
The Ehman 60 is cheap. That's the best reason to buy this 60-megabyte hard-disk drive. It runs fast and has a fine manual, but two problems: it is relatively noisy and expensive. Requires Mac Plus or later. $2,995. Ehman. P.O. Box 2126. Evanston, IL 60202. (312) 823-1628. (May '89)

**FX/20**
The FX/20 is a good 20-megabyte external hard-disk drive.
If we were to pick one word that our customers use to describe WriteNow, it's usable. A great word processor is more than just a stockpile of features—it's the usability of those features, how easy they are to learn and use, and how they feel under your fingertips when doing real work. Everyone claims ease-of-learning and ease-of-use, but WriteNow actually delivers it—and our awards and ratings prove it.

WriteNow is the undisputed performance champion. Editing, searching, spell checking, saving, and printing happen lightning fast. For big and small documents. On any Macintosh. With or without a hard drive.

Don't worry about document compatibility, WriteNow 2.2 is directly compatible with MacWrite, Microsoft Word 3.0, and Microsoft Word 4.0.

Find just the right word with the largest thesaurus ever to ship with a Macintosh word processor.

WriteNow also has the largest—and fastest—spelling checker of any Macintosh word processor.

WriteNow 2.2—still the word processor of choice!

**Quick Comparison of Leading Word Processors**

<table>
<thead>
<tr>
<th></th>
<th>WriteNow 2.2</th>
<th>MacWrite II</th>
<th>Works 2.0</th>
<th>Word 4.0</th>
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<td>Hard disk</td>
<td>Hard disk</td>
<td>Hard disk</td>
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<td>Mail Merge:</td>
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<td>Multiple Header/footers:</td>
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<td>Extensive Undo:</td>
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<td>No</td>
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<tr>
<td>Retail Price:</td>
<td>$199</td>
<td>$249</td>
<td>$265</td>
<td>$395</td>
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**Speed Comparison Charts (in seconds)**

<table>
<thead>
<tr>
<th>Search</th>
<th>Copy &amp; Paste</th>
<th>Reform &amp; Undo</th>
<th>Spell Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>WriteNow 2.2</td>
<td>MacWrite II</td>
<td>Works 2.0</td>
<td>Word 4.0</td>
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</tr>
</tbody>
</table>

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T/Maker will honor your MacWrite & Word Upgrade Offer!  
This is a limited-time offer. Call today for details!  

All tests performed starting with a 12-page test document on a Macintosh Plus with a 20-megabyte hard disk. Full negotiation performed when necessary. © 1990 T/Maker Company. All rights reserved. The following are registered and unregistered trademarks for the companies listed: WriteNow is a trademark of T/Maker Corporation; Macintosh, Apple Computer, Inc.; MacWrite, Claris Corporation; Microsoft, Microsoft Corporation; WordMaster, Franklin Computer Corporation.

Please circle 82 on reader service card.
Good utility software. Reliable and reasonably quiet. Sits next to the Mac and has a large 0-byte sized case. Requires Mac 512K, SCSI port, and new ROM. $649. GCC Technologies, Inc., 580 Winter St., Watertown, MA 02272. (617) 890-0880. (Feb '87)

**Hard Disk 80SC ******
The Hard Disk 80SC is a superfast 80-megabyte unit. You do pay for the hard disk, however. Apple has quality problems, but the current run is fast and reasonably quiet. $1,795. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95125. (408) 996-1010. (Feb '90)

**Hard Disk 20SC ******
The Hard Disk 20SC is Apple's 20-megabyte SCSI hard-disk drive unit. Offers a good price. Requires Mac Plus or later. $859. Heart Data Corp., 9009 Industrial Dr., Suite 260, Canoga Park, CA 91304. (800) 999-8135 or (818) 999-1691. (Feb '90)

**MacGrade 60 ******
The MacGrade 60 is the well built-zero-footprint 60-megabyte hard-disk drive. It features a two-year warranty, a service wheel included to change the SCD, and automatic head parking. $595. MacProducts USA, 1025 Mapac Expy. Sylmar, #218, Austin, TX 78759. (800) 622-3475 or (512) 343-9441. (Feb '90)

**Micro/II-620 ******
The Micro/II-620 is a fast 600-megabyte internal hard-disk drive for the Mac II. The drive is a packaged drive. Requires Mac Plus or later. $2,095. Nova Technology, Inc., 1580 Commerce St., East Haven, CT 06512. (800) 325-1895 or (203) 496-6223. (Feb '90)

**Preference 20 ******
The Preference 20 is a strongly built but relatively slow 20-megabyte hard-disk drive. It has a case. Five-year warranty, automatic head parking, and other features expected of a top-line unit. Requires Mac Plus or later. $695. Micro Technologies, 2107 N. First St., Suite 280, San Jose, CA 95131. (800) 733-0078. (Feb '90)

**UltraDrive 30 ******
The UltraDrive 30 comes with lots of good and useful software. It is an Interactive Brooke-Event. 30-megabyte zero-footprint unit has a two-year warranty. It is a 30-megabyte zero-footprint hard-disk drive. The construction of this 30-megabyte unit does not look nice, but everything works. The manuals are photocopics. The internal termination is also a drawback. Requires Mac Plus or later. $2,572. MicroDrive Servers, 177 O'Toole Ave., B206, San Jose, CA 95131. (408) 954-1227. (Feb '90)

**SD140U External SCSI Hard Disk Subsystem ******
The SD140U External SCSI Hard Disk Subsystem offers an affordable, high-speed hard-disk drive with a unity interface and an average access time of 18 milliseconds. It is a 120-megabyte drive. It is well-designed and is a full-featured drive. Requires Mac Plus or later. $2,095. CMS Enhancements, 1372 Valencia Ave., Tustin, CA 92680. (714) 259-5555. (Jan '90)

**Server 90 ******
The Server 90 is a well-made, fast, and cool-zero-footprint 90-megabyte drive. Features include a push-button 120-megabyte drive. Software overhead keeps actual performance improvements to about 2.5 times normal. This pricey but powerful unit is easy to hook up and use. Requires Mac Plus or later. $11,995. ATTO Technology, 1567 Sweet Home Road, Austin, TX 78759. (512) 688-4259. (Feb '90)

**ServerDisk 30 ******
The SiliconDisk is a large, very high performance dedicated RAM disk that runs 300 times faster than a typical 300-megabyte hard-disk drive. Software overhead keeps actual performance improvements to about 2.5 times normal. This pricey but powerful unit is easy to hook up and use. Requires Mac Plus or later. $629. SCC Technologies, 580 Winter St., Waltham, MA 02154. (617) 890-0880. (Feb '90)

**MiniFinder ******
The MiniFinder is a well-built zero-footprint 60-megabyte hard-disk drive. It has automatic head parking and a service wheel included to change the SCD, and automatic head parking. Requires Mac Plus or later. $859. Heart Data Corp., 9009 Industrial Dr., Suite 260, Canoga Park, CA 91304. (800) 999-8135 or (818) 999-1691. (Feb '90)

**MacBottom HD-70 Hard Disk ******
The MacBottom HD-70 Hard Disk is an excellent drive that comes with some very good software, including HFS Backup, $679; 1,200-ppm Hayes-compatible printer, $100 extra. Personal Computer Peripherals Corp. (PCPC), 4710 Eisenhower Blvd., Building 7, Suite B, Tampa, FL 33634. (800) 622-2888. (Apr '89)

**MacStor 90 ******
The MacStor 90 is an expansive, expandable 90-megabyte unit. Requires Mac Plus or later. $1,900. Radical Sheep Productions, 62 MacDonnell Ave., Toronto, Ontario M6R 2A2, Canada. (416) 331-7774. (Dec '89)

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**Hypermedia ******
All Baa Baa and the Forty Winks ******
All Baa Baa and the Forty Winks is an Interactive Brooke-Event. It has an interesting feature: a time advent in which you fly away on a magic pillow to the dark, menacing Quill and Quill and then return home. Nice illustrations. $22. Radical Sheep Productions, 62 MacDonnell Ave., Toronto, Ontario M6R 2A2, Canada. (416) 331-7774. (Dec '89)

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Why settle for an incomplete set of utilities when you can have them all? 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.

For the dealer nearest you or for additional information, call 1-800-888-8199.
ArchText

ArchText is a text processor with many hyperext capabilities that allow the ability to include graphics. "Nodes" of text are accessed by means of different "maps." Very powerful.


Authenticate and Mutate

Authenticate and Mutate are HyperCard extensions that add valuable abilities for programming. Authenticate is an XFCN that lets you control the contents entered into it. It also sets the error response, which is great for database creators. Mutate, also an XFCN, forms "mutated" strings in ways that HyperCard can't begin to dream of. Authenticate, version 2.4; Mutate, version 1.0. Knowledge Technology, Ltd., Disability Dimension, $125. SoftStream International, 19 White Chapel Drive, Mount Laurel, NJ 08054. (800) 262-6610. (June '89)

BMUG PD ROM

BMUG PD ROM is a CD-ROM disc containing 300 megabytes of shareware, public-domain software, and demo ware. Categories include business, education, games, fonts, Mac II-specific products, and the like. Requires Mac Plus or later. $99.50. Discovery Systems, 7001 Discovery Blvd., Doral, FL 33166. (305) 451-1313. (July '89)

ClubMac CD-ROM

ClubMac CD-ROM discs contain approximately 300 megabytes of shareware, public-domain software, and demo ware in 23 categories such as business education, music, and fonts. Has an electronic bulletin-board system. Version 4.0. Requires HyperCard 1.2. $199. Eudora, 531 S. Stevens Ave., Suite B, Solana Beach, CA 92075. (619) 259-0255. (July '89)

Family Matters

Family Matters is a set of HyperCard stacks that lets you catalog family and personal information. Has areas for historical information, current possessions, and data. Decent organization. The interface is pretty bare bones, and the printing abilities are inadequate. Version 1.0. Requires Mac Plus or later. HyperCard, $49.50. Spinnaker Software Corp., One Kendall Square, Cambridge, MA 02139. (800) 826-0705. (Jan '90)

Guide


HyperAnimator

HyperAnimator lets you create talking heads for HyperCard stacks using MacTalk or digitized sound resources. Easy to implement, especially if you know HyperCard well. Version 1.5. $199.50. Bright Star Technology, 1450 114th Ave. S.E., Suite 200, Bellevue, WA 98004. (206) 451-3697. (Feb '89)

HyperAtlas

HyperAtlas is a collection of U.S. and world maps that are networked to stacks containing economic, political, and population data. Version 1.0. Requires HyperCard and a disk drive. HyperCard, $99. MicroMaps Software, P.O. Box 757, Lambertville, NJ 08530. (609) 397-1611. (Oct '88)

HyperBASIC

HyperBASIC is a stand-alone XCMD-complier application. You must be able to program in BASIC to use it. Its BASIC is pretty standard and gives access to 575 Toolbox traps (not a lot). There's no debugging capability worth using, and the manual is poor. This is not a good system for HyperCard XCMD creation yet. Version 2.0. Requires Mac Plus or later. HyperCard, $99. Technosys, 39232 Coconut Palm Drive, Suite 111, Tampa, FL 33619. (813) 620-3494. (May '90)

HyperCard

HyperCard is a unique program for the Mac. It uses an indexcard metaphor, and it contains the HyperTalk programming language. Version 1.2. Requires Mac Plus or later. Free with new Macs and bundled with many HyperCard stacks, otherwise, $49.95. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. (Dec '87)

Eddy

HyperCard

HyperDA lets you browse through HyperCard stacks via a D&A. A true hypertext for flyperCard users who cannot normally access stackware. Doesn't support global variables. Version 1.2. Requires Mac Plus or later. HyperCard, $295. HyperDA, $94.29. (May '90)

Nutrition

The Nutrition HyperCard stack is a good way to help you maintain a healthy diet. The nutritional database needs more information, but otherwise the stack is very useful. Version 2.0. Requires Mac Plus or later and HyperCard. $49.95. MindLink, Box 247, NutriSource, VT 05053. (802) 457-2025. (May '90)

Nutrition

Nuts & HyperBolts

Nuts & HyperBolts is a series of large HyperCard stacks that help you improve your grammar and spelling skills. The mouse: there are no keyboard shortcuts — period. Version 2.0. $189.50. Sterling Swift Software, 18005 Colima Road, Suite 8, Canoga Park, CA 91304. (818) 343-3252. (Aug '89)

101 Scripts and Buttons

101 Scripts and Buttons for HyperCard is a collection of scripts, buttons, fields, graphs, utilities, and a host of other items. Requires HyperCard and a disk-drive program. Touching icons, cursors, and more for generating HyperCard stacks. Version 1.1. Requires HyperCard and a hard-disk drive. $69.95. Individual Software, 125 Shoreway Road, Suite 3000, San Carlos, CA 94070. (800) 331-7995; in California, (415) 595-8855 (CA). (June '89)

Reports

Reports endows HyperCard stacks with the power to sort and graph data, as well as producing a database does. Customizing reports is difficult. Version 1.2. Requires HyperCard. $119.95. Mediagenic, 3885
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**MINIFINDERS**

Bohanon Drive, Menlo Park, CA 94025. (415) 329-0500. (Aug '88)

**Script Edit**

Script Edit lets users open multiple script windows simultaneously from different stacks. It makes stack creation easier and more convenient than it was previously possible. Version 1.0. Requires Mac Plus or later. $79. Somak Software, 535 E. California Blvd., Suite 113, Encinitas, CA 92024. (800) 842-5020 or (619) 942-2556. (Feb '89)

**scriptExpert**

scriptExpert helps you generate HyperTalk scripts by leading you through the correct use of the language. Select a command, and dialog boxes prompt you for necessary components. Version 1.2. Requires HyperCard $79.95. HyperCard Publishing, P.O. Box 8243, Foster City, CA 94404. (415) 345-4620. (Oct '88)

**STELLASctack**

STELLASctack lets you change the boxes and circles of a STELLA simulation into familiar images and icons with digitized sound and animation. Contains the STELLA kernel for accessing STELLA models; lets you change models in realtime. Version 2.0. Requires HyperCard or later. Business, $295; education, $150. High Performance Systems, 13 Dartmouth College Highway, Lyme, NH 03768. (603) 795-4857. (July '89)

**Time Table of Science and Innovation**

Time Table of Science and Innovation presents events from the history of technology on a HyperCard-based CD-ROM: Text, graphics, and sound are integrated, and related events are well linked. Includes HyperCard on CD-ROM, Version 2.0. $185. Xsolar, 1205 Valencia Blvd., Marina Del Rey, CA 90293. (213) 841-2790. (May '89)

**VideoWorks II HyperCard Driver**


**Wild Things**

Wild Things is a set of 40 XCMDs that teaches you about XCMDs. Comes on four disks, two of which are devoted entirely to the code. Some code is provided in Pascal (MPW, TML, and Lightspeed), C (MPW and Lightspeed), and FORTAN (MPW) for each of the XCMDs. Requires Mac Plus or later, hard-disk drive, and System 6.0.2 or later. $150. Language Systems, 441-B Carlisle Drive, Herndon, VA 22070. (703) 478-0181. (Dec '89)

**XCALC**

XCALC adds calculation and spreadsheet-like abilities to stacks. Grids restricted to the size of single cards. Extends HyperCard's math abilities significantly, Manual could be better. Requires 2 megabytes and HyperCard (included). $149.95. Trendware Corp., P.O. Box 2285, Huntington, CT 06550. (203) 926-1116. (Jan '90)

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**MULTIMEDIA**

**Business Simulator**

Business Simulator is a simulation-game training tool. You have to manage a company through several stages during 25 years and decisions become more difficult over time. Version 2.0. Requires Mac Plus or later. Can run from a hard-disk drive. $69.95. Strategic Management Group, 3624 Market St., Philadelphia, PA 19104. (215) 387-4000. (Dec '87)

**ColorSpace III/FX**

ColorSpace III/FX brings live 24-bit video to the Mac. The board converts regular TV signals so they can be displayed on the Mac. It also offers sophisticated special effects, Includes Digitizer DA to grab frames for export. The III lets you mix live video with computer graphics. Requires Mac II or later. III, $2,299; FX, $3,499. Mass Microsystems, 550 Del Rey Ave., Sunnyvale, CA 94086. (408) 522-7979 or (408) 522-1200. (Mar '89)

**MacRecorder**

MacRecorder is an audio digitizer for adding sounds to your Mac animations, or HyperCard stacks. Supports an extensive array of audio-manipulation effects. HyperSound Toolkit makes adding sounds to HyperCard stacks easy. Version 2.0. Requires Mac Plus or later. Requires HyperCard version 1.0.1 or later. $249. Fabulous, 150 Constitution Ave., 2000 Powell St., Suite 600, Emeryville, CA 94608. (415) 596-9100. (June '89)

**ShowCase FX**

ShowCase FX is an animated-titling package that provides several textual effects, including Acg's own Poly fonts, to use for making title sequences. Provides a good introduction to twelwe and frame-by-frame animation. Requires Mac II and 2 megabytes. $395. Aegis Development, 2210 Wilshire Blvd., Suite 277, Santa Monica, CA 90403. (803) 345-8871 or (213) 392-9972. (Dec '89)

**TV Producer Pro**

The TV Producer Pro is a NuBus card that overlays Mac graphics and text onto a video signal. Software is clumsy to use. Requires Mac II, Apple video card, and video source. $990. Computer Friends Interactive, 14250 N.W. Science Park Drive, Portland, OR 97229. (503) 626-2291. (May '88)

**VideoWorks II Accelerator**

The VideoWorks II Accelerator compiles VideoWorks II movies to make them run more smoothly. Compensates for the QuickDraw screen display. Version 1.0. Requires Mac Plus or later and VideoWorks II; hard-disk drive recommended. $195. MacroMind, 410 Townsend St., Suite 408, San Francisco, CA 94107. (415) 442-0200. (Dec '88)

**VideoWorks II Clip Animation**

VideoWorks II Clip Animation's Clip Charts, Black and White Movies, and ClipGifs are separate aids to help you construct movies and business presentations. Requires VideoWorks II. $49.95 to $99.95. MacroMind, 410 Townsend St., Suite 408, San Francisco, CA 94107. (415) 442-0200. (Aug '88)

---

**Music**

**Alchemy**


**Eddy**

Apple MIDI Interface is a simple and elegant virtual digital interface with 1-megahertz clock rate. Has only one MIDI input and one output. Works up to System 5.0. Requires Mac Plus or later. $128. Apple Computer, 20255 Mariani Ave., Cupertino, CA 95014, (408) 996-1010. (June '88)

**ConcertWare+MIDI**

ConcertWare+MIDI is a composition and transcription program that can record multiple notes on a single track. Easy to use if you read music. Handles eight tracks of eight voices each. Version 5.1. Requires Mac Plus or later. $189.95. Great Wave Software, 5533 Scotts Valley Drive, Scotts Valley, CA 95066. (408) 438-1990. (Dec '87)

**Cue: The Film Music System**

Cue: The Film Music System is a powerful and versatile assistant for scoring films. Automates spotting and logging cue points and searching for matching tempos. Also performs many minor jobs, such as generating a performing-rights cue sheet. Version 3.0. Requires Mac 512K or later. $595. Opcode Systems, 1024 Hamilton Ct., Menlo Park, CA 94025. (415) 321-8977. CP (Feb '89)

**Deluxe Music Construction Set**

Deluxe Music Construction Set lets you enter up to 48 voices on eight staves and play the music through a Mac's internal speaker and/or MIDI. Version 2.5. Requires Mac Plus or later. $129.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. (600) 245-4525 or (415) 571-7717. CP (June '88)

**Encore**

Encore is quasi-rule-based music-notation program with a very nice interface. It supports multiple files and can deal with MIDI sequencers. Requires System 1.1.6a. Requires Mac Plus or later. $595. Passport Designs, 625 Miramonte St., Half Moon Bay, CA 94019. (415) 726-0200. (May '90)

**Finale 2.0**

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<thead>
<tr>
<th>Capacity</th>
<th>External</th>
<th>Quantum</th>
<th>Internal</th>
<th>Quantum</th>
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</thead>
<tbody>
<tr>
<td>20+MB</td>
<td>$345</td>
<td>N/A</td>
<td>$295</td>
<td>N/A</td>
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<tr>
<td>40+MB</td>
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<td>$575</td>
<td>$645</td>
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</table>

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  - PhoneNET StarConnector™: $18
  - PhoneNET Din-8 Connector: $31
  - PhoneNET to LocalTalk Adapter: $31
  - PhoneNET StarConnector™ 10 Pack: $138
  - PhoneNET StarController™: $588
  - PhoneNET Repeater: $313
  - Star Wiring Kit Harmonica: $64
  - Portable Pack: $373
  - Hayes Interbridge: $645
  - Kinetics FastPath 4 Gateway: $1395
- **MacAvenue**
  - LocalTalk DB-9 Connector: $32
  - LocalTalk Din-8 Connector: $32
- **Shinco**
  - NetSerial X232: $275
  - NetBridge: $339
  - TeleBridge: $339
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<thead>
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<th>Memory/Boards</th>
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<tr>
<td>2x1MB SIMM Kit, 80ns</td>
<td>$25480</td>
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<tr>
<td>4x1MB SIMM Kit, 50ns</td>
<td>$25482</td>
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<tr>
<td>4x4MB SIMM Kit, 50ns</td>
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<td>4x1MB SIMM Kit for 1fx</td>
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### Keyboards

#### DataDesk

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<td>Mac-101 Keyboard, beige</td>
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### Mice

#### Kensington

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<th>Mouse</th>
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<td>Mouse Systems Little Mouse</td>
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### Scanners

#### Logitech

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<td>ScanMan 32</td>
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<tr>
<td>Page Scanner</td>
<td>$22782</td>
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<td>ThunderScan</td>
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### Sound

#### Farallon

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<td>MacRecorder</td>
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<td>MicroTV</td>
<td>$23731</td>
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<td>DigiVideo Color</td>
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### Electronics

#### Summagraphics

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<th>Sound Card</th>
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<tr>
<td>BitPad Plus</td>
<td>$26885</td>
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- Data-Vac vacuum and accessories: [$41026] |
- Keyboard Drawer: [$41753] |
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- Mac to Imagewriter II, 6 ft. $26287
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- SCSI Peripheral Cable, 2 ft. $26289
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- Microsoft Excel: $30180

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- Symantec SAM: $30342
- XTree Mac: $30344
- CanOpener: $30346
- QuickKeys: $30350
- Copy II Mac: $30362
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- Life & Death: $29248
- Hunt for Red October: $29250
- Ancient Art of War at Sea: $29252
- Carmen Sandiego/World: $29254
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MINIFINDERS

Finale packs power and a music-related reference section. It's best suited to users needing absolute control over all the music elements in large-scale compositional and/or production purposes. Version 2.0 Requires Mac Plus, hard disk drive. MIDI instrument and interface, and PostScript printer. Along with Finale's Corel Software, 1401 E. 79th St., Minneapolis, MN 55425-1126. (800) 843-1337 or (612) 554-9400. (May '89)

Graph Notes

Graph Notes is a very good page-layout program for music notation, with MIDI support. Comes with special musicalnotation keypads. Version 2.0. Requires Mac Plus or later. $595. Music Software Plus, 7000 E. Drive, Suite 250, Apos, CA 90050. (Apr '89)

Harmony Grid

Harmony Grid offers an experimental approach to harmony theory. Users are presented with a grid, so they can see scales and chords as repeating patterns. They play these tones by moving the mouse over the grid, resulting in improvisation without requiring any training or technique. The program automatically provides counterpoint as well. Supports MIDI. Version 1.05. $599. Hip Software, 117 Harvard St., Suite 3, Cambridge, MA 02139. (617) 661-2447. (Aug '90)

Jam Factory

Jam Factory is a program for performing complex manipulations on MIDI data in real time. Unique, entertaining, and very powerful but requires lots of patience and practice. Version 2.0 Requires Mac Plus or later, MIDI interface, and MIDI synthesizer. $249. Intelligent Music, 116 N. Lake Ave., La Canada, CA 91011. (518) 434-4110. CP (Oct '87)

Jam Session

Jam Session is a music program for those who think MIDI refers to the length of skirt. Without any skill, you can "jam" with rock, jazz, rap, or country tunes. A sort of "Sing Along with Dr. Mitch" for the computer set. Requires Mac 512K or later. $49.95. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101. (415) 492-3200. CP (July '88)

Listen

Listen is a musical educational tool for home use. It has a keyboard and a guitar fret board for users to input notes, and it offers a wide range of exercises. Version 2.1. $34.95. CTV Software, 1100 E. Hamilton Court, Menlo Park, CA 94025. (415) 321-8977. (Mar '89)

M

M is a music-composition and -creation program that works with MIDI data in real time. Unique, entertaining, and powerful but requires lots of practice and patience. Version 2.0. Requires Mac 512K or later, MIDI interface, and MIDI synthesizer. $249. Intelligent Music, 116 N. Lake Ave., Albany, NY 12206. (518) 434-4110. CP (Oct '87)

Master Tracks Pro

Master Tracks Pro is a full-featured second-generation MIDI sequencer that adheres to the Mac interface very well. It's the first program to have graphics-controller editing. Version 4. Requires Mac 512K or later. $495. Passport Designs, 625 Minram Sts., #103, Half Moon Bay, CA 94019. (415) 726-0280. CP (Dec '87)

Music Mouse

Music Mouse is a music program in a genre all its own. Called an intelligent instrument, Music Mouse gives you instant musical feedback as you move the mouse and type on the keyboard, which controls tempo, volume, and so on. Version 2.0. $79.95. Dr. T's Music Software, 220 Boylston St., Suite 206, Chistnut Hill, MA 02167. (617) 244-6954. (May '87)

MusicPro

MusicPro, a subset of Finale 2.0, was designed specifically for preparing lead sheets, piano-vocal parts, and Paired harmony. It's relatively easy to learn and is a very good performer. Version 1.0. Requires Mac Plus or later. $249. Coda Music Software, 1401 E. 79th St., Minneapolis, MN 55425-1126. (800) 843-1337 or (612) 854-1288. (May '90)

Performer

Performer is a full-featured MIDI sequencer that includes looping, MIDI file editing, simultaneous Ins and Outs, unlimited overdubbing, and compatibility with Professional Composer for transcription. Version 3.4. Requires Mac 512K or later and MIDI interface. $495. Mark of the Unicorn, 223rd Third St., Cambridge, MA 02142. (617) 576-2760. CP (Jan '88)

Practica Musica

Practica Musica is a classical-harmony course taught as a series of 11 activities that are presented as games. Topics include simple pitch reading and writing, scales, modes, interval recognition, chord spelling, and ear training. Supports MIDI Version 2.2. $215. Ars Nova Software, 2900 Box 637, Kirkland, WA 98033. (800) 454-8868. (Aug '90)

Professional Composer

Professional Composer produces performance-quality sheet music using Adobe's Sonata font. Scores can be created from scratch or imported from Performer (and can be exported to Performer for MIDI playback). Version 2.3. Requires Mac 512K or later. $249. Mark of the Unicorn, 223rd Third St., Cambridge, MA 02142. (617) 576-2760. CP (Jan '88)

Sound Designer

Sound Designer is a standard for editing samples of lower-cost samplers, but it still lacks real-time high-fidelity playback. Requires Mac 512K or later, sampler, and MIDI interface. Emax, E II, 2000/2002, DSS-I, $900; $495; all others; $395; Sound Designer Universal, version 1.3; $395; Sound Designer II, version 1.03, $995. Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. (415) 688-0600. CP (Oct '88)

Studio Session

Studio Session consists of two programs — Editor and Player — that produce music with six voices of digitized sound. Excellent program and manual make this a good buy. $89.95. Bogan Productions, 60 Heritage Harbor, Suite G, Monterey, CA 93940. (408) 648-4000. (Mar '90)

Ultrasonics


UpBeat

UpBeat turns the Mac into a front panel for a highly complex and versatile drum machine. Input patterns with mouse, MIDI keyboard, or drum machine. Version 2.0. Requires Mac 512K or later. $249. Intelligent Music, 116 N. Lake Ave., Allston, MA 02134. (518) 434-4110. CP (May '88)

Vision

Vision sets a new standard in Mac sequencers. Supports full SMPTE control, event list, and graphics editing; real-time and non-real-time MIDI editing, tempo, meter, and dynamic changes; and standard MIDI files. MIDI Keys maps certain Mac keyboard commands to your MIDI controller. Requires Mac Plus or later, MIDI interface, and MIDI synthesizer. $495. Opcode Systems, 1024 Hamilton Court, Menlo Park, CA 94025. (415) 321-6977. CP (Dec '89)

5 NUMBER CRUNCHING

Data Acquisition and Analysis

Analog Connection Workbench

Analog Connection Workbench is a comprehensive application generator for general-purpose data acquisition, control, and analysis. Users create flow diagrams that make live color plots. Powerful and very easy to use. Version 3.0. Requires Mac SE or later, $995. Strawberry Tree, 160 S. Wolfe Rd., Palo Alto, CA 94306. (408) 736-8800. (July '89)

DeltaGraph

DeltaGraph is the new champion charting tool. Has 22 types of 2-D and 3-D charts. Uses up to 256 colors per chart. Easy to use and can import data from most sources. Version 1.0. Requires Mac SE or later, $195. DelaPoint, 200 Heritage Harbor, Suite G, Monterey, CA 93940. (408) 648-4000. (Mar '90)

Forecast

Forecast lets you draw accurate on a chart, and it converts the curve to neatly rounded values for use in spreadsheets. The program is nearly foolproof and very useful for users preparing budgets as well as other financial projections. Version 1.0. Requires Mac Plus or later, $69.95. Palo Alto Software, 260 Sheridan Ave., #219, Palo Alto, CA 94306. (415) 325-3190. (Oct '89)

GeoQuery

GeoQuery puts your database on the map by accessing zip code information. Comes with maps of the U.S. Other atlases available. Version 1.0. Requires Mac Plus or later. $339.95. GeoQuery, 1150 Commercial Ave., Northbrook, IL 60062. (800) 323-5423. (July '89)

Igor

Igor is a data-visualization and analysis program. It offers a
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. Who were the contenders? Every other trackball and mouse on the market. (Not to mention joysticks, keyboards and graphics tablets.) The winning secret? Simple.

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reasonably complete set of options and tests. Although it doesn’t have all the data-manipulation features of a statistics package, you can do anything mathematically. A powerful macro language and easy command structure make repetitive tasks simple. Performance in most areas is very good, with good printing quality and speed as excellent. You can import graphics as well as data, and it supports a variety of printers. Version 1.1. $295. WaveMetrics, P.O. Box 2088, Lake Oswego, OR 97035, (503) 620-3001.

KaleidaGraph $299


LabTech Notebook $45

LabTech Notebook is a general-purpose data acquisition and -analysis package. This DOS port has menus, but the interface is so poorly designed that it is almost useless. Also looks like a DOS program. This version doesn’t even have a Print function. Version 1.0. Requires Mac II and later, $995. Laboratory Technologies Corp., 400 Research Drive, Wilmingtom, MA 01887. (508) 657-5400. (July ’89).

LabVIEW 2 $1,595

LabVIEW 2 is a graphical programming environment for creating applications for GPIB and serial data acquisition and -control operations. Data analysis includes complex math and signal processing. Uses a screen on-screen control panels to emulate test instruments. The most complete such package for either PC or Mac. Requires Mac Plus or later and hard-disk drive, $1,995. National Instruments, 6504 Bridge Point Parkway, Austin, TX 78730-5039. (800) 457-1090 or (512) 454-2030. (July ’89).

MacAIDIOS II $995

MacAIDIOS II is a hardware and software interface for laboratory instruments. Standard configuration samples up to 142 kilohertz. Documentation is sketchy. Mac II ready data-acquisition card, $1,490; MacAIDIOS II software interface, $600. GW Instruments, 55 Midford St., Somerville, MA 02143. (617) 625-4960. (July ’88).

MacInstruments $695

MacInstruments is an oscilloscope and analog-to-digital recorder functions and some statistics. Records up to 83,000 samples per second and works with a wide selection of GW hardware. Version 1.03. Requires Mac with 1 megabyte. $790. GW Instruments, 35 Medford St., Somerville, MA 02143. (617) 625-4096. (July ’89).

MacLab $299

MacLab turns your Mac into an oscilloscope with chart-recorder functions. This hard-ware-software package records from 12 samples per hour to 40,000 samples per second. It also has an interface and analysis features, such as slope of tangent and area under curve. Built-in amplifiers. Version 3.0. Requires Mac 512K or larger, $355; optional differential amplifiers, $1,125. World Precision Instruments, 375 Quinipiac Ave., New Haven, CT 06511. (203) 469-8281. (July ’89).

MacPac $495

MacPac is a hardware-software combination and chart-recorder emulator that records from 2 samples per minute to 10,000 samples per second. The portable hardware can be used remotely. Version 1.05. Requires Mac 512K or later, $1,195; optional external amplifiers, $395. BioPac Systems, P.O. Box 585, Santa Monica, CA 90406. (310) 451-0350. (Sept ’89).

MacSpin $795


Parameter Manager Plus $395

Parameter Manager Plus analyzes input data, using a spreadsheetlike interface, in real time. It can handle both hand-entered and imported data. It includes linear and non-linear control, equation fitting, predictive maintenance, histograms, drawings, and presentation. Version 3.0. Requires Macintosh Plus or later, $589; communications module, $795. GenStat, 510 Cottonwood, Midpitas, CA 95035. (408) 432-1000. (July ’89).

STELLA Software for Business $1,995

STELLA Software for Business is a simulation tool for modeling complex business systems. Requires that you master a discipline called system dynamics. Version 2.0. Requires Mac 512K or larger, $540; academic discount, $209. High Performance Systems, 13 Dartmouth College Highway, Hanover, NH 03755. (603) 793-4587. (June ’89).

SuperANOVA $65

SuperANOVA is a slick linear-modeling program with a great interface. This is not a general statistics program but a more specialized tool. Feature-laden and very powerful. Version 1.02. Requires Mac Plus or later, $495. Abacus Concepts, 1984 Bonita Ave., Berkeley, CA 94704. (415) 540-1949. (Mar ’90) * $99 Eddy

MATHEMATICS

Math View Professional $695

Math View Professional is an equation solver that combines 2-D and 3-D plotting with routines for matrices, differential equations and integrals, complex numbers, and the like. Interface leaves a lot to be desired. Version 1.1. Requires Mac 512K or later, $249.5. BrainPower, 30497 Canwood St., Suite 201, Agoura Hills, CA 91301. (818) 707-1712. (Sept ’89).

Mathematica $2,450

Mathematica is a powerful tool for doing all kinds of math. Offers arbitrary-precision numerical calculations, built-in computer algebra, and very powerful. Version 1.2. Requires Mac Plus and a hard disk drive; requires 2 megabytes RAM to run kernel. $945. Mac II version, $795. Wolfram Research, P.O. Box 6039, Champaign, IL 61826. (800) 441-6284. (Nov ’88) * $795.

Model-II $995

Model-II is a good tool for simple mathematical modeling and simulating small dynamic systems. The manual is very good and performance is adequate. It requires knowledge of what you are modeling — there’s no AI. Version 1.1. Requires Mac Plus or later, $995. Norris Software Systems, 5201 Western Ave., Suite 432, Knoxville, TN 37921. (615) 588-5774. (June ’90).

Theorist $2,450

Theorist is an elegant equation solver that surpasses Mathematica in ease of use and practical functionality. The equation-derivation process doesn’t require any programming, just click-and-drag techniques on standard symbolic algebra. Many of math functions and transformations automatically activated by a few menu commands. Can also visualize your equations and theories through graphs and animation, including 3-D and color. $3,795. Prescient, 814 Costar St., San Francisco, CA 94114. (415) 282-5864. (June ’90) * $999 Eddy

SPREADSHEETS

DataMerge $29

DataMerge simplifies manipulating tabular data. It works fine with all major spreadsheet programs and can merge up to nine files. The files can be larger than existing RAM.

Excellent performance. Version 1.0. Requires Mac 512K or later. $99. Seawell Micro Systems, P.O. Box 22030, Austin, TX 78765. (512) 347-7008 or (202) 322-3123. (May ’89).

Microsoft Excel $1,995

Microsoft Excel 2 has a major upgrade. Improvements include variable row heights, multiple fonts, improved macros, hot links to other Microsoft products, productivity, and the 1-megabyte limit. Excel remains the standard. Version 2.2. Requires Mac Plus or later and System 6.0.2 or later; hard disk drive recommended. $395. Microsoft Corp., One Microsoft Way, Redmond, WA 98052-6399. (800) 426-9400. (May ’89) or (206) 454-2030. (Sept ’89).

Full Impact $1,995

Full Impact is a full-featured spreadsheet program that produces good graphics and has a smoother interface than Excel. Uses virtual memory, which needs more than 1 megabyte of RAM, to create bigger spreadsheets than any other product. FullTalk macro language is easy and graceful, and XMacros give access to C, Pascal, and Mac Toolbox calls to customize menus and create new functions. File sizes are bigger than those of other spreadsheet programs and an Version 2.1. $395. Ashton-Tate, 20161 Hamilton Ave., Torrance, CA 90502. (213) 329-8000. (Apr ’89).

MICROTEMP Financial Calculators $495


101 Macros for Excel $69.95

101 Macros for Excel offers all the power of macros without your having to learn how to write them. Some macros include a search-and-replace macro and a macro to transpose rows into columns for use with programs. Version 1.0. $699.5. Individual Software, Inc., 125 Shoreway Road, Suite 3000, San Carlos, CA 94070. (800) 331-3313 or (415) 595-8855 (CA). (July ’88).

Trapeze $1,995

Trapeze is a powerful presentation worksheet that combines math-like calculations and graphic representation. The interface, which is based on a special custom icon bar, can be used with Works and DeltaPoint, Inc., 200 Heritage Harbor, Suite G, Monterey, CA 93940. (408) 375-4700. (Dec ’87).
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Wingz combines a powerful and roomy spreadsheet program with an easy-to-use graphic interface, making it perfect for developing customized applications. Lacks a few standard spreadsheet niceties but makes up for it with its stylish graphics, including color and 3-D. Version 1.1. Requires Mac Plus or later. $695. SAS Institute, Cary, NC 27513-2006. (919) 677-8000. (Apr '90)


StatView SE + Graphics. StatView SE + Graphics is the SE version of StatView Plus, but it features an easy-to-use interface and excellent presentation graphics. There's a full range of procedures available, but the data-transformation functions are limited. Its interactive exploratory graphics are weak, but performance is adequate. Requires Mac SE, $399; with SuperANOVA, $575. Abacus Concepts, Inc., 1844 Bonita Ave., Berkeley, CA 94704. (800) 666-7828 or (415) 540-1949. (Apr '90)


JMP. JMP provides good data-management and exploratory inferential statistics tools. The performance is slow. JMP is very different from similar packages — some users will find it confusing. The range of nonparametric and multivariate procedures is too limited. Version 1.0. Requires Mac Plus or later. $695. SAS Institute, Cary, NC 27513-2006. (919) 677-8000. (Apr '90)

Acta Advantage. Acta Advantage is an outlining package. Also comes with the Acta DA. Smart Paste lets you paste material from other applications into Acta outline format. Includes drivers for translating Acta outlines into MORE and ThinkTank (both Windows) and into WriteNow, Works, and RTF files. DA, version 3.01; application, version 1.03. Requires Mac Plus or later. $319. Symmetry, 8603 E. Royal Palm, Suite 110, Scottsdale, AZ 85258. (800) 624-2485. (Aug '89) *89 Edy

IdeaFisher. IdeaFisher is a thought processor that's based on an eight-disk, more than 7-megabyte database of words, phrases, clichés, and titles. The database is cross-referenced and indexed in several ways. Useful search techniques are provided and your "conclusions" are held in a separate file. It's text-based, so it's fairly quick, but it's not attractive. The filters are unsophisticated and equal weight to everything. Requires Mac Plus or later. $495. Fisher Idea Systems, 18881 Von Karman Ave., Irvine, CA 92715. (714) 474-8111. (May '90)

MORE II. MORE II is an outlining and organizational tool that is an improvement over its predecessors, MORE and ThinkTank. It has on-screen capabilities well beyond its competitors, especially in a multi-monitor setup. Version 2.01. Requires Mac Plus or later. System 4.1 or later, and a hard-disk drive. $395. Symmetry, Living Videotext Division, 10201 Torre Ave., Cupertino, CA 95014. (408) 253-9600. (May '90)

Personal Information Managers. Address Book Plus. Address Book Plus is a very nice name-and-address manager. It prints only on one side of a page, but it has all the other features you might need. Its sorting and import/export abilities are good. A limited DA allows file access from other applications. Version 1.0. Requires System 6.0.2 or later. $395; with leather binder, $595. Excalibur Software, 2929 Campus Drive, San Mateo, CA 94403. (415) 345-5900. (Apr '90)

Business Class. Business Class is a HyperCard stack that contains world-travel information and itinerary planning. Uses maps to locate countries without possessing United States domestic-travel information. Requires HyperCard. $495. Mediagenic, 3885 Bohannon Drive, Menlo Park, CA 94025. (415) 329-0500. (Dec '89)

For the Record. For the Record is a database designed for legal, financial, and personal records. Allows password protection of screens containing sensitive personal data. Version 1.0. Requires Mac 512K. $495. Nolo Press, Inc., 2852 E. Corte Bella, Berkeley, CA 94704. (415) 848-9027. (Nov '89)
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MINIFINDERS

950 Parker St., Berkeley, CA 94710. (415) 549-1976. (Feb '89)

Front Desk MultiUser  
Front Desk. MultiUser is a schedule and resource manager best suited for small professional offices. Can be used in a network environment. Basic functionality but simple and capable. Version 6.10. Requires Mac 512K and System 5.0 or later (single user), Mac Plus and System 5.0 or later (multiserver). Single user, $99; 2 to 5 users, $75 each; 6 to 10 users, $60 each; 11 or more users, $40 each. Layered, The Schratt Center, 529 Main St., Boston, MA 02129. (617) 242-7700. (Jan '89)

MacPhonebook  
MacPhonebook handles name-and-address lists with up to 1,600 entries. Its form is print­ ing paper, medium, and a small (Little Black Book) formats. Version 1.0. Requires Mac 512K or later. $79.95. Simon & Schuster, Temple St., Brooklyn, NY 11215. (718) 499-6293. (Oct '89)

My Time Manager  
My Time Manager is a computer-based organizer with a full range of nicely implemented tools including an appointment book, an address book, a notes and contacts area, and a dialer. Only daily and monthly reports are available for printing. Its performance is good and the publisher support is excellent. Version 2.0. Requires Mac Plus or later and HyperCard. $79.95. MacShack Enterprises, 19 Harvard Road, Canton, MA 02140. (617) 876-6343. (Apr '90)

QuickDEX  
QuickDEX keeps your telephone numbers in an electronic Rolodex DA. Can dial phones easily, Version 1.4a. Requires Mac; hard disk drive recommended. $60. Casady & Greene, P.O. Box 223779, Carmel, CA 93922. (408) 624-8716. (Jan '89)

Remember?  
Remember? is a nice share­ware INIT that lets your Mac remind you of important items. Each item you start using has been entered for the day via Remember?’s DA; it presents a window with the details. Its free-form option list is easy to maintain. The DA also lets you check your calendar in advance, Implementation is clean. Version 1.3. Shareware, David Barker, 1330 W. North St., Egg Harbor, NJ 08235-1763. (Oct '89)

Take Control of Cholesterol  
Take Control of Cholesterol is one of a series of health- and food-related programs. It is clearly a port from a simpler interface, but in spite of that, it’s a good tool. It’s designed to be used with Eater’s Choice, a program that tells you how to reduce cholesterol by lowering your saturated-fat intake. The program sets up worksheets and can tell you how to eat meals plans. Version 2.0. $39.95. Lifestyle Software Group, 63 Orange St., St. Augustine, FL 32084. (800) 289-1157 or (904) 825-0220. (Jun '89)

WillMaker  
WillMaker is a simple yet valuable run-time BASIC program for creating wills. Not elegant, but it does the job well. Version 3.0. $39.95. Nolo Press, 950 Parker St., Berkeley, CA 94710. (415) 549-1976. (Mar '89)

Organizers

DiagramMaker  
DiagramMaker is a jack-of-all-trades object-linking program. Can form a network of custom­ made objects with connecting points at the centers, corners, or centers of sides. Can make custom organization charts from text outlines. Lines join on contact and can be pulled into arcs. Objects can be linked to objects in other documents. No automatic right­ hand­ page formatting. Text­ find feature is useful and unique. Version 1.1. Requires Mac 512K or later. $145. Action Software, 1507 E. Franklin St., Suite 122, Chapel Hill, NC 27514. (919) 942-1111. (Jan '90)

FastTrack Schedule  
FastTrack Schedule is a flexible Gantt-based project scheduler that uses a hierarchical outline format. Provides the highest degree of functionality and the best on-screen and printed­graphics abilities in its class. A perfectly suited project management system for Mac. Version 1.03. Requires Mac Plus or later. $195. AEC Management Systems, 22611 Markey Court, Building 113, Hayward, CA 94545. (510) 480-1980. (Oct '89)

FlowMaster  
FlowMaster charts your ad­ vanced plans in print, TV, billboards, and other media. Analyzes costs/benefits of a campaign in terms that even the most jaded Madison Ave. execs will find innovative. Includes bar-chat and tabular output as well as a color­drawing environment for touching up charts. Version 2.0. Requires Mac 512K or later. $795. Telmar Information Services, 902 Broadway, New York, NY 10010. (212) 460-0000. (June '90)

Information Manager  
Information Manager is a dedicated database program for managing project information. Designed to be used in conjunction with MacProject II or Micro Planner. Helps to track data needed to make decisions and monitor status. A useful alarm feature keeps track of critical dates. Version 1.22. Requires Mac Plus or later. $195. AEC Management Systems, 20523 Painted Hills Rd., Germantown, MD 20874. (301) 428-3694. (Oct '89)

KeyPlan  
KeyPlan is a hybrid outline­/ project planner. It lacks some of the powerful tools of MacProject II and Micro Planner but is easier to use. It’s flexible, fast, and suited for managers who need some quick project­planning help. Version 1.0. Requires Mac Plus or later; System 6.0.2 or later. $395. Information Systems Software, 222 E. First St., Mesa, AZ 85203. (602) 844-2199. (Apr '90)

MacFlow  
MacFlow is a capable process­flow diagrammer with hierarchical nesting capabilities. Good control over symbol connection points. Recognition mechanism is good but can go partly awry with major object shifts. Excellent line­segment editing. Version 3.12. Requires Mac Plus or later and System 6.02 or later. $245. Mainstay, 3511 B Reef Ave., Agoura Hills, CA 91301. (818) 591-6540. (Feb '92)

MacProject II  
MacProject II is a well­ executed PERT and CPM project­management system with time and expense reporting. Can manage projects and produce management reporting. Crisp documentation aids an easy­to­follow design makes this package a true value. Version 2.12. Requires Mac Plus or later. $495. G321 Corp., 5201 Patrick Henry Dr., Santa Clara, CA 95052. (408) 987-7000. (Oct '89)

MacSchedule  
MacSchedule is a simple Gantt­based project­management and outlooker system. Offers advanced project­time scaling but isn’t advanced enough for users. Limited color, graphics, and printing capability. Version 2.0. Requires Mac Plus or later. $195. Mainstay, 3511 B Reef Ave., Agoura Hills, CA 91301. (818) 991-6540. (Feb '90)

MetaDesign  

Micro Planner Plus and Project Exchange  
Micro Planner Plus and Project Exchange provide full PERT and CPM implementation, with advanced resource leveling, better date­driven reporting. Output can be used easily for management presentations. Micro Planner Plus, version 6.1F; Project Exchange, Micro Planner Plus, $595; Project Exchange, $100. Micro Planning International, 1630 South Foothill Highway, Suite 311, Mill Valley, CA 94941. (415) 389-1420. (Oct '89)

PERT & Critical Path Techniques  
PERT & Critical Path Techniques is technically the most sophisticated project­management system we've seen. Has a full Gantt and CPM implementation, including all second­order slack and timing calculations, based on a custom­made extension of the Mac interface. Project­manager aficionados might want to consider this one. Version 6.0; Requires any Mac. $152. Lionheart Press, P.O. Box 379, Alburg, VT 05440. (514) 933-9418. (Oct '89)

Rendezvous  
Rendezvous is a classic personal organizer with excellent printing abilities. Lacks a name­and­address section and needs automatic transfer of data between sections. Still, it's nice and quite useful. Version 2.5. Requires Mac 512K or later and System 6.0 or later. $200. PMC Telesystems, P.O. Box 5127, Vancouver, British Co­ lumbia V6B 4A9, Canada. (604) 255-9949. (Feb '90)

ScheduleMaker  
ScheduleMaker is a dedicated employee­ or equipment­scheduling system that uses a simple Gantt­type chart format but is not a project­management tool. Automates the process of figuring out who should work when and how much it will cost. Version 2.0. Requires any Mac. $295. Craig Manage­ ment, 16717 Monitor Ave., Baton Rouge, LA 70817. (504) 291-6380. (Oct '89)

Tim Berry's Business Plan Toolkit  
Tim Berry's Business Plan Toolkit is an integrated set of Excel macros and templates with HyperCard­based text that makes creating business plans and forecasts relatively easy. Excel, 5.01; HyperCard 2.0; Requires Mac Plus or later and System 4.2 or later. $99.95. Palo Alto Software, 620 Hillview Ave., Palo Alto, CA 94306. (415) 325-3198. (Sept '89)

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and organization-chart tool with a choice of connection modes for each individual line. Can generate text-based code or pick up E-mail to manipulate.

For serious program development, has excellent right-angle-reconnection talents, even with major object shifts. Limited user control of where lines connect to symbols. No line nodes for other lines to attach. Excellent navigation throughout hierarchy, view to view, and page to page. Version 1.0. Requires Mac Plus or later and System 6.02 or later. $345. Kaetcon Software, 112777 Jones Road, Suite 445, Houston, TX 77070. (713) 890-3434. (Jan '90)

**Tools**

**Fedit Plus**
Fedit Plus is the file and disk editor for everyone, from new-egg Mac owner to the plainest. It can recover deleted MFS files. Not fully HFS-compatible. Version 1.0. Requires Mac Plus or later. $49.50. MacMaster Systems, 108 E. Fremont Ave., Sunnyvale, CA 94087. (408) 773-9834. (Sept '89) *86 Eddy

**INIThound**
INIThound is a developer tool that carefully monitors the startup process and reports, in a detailed report, exactly what transpires. A very handy problem-solving tool.

**Quintus MacProlog**
Quintus MacProlog is a highly improved program that permits incremental and optimizing compilers, a graphics-environment, and many other advanced features. Version 1.0. Requires Mac Plus or later. $129. Cambridge InformationWare, P.O. Box 1296, Cambridge, MA 02139. (617) 484-8364. (Mar '90)

**Just Enough Pascal**
Just Enough Pascal is a Pascal tutorial. It includes an extensive set of Pascal program design exercises, and a comprehensive manual that includes a full set of Pascal programs for students to learn from. Version 2.0. Requires Mac Plus or later. $224.95. LWM 22 (additional fonts), $89.95. PostShow Professional (includes all fonts), $224.95. LWM 22 (additional fonts), $89.95. PostShow Professional (includes all fonts). PostShow Professional, Inc. 45 Winthrop St., Concord, MA 01742. (603) 223-7469 or (508) 369-1441. (Apr '90)

**Protol**
Protol is a programming editor that can create new application editing programs with a full-fledged program design system. It includes a full set of application specifications, and a comprehensive manual that includes a full set of application specification spreadsheets. Version 2.0. Requires Mac Plus or later. $224.95. LWM 22 (additional fonts), $89.95. PostShow Professional (includes all fonts), $224.95. LWM 22 (additional fonts), $89.95. PostShow Professional (includes all fonts). PostShow Professional, Inc. 45 Winthrop St., Concord, MA 01742. (603) 223-7469 or (508) 369-1441. (Apr '90)
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QUED/M
QUED/M stands for Quality Editor with Macros. Powerful macros and searching capabilities make it easy to edit a program and use the built-in string matching capability to load the compiler. Supports ten Clipboards, for unlimited search-and-replace patterns. Looks awkward to users unfamiliar with UNIX or grep. Version 2.07, $119. Paragon Computing Corporation, 16000 Highland Drive, Suite 312, Solana Beach, CA 92075. (800) 922-2993 or (619) 431-1477. (Feb '90)

SuperExpert
SuperExpert is an expert system shell that induces rules from examples. Rules become understandable to many computer experts. Examples and examples are used. Pricey for what you get. Version 1.4. Requires Mac 512K or later, $199.5. Softsys, Inc., 162 Maclean Ave., New York, NY 10016. (212) 685-2080. (July '88)

Visual Interactive Programming
Visual Interactive Programming is an interactive programming system for creating simple Mac applications. Programs are constructed in a flowchart-type manner. Easy access to most Toolbox routines. Translators are available for THINK Pascal, Turbo Pascal, MPW C, and MPW Pascal. Extensions are available for Grid Manager, Speech Manager, Matrix Manager, Advanced Manager 1, and Telecommunications Manager. Version 2.5.1, $149.95. Mainstay, 5311-B Del Amo Bv, Gardena HI., CA 90247. (818) 991-6540. (June '87)

Utilities
After Dark
After Dark is the excellent screen saver that introduced the concept of modules. A steady stream of interesting modules, including Puzzle, have been released. Although the first version had some minor bugs, the current version is fine. Version 1.01 Requires Mac 512K or later, $39.95. Berkeley Systems, Inc., 1700 Shattuck Ave., Berkeley, CA 94709. (415) 546-0955. (Apr '90). Anti-Virus Kit
Anti-Virus Kit is an antivirus utility that comes in three parts: an alert INIT, an application that installs a history file on any disk that records changes to that disk, and an application that helps identify the time an infection was introduced. Does not have repair capabilities. Version 1.0. Requires Mac 512K and System 4.1, $79.95. 1stAid Software, 42 Radnor Road, Boston, MA 02135. (617) 782-4676. (Oct '89).

AutoSave
AutoSave 2 provides insurance against system crashes. It saves your work automatically at intervals from 1 to 99 minutes. Compatible with many applications but not recommended for use with databases. Version 1.1, $49.95. Magic Software, 12206 Franklin St., Bellevue, NE 68005. (800) 342-2643. (Dec '89)

Calculator Construction Set
Calculator Construction Set lets you build calculator imagineable. The finished calculators are real working DAs. Takes some effort, and you'll need to read the manual, but the results are worth it. Version 2.06. Requires any Mac. $89.95. Dubl-Clack Software, 9316 Deering Ave., Chatsworth, CA 91311. (818) 700-9525. (Feb '90)

CalendarMaker
CalendarMaker is a utility that creates a variety of calendars. Many people use it to create personal calendars, Excellent printing routines. Version 3.3. Requires Mac 512K or later and System 4.1 or later. $49.95. CE Software, P.O. Box 65580, West Des Moines, IA 50265. (515) 234-1995. (Sept '89)

Eddy
Eddy is an electronic version of Post-it notes. A mini word processor lets you attach notes to a spreadsheet cell, to words in a text document, or to a window on the desktop. Version 2.2. Requires Mac 512K or later. $39.95. Denovo Software, 3303 N.W. 27th Ave., Miami, FL 33122. (305) 594-6965. (Dec '88)

Copy II Mac
Copy II Mac is a collection of powerful yet easy-to-use disk utilities with disk-copying abilities and much more. Version 7.2. Requires Mac 512K or later. $39.95. Central Point Software, 15220 N.W. Greenbrier Parkway, #200, Beaverton, OR 97006. (503) 690-5162. (Mar '90)

Desktop Help for Excel
Desktop Help for Excel is a DA that gives you context-sensitive help for Excel 2.2. It's much more extensive and better than Excel's own help file. You won't be told to look it up in a separate manual. Version 2.2. Requires Mac Plus or later. $79.95. Help Software, 10659A Maplewood Road, Cupertino, CA 95014. (408) 257-3815. (Mar '90)

DiskExpress
DiskExpress organizes hard disk drive entries and organizes fragmented files. Best of its kind. Version 1.5. Requires Mac 512K. $89.95. AL-Soft, Inc., P.O. Box 927, Spring, TX 77383-0927. (713) 353-4090. (Jan '89)

Electric Dvorak
Electric Dvorak is the best Dvorak implementation for the Mac. The basic program is an installer that puts the small (3K or so) necessary resources into your System file. Once its done, you can toggle between the standard key mapping and a Dvorak arrangement with a System-1 command button. Either keyboard can be set as the default startup arrangement. The documentation, which is all electronic, is suite but excellent. The chart of the Key-Caps layout is provided as well. Version 1.0. Free. Tom Phoenix, Box 265- ed, Portland, OR 97207-0265. (Aug '90)

Freedom of Press

Hot Keys (MacWrite II version)
Hot Keys (MacWrite II version) is a set of MacroMaker macros for MacWrite II (versions for Works and PageMaker are also available). Includes utility macro software and a keyboard overlay. Works well and contains many useful macros for the Finder as well. Version 1.0. Requires System 6.0.2 or later. MacroMaker (included), and extended keyboard. $44.95 per version. K1.SS, (Keep It Simple Software), 324 Fuller, C-3, Helena, MT 59601. (406) 442-3559. (Jan '90)

Icon-ll
Icon-ll lets you create icons to use as alternatives to menu commands. Use its 100 icon templates, or create your own. Version 2.0. $89. Tactic Software, 13615 S.W. 128th St., Miami, FL 33186. (305) 378-4110. (Feb '88)

Image Grabber
Image Grabber is a DA screen-capture program that's like an improved version of the old Camera DA. Can capture pulldown menus and compressed graphics to 2-bit black-and-white files, which saves huge amounts of memory. It has real-time and mouse-selectable modes and can export MacPaint and PICT formats. Version 2.0. Requires Mac Plus or later. System 6.0.2 or later. $90. Sabian Software, P.O. Box 70278, Bellevue, WA 98007. (206) 861-6052. (May '90)

Mail Rater
Mail Rater is a large HyperCard stack that takes all the guesswork out of postage. It should pay for itself in a very short time. Requires Mac Plus or later, HyperCard 1.2.1 or later, and a postage scale. $495. Silk Screen Software, 27601 Forbes Road, Suite 50, Laguna Niguel, CA 92677. (714) 367-0007. (Feb '90)

MasterJuggler
MasterJuggler is an Icon-DA Juggler with so many features added that they can't be listed here. A world-class utility. Not as elegant as Suitscase II but has more features. Version 1.5. Requires Mac 512K or later. $89.95. AL-Soft, Inc., P.O. Box 927, Spring, TX 77383-0927. (713) 353-4090. (Mar '89)

MathCAD
MathCAD is a solid, if somewhat quirky, math processor that has a built-in graphing program and can also create charts, although its data-handling ability is somewhat limited for this use. Data entry needs to be improved and made more Mac-like. Version 2.0. Requires Mac Plus or later. $495. MathSoft, One Kendall Square, Cambridge, MA 02139. (508) 628-4223. (Apr '90)

MockPackage + Utilities
MockPackage + Utilities is a set of extremely powerful DAs. Includes a text editor, text printer (supports LaserWriter), charter, terminal, several other useful tools, and EZmenus. Version 4.4, $49.95. CE Software, P.O. Box 65580, West Des Moines, IA 50265. (515) 224-1806. (Aug '87)

Partner
Partner is an INIT that lets you use graphics-editing applications while using a DTP program. Includes Text, Word, PageMaker, QuarkXPress, MacDraw, MacDraw II, Illustrator, FreeHand, FreePaint, SuperPaint, and Canvas. Version 1.0. Requires Mac Plus or later. $99. Salient, 3101 Avalon Court, Palo Alto, CA 94303. (415) 852-9567. (May '90)

Pyr0
Pyr0 is the premier Mac screen saver. All the required settings are found in the Control Panel. Current version features modules such as Aquarium and Flashlight. Version 4.0. Requires Mac 512K or later, System 6.0.2 or later. $39.95. Fifth Generation Systems, 10049N, Reiger, Baton Rouge, LA 70802. (800) 873-4384. (Sept '89)

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any command (menu choices, DAs, etc.) or series of text blocks and/or commands to any key or key combination. Enormously powerful; necessary for Apple Extended Keyboard owners. Version 1.2. Requires Mac 512K or later. $99.95. CE Software, P.O. Box 65580, West Des Moines, IA 50265. (515) 224-1995. (Jan '88) *'87 Eddy

SAM (Symantec AntiVirus for Macintosh) ****** SAM (Symantec AntiVirus for Macintosh) version 2.0 is a clear step forward in virus protection. The most significant new feature is an easy upgrade procedure that lets users upgrade SAM to fight new viruses by calling Symantec's 24-hour Virus Newsline. The INIT portion, SAM Intercept, has been improved slightly, although its interface has suffered a bit in the process. Virus Clinic (the batch-checking application) now sports a better interface and some new power. Version 2.0. $99.95. Symantec, 10201 Torre Road, Cupertino, CA 95014. (408) 253-9600. (Aug '90)

Screen Gems ****** Screen Gems is a package of five color utilities for Mac II owners. Color Desk puts art onto your desktop. Dimmer dims the screen when the Mac is inactive, and Switch-a-Roo lets users switch between any two color modes instantly. Globe is a neat demo, and TN-3 lets you customize the Finder's Color menu. Version 1.0. Requires Mac II with 2 megabytes, a color monitor, and System 4.2 or later. $79. Microseeds, 7030-B W. Hillsborough Ave., Tampa, FL 33614. (813) 882-8635. (Sept '89)

Stepping Out II ****** Stepping Out II is a software alternative to a large-screen monitor. Lets you create a virtual screen (as large as memory allows) inside the Mac's 9-inch screen. Automatically scrolls to new document position as you type or draw. Version 2.0. Requires Mac Plus or later. $95. Berkeley Systems, 1700 Shattuck Ave., Berkeley, CA 94709. (415) 540-5535. (Oct '89)

Suitcase II ****** Suitcase II is even better than its predecessor. Increased file-management capabilities let you open 99 font, DA, sound, or Fkey files at a time. Display any installed font in any style. Fonts can also appear in their proper typefaces on the font menus. Includes Font Harmony for resolving font-ID conflicts, and Font & Sound Valet for font and sound compression. Version 1.2.6. Requires Mac 512KE or later. $79. Fifth Generation Systems, 10049 N. Reiger, Baton Rouge, LA 70809. (800) 873-4384. (June '89) *'87 Eddy

SUM II ****** SUM II is an upgraded and expanded version of the essential SUM data-recovery utility. Includes utilities for partitioning, encrypting, backing up (based on Redux), and optimizing. None of these modules is preferable to the dedicated packages available, but they all work. The recovery module is still excellent and has a much improved interface. Version 2.0. Requires Mac Plus or later and System 4.2 or later. $149.95. Symantec, 10201 Torre Ave., Cupertino, CA 95014. (408) 253-9600. (Dec '89)

SuperGlue II ****** SuperGlue II is the newest and best print-to-disk program. Offers superior operation along with many nice touches, such as Glue Notes (Post-it-like notes) and One-Timer, an Fkey that makes operation immensely easier. Version 2.0. Requires System 6.0 or later. $119.95. Solutions, Inc., 30 Commerce St., Williston, VT 05495. (802) 658-5506. (Nov '89)

Tablecloth ****** Tablecloth is a small package that makes using MultiFinder less confusing and far more pleasant. Hides all but the active window when you triple-click in the window. Version 1.0. Requires System 6.0.1 or later and MultiFinder 6.0.1. $49.95. User-Tek, 444 E. 66th St., Suite C, Tulsa, OK 74136. (800) 888-7640. (Oct '89)

Tempo II ****** Tempo II is a powerful keyboard macro program that gives owners of extended keyboards their money's worth. Especially good for building sequential macros. Features include conditional branching and the ability to remember menu selections by name. Version 1.02. $149.95. Affinity Microsystems Ltd., 1050 Walnut St., Suite 425, Boulder, CO 80302. (303) 442-8480. (Dec '88)

Tidy It Up! ****** Tidy It Up! goes into your cluttered System Folder and straightens things up visually. Where necessary, it creates dummy marker folders. Until System 7 eliminates the System Folder chaos, this is the way to keep track of everything in your System Folder. Version 1.0. Requires any Mac.
Wrap or breaks Macintosh-created text files to a user-specified length and also adds line breaks (using some intelligence) to received text files.

**Virtual 2.0**

Virtual can give you as many as 14 megabytes of effective RAM. Once you start using this program, you're hooked. Its excellent performance and superb support make using it a pleasure. Version 2.0.2 requires Mac IIx or later, SE/30, or Mac II with optional 68850 PMMU. $199; with PMMU chip, $275. Connectix, 125 Constitution Drive, Menlo Park, CA 94025. (415) 324-0727. (Apr ’90) • ’89 Eddy Word Wrapper

Word Wrapper is the sort of simple utility you find useful several times a day (if you telecommunicate much). Wrap or

breaks Macintosh-created text files to a user-specified length and also adds line breaks (using some intelligence) to received text files. Requires Mac 512K or later. $39.95. International Technology Development Corp., 1633 Lombard St., San Francisco, CA 94123. (415) 929-0924. (Nov ’89)

**WorksPlus Command**

WorksPlus Command lets you build and define macros for all Works modules. Predefined macros provide for an even tighter integration of the program’s word-processing, spreadsheet, and database modules. Version 2.0 requires Mac Plus or later and Works. $149.95. Lundeen & Associates, P.O. Box 30038, Oakland, CA 94604. (800) 233-6851. (May ’88)

**AutoBack**

AutoBack creates copies of non-backed-up data files or another hard disk (or on selected tape drives) whenever you save a file or activate AutoBack. Applications and System files are not backed up. You can set AutoBack to back up only selected files. Your options as to what to back up and what not to are a bit too limited, though. Performance is very good. Version 1.31, $99. Soft Trends, 2243 Pacific Ave., Suite B101, Costa Mesa, CA 92627, (714) 650-2158. (Aug ’90)

**CatBack**

CatBack combines disk cataloging and backup. The cataloger is as good as they come, but the backup portion needs some improvement. Backup up from one partition to another on the same drive crashed the program. Other backup performance was OK. Incremental (which CatBack calls archival) and mirror-image backups can be made. The interface and overall operational procedure need some polishing. Version 1.1, $39.95. Master Manufacturing, 118 N. Cypress St., La Habra, CA 90631. (213) 694-6861. (Aug ’90)

**Complete Undelete**

Complete Undelete is a superb file-recovery program. Excellent interface, very fast, and capable of recovering even some partially overwritten files. It pays for itself very quickly. Get it. Version 1.0 requires Mac 512KE or later and System 5.0 or later, $49.95. 1stAid Software, 42 Radnor Road, Boston, MA 02135. (617) 782-4676. (Jan ’90)

**Fastback II**

Fastback II supports incremental and differential backups and offers a choice of compression levels. Backup configurations can be saved as preference files. Macro language supports automated procedures. Nonstandard dialog boxes are occasionally unclear. Version 2.0.1 requires Mac 512KE or later and System 4.2 or later, $189. Fifth Generation Systems, 10049 N. Reiger Road, Baton Rouge, LA 70809. (504) 291-7221. (Oct ’89)

**Fastback**

Fastback II supports incremental and differential backups and offers a choice of compression levels. Backup configurations can be saved as preference files. Macro language supports automated procedures. Nonstandard dialog boxes are occasionally unclear. Version 2.0.1 requires Mac 512KE or later and System 4.2 or later, $189. Fifth Generation Systems, 10049 N. Reiger Road, Baton Rouge, LA 70809. (504) 291-7221. (Oct ’89)

**HFS Backup**

HFS Backup is a top-class backup program. Quick and very reliable. Version 3.0, $999. Personal Computer Peripherals, 4710 Eisenhower Blvd., Building A4, Tampa, FL 33634. (813) 884-3092. (Oct ’89)

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Microsoft Office .............................. 526.
Preferred Publisher DBase5......................... 68.
Satori Bulk Mailer v3.3........................ 75.
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RETROSPECT

Retrospect is a full-featured backup-and-archival package that supports storage devices from floppy disks to DAT drives. Version 4.2. Extends the excellent performance for SCSI devices, most notably tape drives. Version 1.1. Requires Mac Plus and Mac 512K or later. Danzr Development, 1510 Walnut St., Berkeley, CA 94709. (415) 849-0293. (Dec '89) * 89 Eddy

SHADOW

Shadow is a DA that automatically backs up selected files at specified time intervals and after specified actions. Doesn't work with directories (fixed 2.2 in particular). Version 1.23. Requires Mac 512K or later. $39.45. Natural Intelligence, 86 Richdale Ave., Cambridge, MA 02140. (800) 999-4649 or (617) 266-7858. (May '90)

FILE/DISK MANAGEMENT

Boomerang

Boomerang is a handy INIT that adds full navigational and search features to all Open and Save dialog boxes. It automatically remembers all the files and folders recently accessed and can be configured to always display the last used ones. It can save you a lot of time, and it's shareware! Version 2.0. Requires Mac Plus or later. $59.95. ZettaSoft, 2425B Channing Way, Suite 492, Berkeley, CA 94704. Also available for download on Zmac and other on-line services. (Feb '90)

CanOpener

CanOpener searches files at a decent clip for specified strings. Can read and display text, MacPaint, PICT, EPSF, TIFF, RIFF, and MacDraw II formats. The interface looks odd but is masterful. Version 1.1. Requires Mac Plus or later. $125. Abbott Systems, 62 Mountain Road, Plainville, NY 10570. (800) 552-9127 or (914) 347-3116. (Feb '89) * 89 Eddy

Disk Doubling

Disk Doubling is an INIT that adds a find and replace feature to the operating system. Version 1.0. Requires Mac Plus or later. $25. CRA Z Software, P.O. Box 6379, Haverhill, MA 01835. (917-252-5266. (Aug '90)

Findwell

Findwell is an indispensable utility that installs a new button into the Open dialog box of every Mac application. Press the button, type a search string, and click on Find, and Findwell searches for any files that match. Click on Open, or double-click to open the correct file. Version 2.0. Requires Mac 512K or later. $99.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95061. (408) 423-5696. (Now '87)

Handoff

Handoff solves the annoying problem of not having the exact application to open a document. It lets you specify, for example, that Word should open all documents created by MacWrite. Slick. Version 1.1. Requires Mac Plus or later. $49.95. Software Innovations, P.O. Box 811, Allen, TX 75020. (214) 727-2329. (Feb '90)

INITPicker

INITPicker offers a scrollable list of INITs in the System to let you determine their loading order. Holding down a predefined key combination at startup automatically loads all INITs and bypasses the INITPicker screen. Version 1.01. Requires Mac Plus or later. $49. Microseeds, 7030 B.W. Hillsborough Ave., Tampa, FL 33634. (813) 882-8625. (Aug '89)

Inch

Inch is a combination INIT and DA that lets you choose separate startup sets. It does not let you decide to turn off a set temporarily (until the next startup), and it lacks the "run all" or "skip all" commands found in Aask and INITPicker. Version 1.1. Requires Mac 512K or later. $49.95. Natural Intelligence, 86 Richdale Ave., Cambridge, MA 02140. (617) 266-7858. (Aug '89)

MacTree Plus


MultiDisk

MultiDisk is an excellent software disk partitioner that allows partitions to be resized dynamically, password-protected, and even encrypted. Version 1.2. Requires Mac 512K or later. $69.95. AlSoft, Inc., P.O. Box 927, Spring, TX 77383-0927. (713) 353-4090. (May '89)

On Cue

On Cue lets you switch applications without returning to the Finder. Under MultiFinder, active applications are listed on a pop-up menu. Can also launch directly to a specific document. Version 1.3. Requires Mac 512K or later. $59.95. ICOM Simulations, 648 S. Wheeling Road, Wheeling, IL 60090. (708) 520-4440. (Sept '88)

On Location

On Location finds files and text strings. That's it. Once it's found a file, you can view the contents (for most common document formats); open it in its native application; or copy, delete, rename, or move it. This does not do disk partitioning. Version 1.0. Requires Mac Plus and a hard disk drive. $129.95. ON Technology, One Cambridge Center, Cambridge, MA 02142. (617) 225-2245. (Aug '90)

POWERIcons

POWERIcons creates duplicate icons for disk partition changes to hard-disk-drive organization easier and more efficient. POWERIcons can also be created to open sets of frequently used icons by double-clicking. Version 1.03. Requires System 4.2 or later. $79.95. Magic Software, 1602 Casio Drive, Bellevue, NE 68005. (800) 324-6243 or (402) 291-0670. (Feb '90)

POWERmenus

POWERmenus is two products in one. The first allows full access to menus from anywhere on-screen. The second, called Gadgets, includes a phone directory, notepad; and useful application, DA, and Control Panel item launchers. Version 1.03. Requires System 5.0 or later. $79.95. Magic Software, 1602 Casio Drive, Bellevue, NE 68005. (402) 291-0670. (Jan '90)

PowerStation

PowerStation is an extremely easy to use, versatile, and powerful Finder substitute. Loaded with powerful features. Version 2.5.2. $59.95. Fifth Generation Systems, 10049 N. Reiger, Baton Rouge, LA 70809. (800) 873-4364. (Dec '89)

Sector Collector

Sector Collector is a small utility that scans your disks, looking for bad or marginal media. It collects any file in a sector that is damaged and leaves it in a file they aren't used for other storage. It can eventually prevent you from losing files or data. Version 1.0. Requires Mac 512K or later and System 4.2 or later. $49.95. 1st Aid Software, 42 Roadside Road, Boston, MA 02135. (617) 783-7118. (Feb '90)

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hard-disk-utility set. It has the best disk-partitioning software available and can format most hard-disk drives. It also has powerful and safe optimizing and testing features. Excellent performance. Also includes DS Backup, acceptable backup software, and a nice disk duplicator. Version 5.22. Requires Mac Plus and SCSI device. $99.95. La Cie, 16285 S.W. 85th, Suite 306, Tigard, OR 97224. (503) 684-0143. (Jan '90)

Stuffit $99.95. La Cie, 16285 S.W. 85th, Suite 306, Tigard, OR 97224. (503) 684-0143. (Jan '90)


XTreeMac $39.95. SoftWorks, Box 1865, Point Roberts, WA 98281-1865. (604) 709-9525. (Jan '90)

XTreeMac is a file-management utility that uses a file-card metaphor. Can recover deleted files, and supports filters for grouping specified types of files. Not for network use. Buggy. Version 3.0. Requires Mac 512KE or later and System 4.2 or later. $99. XTree Co., 4330 Santa Fe Road, San Luis Obispo, CA 93401. (805) 541-0604. (Sept '89)

PRINTING

Grappler Spooler $54.95. GrapplerSpooler is an adequate spooler but no speed demon. Installation is simple, and there are few problems, but sometimes using it is slower than not using a spooler. It lacks laser-printer support. Version 1.0. Requires Mac Plus or later and QuickDraw printer. $79. Orange Micro, 1400 N. Lakeview Ave., Anaheim, CA 92807. (714) 779-2772. (Apr '90)

JetLink Express $54.95. JetLink Express is a printer driver that lets you print to non-PostScript HP printers. Provides screen fonts for every imaginable HP font cartridge and special Compugraphic screen fonts. Good manual. Check application compatibility before buying. Version 1.2. Requires Mac Plus; System 6.0; hard-disk drive; 512K printer memory (1 megabyte recommended); and LaserJet IID, LaserJet II series, LaserJet Plus, DeskJet Plus, DeskJet, or HP-compatible printer. $149; additional fonts, $198. GDT Softworks, P.O. Box 1865, Point Roberts, WA 98281-1865. (604) 291-9121. (Jan '90)

LaserServe $54.95. LaserServe is a printer spooler for AppleTalk networks. After installation, all operations are done with a DA. Works with MacServe and TOPS. Version 2.1. Requires Mac 512K or later. $95 per node; 5-pack, $295. Infosphere, 4730 S.W. Macadam Ave., Portland, OR 97201. (503) 226-1407. (Feb '87)

MacPrint $95. MacPrint is a printer driver that lets you print to non-PostScript HP printers. Provides screen fonts for every imaginable HP font cartridge and special Compugraphic screen fonts. Good manual. Check application compatibility before buying. Version 1.2. Requires Mac Plus; System 6.0; hard-disk drive; 512K printer memory (1 megabyte recommended); and LaserJet IID, LaserJet II series, LaserJet Plus, DeskJet Plus, DeskJet, or HP-compatible printer. $149; additional fonts, $198. GDT Softworks, P.O. Box 1865, Point Roberts, WA 98281-1865. (604) 291-9121. (Jan '90)

PrintBar $54.95. PrintBar calculates and prints bar codes at varying resolutions. It supports UPC, EAN, 2 of 5, and Code 39. You get the application and the necessary fonts, including printer and screen fonts where required. Operation is a bit clunky, but performance is fine. Output is easily transferable. Version 2.0. Four volumes (for different codes), $225 each; discounts for buying multiple volumes. Bear Rock Software, 6095 Enterprise Drive, Diamond Springs, CA 95619. (916) 622-4640. (June '90)

Printworks for the Mac $295. Printworks for the Mac is a complete software-based dot-matrix-printer control system. Optimizes printing from different applications and is easy to use. Requires Mac 512K or later. Dot-matrix-printer

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56 MiniFinders August 1990 MacUser
SuperLaserSpool supports the widest range of printers (it's the only spooler to support the DeskWriter) and has generally excellent performance. The program's installation is a snap, and use is mostly transparent. SuperMac's support is excellent. Version 2.02. Requires Mac Plus or later. $149.95. SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94086. (408) 245-2202. (Apr '90)


TScript like Freedom of Press, makes non-PostScript printers PostScript-compatible. It also lets you preview EPSF files and PostScript code. If you apply some effects to any font other than Times, Helvetica, or Courier, the eventual printed output can suffer from the jaggies. Speed is good. Limited capabilities make it preferable to Freedom of Press only for these on a tight budget. Version 1.2. $145. TeleTypet­ting, 474 Commonwealth Ave., Boston, MA 02215; (617) 734-9700. (Aug '90)

- SECURITY

Advanced Security is a data-file-security program that lets you place multiple files into a "safe," where you can further protect them through two types of encryption (including DES). Flexible and very easy to use. Allows for installation on hard­disk drive. Version 2.0. $149.95. Kent Marsh Ltd., 1200 Post Oak Blvd., Suite 210, Houston, TX 77056. (800) 325-3587, CP (Mar '87)

Fl. Knox offers a nice mix of security utilities. Supports two forms of encryption, and files or volumes can be "sanitized" to U.S. top-secret standards. Version 1.05. Requires Mac 512K or later. $195. Transfinite Systems Co., P.O. Box N, MIT Branch Post Office, Cam­bridge, MA 02139-0903. (617) 969-9570. (Nov '89)

MacSafe is a data-file-security program that lets you place multiple files into a "safe," where you can further protect them through two types of encryption (including DES). Flexible and very easy to use. Allows for installation on hard­disk drive. Version 2.0. $149.95. Kent Marsh Ltd., 1200 Post Oak Blvd., Suite 210, Houston, TX 77056. (800) 325-3587, CP (Sept '88)

NighWatch locks up your hard­disk drive by using a floppy startup disk that acts as a key. Type in the correct password, and access to the hard­disk drive is allowed. Version 1.03. Requires Mac 512KE, a hard­disk drive, and an 800K drive. Mac II and MultiFinder friendly. $149.95. Kent Marsh Ltd., 1200 Post Oak Blvd., Suite 210, Houston, TX 77056. (800) 325-3587, CP (Sept '88)

SecureInit is a well thought­out program that can lock files and folders, make the System Folder invisible, erase files not on its user­specified approved list, lock disks after use, refresh (replace) specified files with clean copies after use, and password­protect everything. It can also purge files as a disk fills up, but this is too dangerous a feature to use in most cases. SecureInit is particularly good at resisting efforts to bypass it. Version 2.2. $99.95. Direct Software, 1032 Irving St., Suite 513, San Francisco, CA 94122. (415) 347-1590. (Aug '90)

Sentinel is a data-file security program that lets you place multiple files into a "safe," where you can further protect them through two types of encryption (including DES). Flexible and very easy to use. Allows for installation on hard­disk drive. Version 2.0. $149.95. Kent Marsh Ltd., 1200 Post Oak Blvd., Suite 210, Houston, TX 77056. (800) 325-3587, CP (Sept '88)

DiskLock has two parts: an INIT and an application called FolderLock. It has standard locking features and is controlled by a DA. DES is not supported. This is basic security, neither great nor awful. Version 1.0.1. Requires Mac Plus or later. $189. Fifth Generation Computer Systems, 10049 N. Reiger, Baton Rouge, LA 70806. (800) 873-4384. (May '90)

FileGuard is a cdev that operates primarily in the background. It offers varying levels of access and very intelligent controls. It is unique in that it can protect applications as well as data. Overall, it is an excellent security tool. Version 2.0.2. Requires Mac Plus or later. $249. ASD Software, 4650 Arrow Highway, G-21, Montclair, CA 91763. (714) 271-9913. (May '90)

Advanced Security consists of three applications: File Security, which can automatically protect your work; HD Security, which locks hard disks so they can be opened only by a special floppy; and Virus Security, which simply checks itself for changes when it's run. Virus Security lacks real value these days. HD Security is fine as long as nothing happens to the floppy disk. Version 1.2. Requires Mac Plus or later. Single-user version, $149.95; multiuser versions available. Advanced Gravis Computer Technology, 1602 Carolina St., Suite D12, Bellington, WA 98226, (800) 937-0062 or (604) 434-7274. (May '90)
sets of files), using a super-secure DES or a superfast SuperCrypt algorithm. Provides high-level security if you can keep your password secret. Version 2.0. Requires Mac 512KE or later. $149. Super-Soft, 3000 Walnut Ave., Sunnyvale, CA 94086. (408) 245-2202. (Apr '88)

ColorBoard 264
ColorBoard 264 is a relatively low-cost board that has 32-bit capability and good performance. One of the cheapest ways to get 16.7 million colors on your Mac. Requires Mac II series or SE/20 and System 6.0.3 or later. NuBus version, $395; SE/30 version, $1,295. Knowledge Systems, 2000 Walsh Ave., Santa Clara, CA 95051. (408) 562-4200. (Feb '90)

Letter Writer Plus 1111
Letter Writer Plus used to be called ExpressWrite. It's been spiffed up, and new mail-merge and graphics features have been added. It can use Address Book Plus files as well as comma, semicolon, and tab-delimited files. The interface of this large DA has a rough edge or two, but it is the best letter and mail-merge program available. Version 1.0. Requires Mac Plus or later. $89.95. PowerUp Software, 2920 Campus Drive, Sunnyvale, CA 94089. (415) 345-5006. (May '90)

LetterWorks 1111
LetterWorks is a large book of sample letters in text format on disk. There's a letter for everything in here. In some cases, the letters need a lot of modification. Requires a word processor. $79.95. Round Table Publishing, 415 Main St., Ridgefield, CT 06877. (203) 438-5255. (Mar '90)

Mac Envelopes Plus 1111
Mac Envelopes Plus is a Repeat Mailer of the best envelope and mailing-list program available. It's intended for small-business and group users who do substantial mailing. It can print barcode and FIMs automatically, sort and report by zip code or carrier routes, and do everything else so well that your mailings can qualify for the lowest bulk and regular-mail rates. Operation is fast and very, very slick. Inclues a nice DA so envelopes can be printed on the fly from within other applications. Version 2.0. $350. Synex, 692 Smith St., Brooklyn, NY 11215-4502. (718) 459-6293. (Aug '90)

Mac Proof 1111
MacProof has been around for a long time and is still going strong: The latest incarnation is the best so far. It's still a DA. Its rule set isn't as good as that of some of its competition, but the friendly Custom Grammar option is still a good choice for many users. Excellent interactive interface and analysis tools. Price is extremely high. Version 3.2.1. Requires Mac Plus, 2 megabytes, and hard disk drive. $195. French and German editions, $229 each. Lexical Software, 175 E. 400 South, Suite 1000, Salt Lake City, UT 84111. (800) 346-5566. (Aug '90)

MarkUp 1111
MarkUp is a multiuser editing tool that just doesn't click. The idea is great, but performance isn't up to snuff. It does offer excellent security and organizational functions, however. Version 1.01. Requires Mac Plus or later. Single user, $245; sites of five or more, $495; five to 19 sites, $995. Mainstay, 5311B Derry Ave., Agoura Hills, CA 91301. (818) 991-6540. (Mar '90)

MergeWrite 1111
MergeWrite is a mail-merge program for MacWrite (also works with ASCII files). Program combines mail-merge and addressing from a data file into predefined fields in a form letter. Allows simple conditional IF/THEN/ELSE statements. $49.95. Software Dynamics, 137 Knaws Drive, South Windsor, CT 06074. (203) 872-1024. (Dec '87)

Mishu 1111
Mishu is a DA that turns MacWrite and Microsoft Word into a Chinese word processor. It also works with CloseWrite, HyperCard, or any program that reads PICT files. Version 2.1. Requires Mac 512K or later. MacWrite 3.5 or later, and Word 3.0 or later. $89. Xenanatech, 20 Fresh Pond Place, Cambridge, MA 02138. (617) 492-7463. (May '89)

OCP
OCP OmniPage is a very good OCR program that can create editable text files from scanned images. It works only with certain scanners and requires a lot of memory, so be sure you can meet its requirements before you buy. Version 2.1. Requires Mac II and 4 megabytes. $795. Corel, 100 Cooper Court, Los Gatos, CA 95030, (800) 535-7226. (Mar '89) • 89 Eddy

Read-It! 1111
Read-It! is an OCR package that includes printers for most scanners, batch processing, background operation under MultiFinder, and 22 font tables. Recognizes multiple columns, italics, and some foreign characters but not underlined text. Version 2.1. Requires Mac Plus or later. $495. Adobe, 7520 Redwood Road, Suite A, South Miami, FL 33143. (800) 822-0772. (June '89)

RightWriter 1111
RightWriter would be an excellent grammar checker if its interface were better. A port of a popular DOS product, it makes a marked-up, or commented, copy of your document that you can then edit as appropriate in your word processor. It's an application, with no interactive mode. It's often difficult to tell to which passage RightWriter's comments refer, and you have to refer to the manual to decode some of its comments. Good rule set and analysis tools. Version 3.10. Requires Mac Plus and a hard disk drive. $95. RightSoft, 4545 Samuel St., Sarasota, FL 34232. (800) 992-0244, (813) 923-0233. (Aug '90)

TextPerl 1111
TextPerl is a trainable OCR package. Requires less hardware than OmniPage does but is slower. Acceptable accuracy requires teaching more than 30 languages in roman fonts only. Directly supports popular scanners. Version 1.0. Requires Mac Plus and high-resolution (at least 200-dpi) scanner. $995. CTA, 747 Third Ave., Third Floor, New York, NY 10017. (212) 935-2288. (Feb '89)

Spelling and Grammar Checkers
Correct Grammar
Correct Grammar is currently the best Mac grammar checker. This program is so good, it can handle a wide variety of input. The interface is good, although some of the type is too small. Customization is easy and necessary, which is a true of all grammar checkers. It aggressively flags what it thinks are instances of passive voice. Version 1.0. Requires Mac Plus or later. $79. Lifetext, 33 Montgomery St. Suite 1260, San Francisco, CA 94105. (415) 788-2185. (Feb '90)

Grammar Mac
Grammar Mac is a port from the DOS world and it shows — the interface is simply ugly and awkward. The grammar-checking abilities, which are overshadowed by the interface, are quite good. Customization is reasonably easy. Version 1.0. Requires Mac Plus or later. $99. Reference Software International, 330 Townsend St., Suite 110, San Francisco, CA 94107. (415) 541-0222. (June '90)

Language Master
Language Master is an electronic thesaurus for a DA. The dictionary contains definitions, hyphenation points, and part-of-speech information for more than 85,000 entries. The thesaurus has 40,000 unique entry points with synonym information for different parts of speech. Version 1.0. Requires Mac Plus or later and System 4.2 or later. $99. Franklin Software, 3511 N.E. 22nd Ave., Fort Lauderdale, FL 33308. (305) 566-5511. (Jan '90)

LookUp
LookUp is an on-call single-word and batch spell-checker. Designed for the way writers really work. New version can check whole documents. Controlled from a DA. Uses Grammatik, Acorn, and word-processing dictionary. Version 2.0. $39.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95060. (408) 423-5696. (Feb '90)
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Sensible Grammar corrects some of the most common writing errors. It also analyzes the word count and sentence structure to establish a readability index. Version 1.5.9. Requires Mac 512K or later. $99.95. Sensible Software, 335 E. Big Beaver, Suite 207, Troy, MI 48083. (313) 521-4050. (Dec '88)

Selling Coach Professional Selling Coach Professional is the fastest and most-powerful spelling checker. That doesn't automatically translate into the best, but it is very good. New features include a redesigned and much-improved Control Panel, clearer dialog boxes, greater flexibility in keyboard-command-equivalent assignment, and a more user-friendly interface. The biggest and most-powerful spelling checker. 335 E. Big Beaver, Troy, MI 48068. (810) 676-7067. CP $95. (May '89)

SpellWell SpellWell is a stand-alone batch spelling checker. Checks for spelling, capitalization, and other errors. Good dictionary, thorough checking, and simple interface, but it's weak guessing. Excellent performance. Version 2.1. Sensible Software, P.O. Box 1844, Santa Cruz, CA 95061-1844. (408) 423-5069. (Sept '88) *86 Eddy Thunder II

Thunder II is a major upgrade of Thunder I, the popular spelling checker. Now activate/INTEGRATE, THREATS, and CHECKSELF are included. Users select the dictionaries and applications with which it should run. Checks for spelling, meanings, capitalization, and other errors. Includes a spell-checking dictionary, but it's weak guessing. Excellent performance. Version 2.1. Requires Mac Plus or later. $195. Sensible Software, P.O. Box 30038, Oakland, CA 94604. (800) 233-6851. (Oct '87) °87 Eddy

Word Processors

FeMi Macintosh FeMi allows users to create their own word processors. This Chinese word processor follows the Mac interface more closely than Kahlin Brushtype. It lets you create your own characters for those that aren't included in the dictionary. Version 4.1. Requires Mac 512K or later. $395. Wu Corp., P.O. Box 699, Avon, CT 06001. (203) 677-1528. CP (May '89)

FullWrite Professional FullWrite Professional combines outlining and word processing with page-layout and drawing capabilities. It's a very powerful word processor, extremely easy to use. Version 2.0. $74.95. Working Software, Redmond, WA 98052. (800) 426-9400 or (206) 426-2030. (July '89) °89 Eddy

Microsoft Write Microsoft Write is a low-level word processor. It has more features than some word processors in its class, but not all of them work well. Poor value and an expensive upgrade path to Word. Version 1.0. Requires Mac 512K or later. $125. Microsoft Corp., One Microsoft Way, Redmond, WA 98052. (800) 426-9400 or (206) 454-2030. (May '88)


Nisu Macintosh Nisu is a fast, RAM-based, powerful word processor. Excellent search capability unless you have a lot of extra RAM. Still, it's impressive. Version 1.1. Requires Mac Plus or later. $395. Ash­ton-Tate, 20101 Hamlin Ave, Torrance, CA 90006. 9792. (213) 329-0086. (Sept '88)

Kahlin Brushtype Kahlin Brushtype is a Chinese word processor that doesn't support the Mac interface. It has 8,000 characters. It's the most powerful Macime program on the market. Won't work with System 6. Requires Mac Plus or later. $395. Ashton-Tate, 20101 Hamlin Ave, Torrance, CA 90006. 9792. (213) 329-0086. (Sept '88)

WordMaker WordMaker first appeared as an Amiga word processor called ProWrite. Low-mid level program with an interface similar to that of the original MacWrite. Supports up to ten open documents, imported color graphics, and a full-featured mail-merge function. Version 2.0. Mac Plus, System 5.0 or later, and two 800K drives or hard-disk drive and one 800K drive. $395. Paragon Concepts, 990 Highland Drive, Suite 312, Solana Beach, CA 92075. (619) 481-1477. (Feb '90)

Pro-Cite Pro-Cite is a complete database-management system for bibliographies. Almost unlimited flexibility in bibliographic formatting. Full-featured search and sort capabilities. Version 1.3.4 Requires Mac 512K or later. $395. Personal Bibliographic Software, 525 S. 30th St, Phoenix, AZ 85008. (602) 277-1300. (Feb '89)

QUED/MD QuED/MD is an excellent text editor that saves documents in a format that's readable by most modern computers and printers. Doesn't support graphics or multiple fonts. Programming language allows database creation. Version 2.07. $119. Paragon Concepts, 990 Highland Drive, Suite 312, Solana Beach, CA 92075. (619) 481-1477. (Mar '88)

QuickLetter QuickLetter is a well-designed and thoughtfully implemented DA for formatting letters and envelopes. It can send or print your DA to a Macime printer or to a printer available as a driver. Version 1.02. Requires Mac 512K or later. $124.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95061. (408) 423-5696. (Apr '89)

Résumé Expert Résumé Expert is a set of routines designed to help you prepare Résumés. It is very good, but it is very good. Version for P.C. $49. A Lasting Impression, 49 Thomberry Road, Winchester, MA 01890. (617) 721-2037. (Oct '89)

Vantage Vantage is a text-editor DA and the commercial version of McSink. It can change case; count the number of lines, words, sentences, or paragraphs in a document; and search for words in a document. $74.95. Microlytics, Two Tobey Village Office Park, Pittsford, NY 14534. (716) 248-9620. (Mar '90)

WorksPlus Spell Plus WorksPlus Spell Plus is a speedy spelling and hyphenation checker for Microsoft Works. It includes a glossary for abbreviations and time-saving stamping. The biggest drawback is its limitation to one program. Version 2.0. $74.95. Donn & Associates, P.O. Box 30038, Oakland, CA 94604. (800) 233-6851. (Oct '87) °87 Eddy
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<td>20+MB</td>
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The Elements of Auto-Tracing

Get a head start on great line art — all you need is an auto-tracing program, the right techniques, and a little patience.

When artists are faced with a job that requires drawing a real-world object or fleshing out a pencil sketch, they often give themselves a head start by tracing over the original image and then refining it. This approach saves time, effort, guesswork, and frustration. Traditional artists make their traces with translucent paper, but today’s graphics programs, coupled with one of many affordable scanners, enable desktop-publishing artists to use a scanned image as a template for electronic tracing.

You can painstakingly hand-trace the contours of a scanned image with a mouse or stylus, but an auto-tracing program can go over the image automatically in a matter of seconds. Basically, auto-tracing produces an object-oriented image from a bit-mapped one. You identify the bit-mapped area you want to trace, and the program follows whatever edges it perceives, resulting in an object-oriented outline of the shapes it found. Auto-tracing is most useful for creating high-quality outlines from scanned line art, high-contrast photographs, and bit-mapped clip art (see Figure 1).

Object-oriented outlines have the

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**Figure 1: Pretrace Preparations**

Figure 1: Auto-tracing produces an object-oriented image from a bit-mapped one and is most useful for creating high-quality outlines from scanned line art, high-contrast photographs, and bit-mapped clip art. This 72-dpi painting was created by hand, scanned, and specially prepared for auto-tracing by cleanly separating white and dark areas. Patterned fills were replaced by solid black, while some fills were removed completely.

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**Figure 2: Tight Traces**

Figure 2: Several programs let you control the accuracy of the trace and the smoothness of the finished tracing. UltraPaint displays an example of the effect, and it works interactively as you adjust the controls. In this case, a tight curve fit was chosen.

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By Salvatore Parascandolo

206 August 1990 MacUser
advantage that you can resize and manipulate them without experiencing jaggedness, pixel crumbling, or irretrievable loss of detail. A finished tracing can be edited with a program’s native drawing tools, or it can be exported to other applications, where it can be reshaped, smoothed, filled, or combined with other graphics.

Auto-tracing can capture small contour details, or it can attempt to smooth out the irregularities inherent in a bit map. It can certainly give you a head start on a difficult rendering job. The quality and usability of your auto-tracings depend on the basic nature of the original image, the quality of the scanner, the resolution of the resulting bit map, the smarts of the auto-tracing program, and the options you’ve selected.

Matching the Tracer to the Job

Auto-tracing is now a common feature of graphics programs, from the simplest paint-only DAs to sophisticated PostScript powerhouses. Chances are you already have a program that provides it. Canvas, DeskPaint, Digital Darkroom, FreeHand, Illustrator, Streamline, SuperCard, SuperPaint, and UltraPaint all have this capability, and more programs with auto-tracing are emerging. Of these, only Adobe’s Streamline is dedicated solely to auto-tracing; the other programs offer it as a feature.

Each program has its own tracing interface — some have customizable settings — but they all do a respectable job, even on intricate contours. The differences among auto-tracers become more evident as the traceable details get smaller or when low contrast or jumbled pixels make it difficult to determine where the edges are. Some auto-tracers let you set curve-fitting preferences — how tightly to hug the contours of the bit map, how small a speck to ignore, whether to run a trace only on the outermost contours of the bit map, and whether to bias line segments toward being curved or straight. Making a few tweaks to such preferences can work miracles (see Figures 2 and 3).

Indeed, your trek to the terrific trace demands mastery over the options offered by your particular application. You may find that a particular auto-tracer turns out outlines that are just plain...
cheesy and that take you forever to clean up. Or you may conclude, in retrospect, that some tracings could have been done better or faster by hand. These are signs that your application or its auto-trace settings are inappropriate for the task or that the scan or original image is beyond help. But it never hurts to give auto-tracing a shot at any image. If you succeed, your time investment will pay off immediately, and the experience you gain in the attempt will improve future tracings. Take the time to find your scanning and tracing tools’ most effective settings — then record these settings where you can easily access them.

Keep in mind what your final use of the trace will be, and consult Table 1 to find the auto-tracing product(s) suitable for your needs. If the trace is headed for a QuickDraw program, your final tracing should be in PICT format. If you need PostScript line art, use a tracing method that produces PostScript outlines. You can also convert PICT outlines to PostScript with a conversion utility such as Adobe’s DrawOver, or you can use FreeHand’s Open command to convert PICT to native format.

Of the programs discussed here, only Streamline has the capability to go directly from a trace to printable line art. Unlike the other programs, it correctly identifies areas as being white or black, appropriately fills traced objects with black or white, and stacks finished objects so that no details are hidden. You can open a Streamline tracing in Illustrator and print it, often without a click of work — and with surprisingly good results (see Figure 4). Also noteworthy is Illustrator itself, which auto-traces one contour at a time as you click on areas of the bit map, giving you control over exactly what gets traced. Despite its piece-meal approach and minimal tracing controls, Illustrator does an excellent job of fitting the curve to the bit map.

Winning the Trace

Auto-tracing may sound easy, but it can be pure frustration if you don’t follow a few simple guidelines. Here are a few pointers to improve your chances for achieving a usable trace:

• Have reasonable expectations — if your original image is scrappy, don’t expect miracles. The idea is to produce a usable, not a perfect, trace. Even if all you get is a general outline of the major components, it can still be useful.

• Use an uncluttered image with good contrast, preferably in black-and-white. Anything with fuzzy edges is going to need work.

• Start with a large original image so the scanner can clearly discern details. Be sure the lines are continuous and are unbroken by scratches, stray marks, and printing flaws.

• Make a high-resolution scan (150 to 300 dpi). This is a must if your original image is small and detailed.

• Choose the high-contrast options on the scanner when scanning line art to force it to ignore insignificant specs. Adjust the brightness and contrast controls of the scanner to get the most detail and least noise.

• Examine the scan under magnification so you can retouch problems such as random specks, dust, and stray marks, and fix broken borders or create new ones.

• The clearer the borders, the better the trace. Slightly separate items that have a common border to ensure that they are traced as separate objects (see Figure 4).

• Isolate the area you want to trace. Anything outside this area will just slow down the process and give you endless stuff that you’ll have to erase later. You can isolate the desired area at the time you scan, when you edit the scanned image, or when you specify what area to trace.

• Remove all details that you don’t want converted into objects. These include background items as well as inner details that could interfere with the correct tracing of more important areas.

• If the scan is a gray-scale image, don’t expect a good trace, especially if there are mixed areas of subtly different grays. Use any available brightness and contrast controls so that the detail you’re after stands out. Most importantly, you should posterize your image, which divides it into easy-to-discern bands of gray that can be traced cleanly (see Figures 5 and 6).

• Adjust the program’s trace settings, if they are customizable, to produce paths with a manageable number of control points, or vertices. When a program follows the edges of a bit map too closely, it creates a control point at just about every pixel step. Too many of these vertices can slow down image handling and create an editing nightmare.

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*Solutions*

Figure 5: Auto-Tracing Photographs

Figure 5: Auto-tracing programs don’t usually have the ability to trace gray-scale images. Before this scanned photo was traced with Digital Darkroom, it was posterized, which reduced the number of gray shades to eight. This process created discrete areas throughout the image that were easy for the auto-tracing program to handle.

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Figure 6: Tracing Magic

Figure 6: The original photograph was scanned, posterized, despeckled, hand-groomed, and auto-traced in Digital Darkroom. It was saved as an Illustrator-format file and then opened in Illustrator for editing. Individual areas were manually assigned gray values, and some paths were tweaked. Much more could be done to the image, including colorization.
### Table 1: Auto-Tracing Features

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*Can convert entire files to Illustrator 1.1 format with Canvas Separator.

*Controlled by freehand tolerance value in Preferences dialog box.

- If your program makes tracings with too many vertices and has no options for you to control the number, you can delete the excess points from the finished tracing with an object-oriented graphics program. If you don't zap the extra points, the printed tracing will look jagged or lumpy.

**Final Traces**

Look through your software collection and find all the programs that auto-trace. Practice your auto-tracing technique with each one, using a typical scan or a bit-mapped drawing created in a painting program, and see just how far you can push the software — or how far the software can push you.

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MacUser August 1990 209
Capturing Font Outlines

Ever wish you could manipulate text the way you do graphics? Here are nine ways to create editable outlines of your favorite fonts.

Modern typographical design involves more than simply selecting the right font for the situation. As geometric shapes, letterforms have become an integral part of the graphic artist’s toolbox, lending themselves to distortion, collage, and various other kinds of manipulation. To use letters in this way in computer graphics programs, you must be able to convert text characters into editable graphic outlines and then manipulate them with an object-oriented program such as FreeHand, Illustrator, or MacDraw (see Figure 1).

The simplest, least expensive solution is to use a drawing program to enter the letters in the largest available point size and then to hand-trace the text (preferably with a polygon tool) at high magnification. This method could give you the quality you’re after, if you’re willing to spend time adjusting lines and tweaking tiny details. If you have the right tools, however, you can capture letters — or even entire alphabets — with a minimum of time and frustration.

The Toolbox

There are endless combinations of programs, hardware, utilities, and techniques that let you obtain editable font outlines. This article highlights nine possible scenarios, each of which uses a particular kind of software and/or hardware. Most capture only one letter at a time, but a couple let you share the whole character set in one fell swoop (see Figure 2). One of these combinations may match the equipment you already have on hand; if not, determine which method is most cost-effective for you and invest in a font-filled future.

Before we get to the specific scenarios, here’s a short list of elements that many of the methods have in common:

Fonts. The methods may work with Type 1 fonts, Type 3 fonts, or both. Type 1 fonts are Adobe-style encrypted fonts. Adobe used to be the sole purveyor, but many third-party vendors — Bitstream, Compugraphic, and Monotype, among others — now provide part or all of their typeface libraries in Type 1 format. Type 3 fonts are unencrypted, and third-party vendors produce them using Fontographer or other type-creation tools.

Auto-tracing. Several scenarios use the auto-tracing capabilities now found in many graphics programs (see “The Elements of Auto-Tracing” in this issue). Some of the programs that have an auto-tracing feature include Canvas, DeskPaint, Digital Darkroom, FreeHand, Illustrator, Streamline, SuperCard, SuperPaint, and UltraPaint.

Scanning. Scanners come in several flavors and are available from many companies. You can use anything from a hand-held monochrome scanner to a flatbed color scanner.

Screen capture. Several utilities let you convert all or part of your screen image into a PICT or PICT2 file for later editing. These utilities include Capture (Mainstay), Exposure (Preferred Publishers), and QuickShot (Boston Companies).

Printing. Where specified, you need a true Adobe PostScript printer such as a LaserWriter HNT. If you use ATM for font scaling, you can use a non-PostScript printer such as the HP DeskJet or LaserJet, the GCC Personal LaserPrinter, or even an ImageWriter. The printer can be used in three ways:

• As a source for creating printed letters from built-in fonts. After printing, these can be scanned and then traced. Adobe PostScript printers can print Type 1 and Type 3 fonts in practically any size. Some PostScript clones can do this only with Type 3 fonts; other printers come with their own outline-font system and can print a limited set at large sizes.

• As a source of font-outline information, so that editable outlines can be produced directly and accurately from data stored in the printer.

• As a resource for computing (but not printing) a large font bit map that can be displayed on-screen and saved as a traceable image.

Figure 1: Fontastic Art

Figure 1: You can’t produce type effects such as this with a standard PostScript font. If you convert the font’s characters to editable outlines, however, you can create imaginative display type in a drawing application such as Illustrator or FreeHand or in a font-manipulation program such as TypeStyler.

By Gregory Wesson

210 August 1990 MacUser
Scenario 1: ATM, screen-capture utility, Illustrator or FreeHand
1. Enter the character(s) you want to convert, using the largest point size that fits on-screen. Version 1.9.3 of Illustrator lets you specify 1,000 points or larger.
2. Select the text block, and scale it to 127 points or larger. ATM will re-image smooth text when the block is resized.
3. Convert the text to a bit map: In Canvas or UltraPaint, convert the text block into a bit map; in SuperPaint, select the text block and choose Cut to Painting.
4. Auto-trace the text block, using the built-in function in each program. Tweak UltraPaint’s and SuperPaint’s trace controls to get the best results.
Pros: Good curve editing in all three programs. SuperPaint can produce PostScript outlines; Canvas 2.1 and UltraPaint can convert their QuickDraw outlines to PostScript through the Canvas Separator utility.
Cons: Works only with Type 1 fonts. Canvas’ auto-tracing usually creates too many control points (see Figure 3). Canvas and UltraPaint need a separate utility to produce PostScript curves.

Scenario 2: ATM plus Canvas, UltraPaint, or SuperPaint
1. Choose a Type 1 font, and enter the characters you want at the maximum point size the menu provides.
2. Select the text block, and scale it to any size you want (using the menu or by dragging). ATM will re-image smooth text when the block is resized.
3. Convert the text to a bit map: In Canvas or UltraPaint, convert the text block into a bit map; in SuperPaint, select the text block and choose Cut to Painting.
4. Auto-trace the text block, using the built-in function in each program. Tweak UltraPaint’s and SuperPaint’s trace controls to get the best results.
Pros: Good curve editing in all three programs. SuperPaint can produce PostScript outlines; Canvas 2.1 and UltraPaint can convert their QuickDraw outlines to PostScript through the Canvas Separator utility.
Cons: Works only with Type 1 fonts. Canvas’ auto-tracing usually creates too many control points (see Figure 3). Canvas and UltraPaint need a separate utility to produce PostScript curves.

Scenario 3: TypeStyler plus Type 1 or Type 3 fonts
1. Use TypeStyler’s Font Converter command to select and convert a Type 1 or Type 3 font to the SmoothFont format.
(Note: The program crashes with some Adobe Originals fonts, such as Lithos and Juniper. It also can’t convert composite Type 3 fonts — that is, fonts created in Fontographer that are based on Type 1 fonts.)
2. Click the text tool on the drawing area to bring up the Text Attributes dialog box. Choose the converted font’s name and enter the desired letter(s).
3. At this point, you can work with the outline within TypeStyler or use the Export command to save the text outline as an Illustrator file.
Pros: Converting fonts directly to outlines is simple and bypasses digitizing and tracing errors. TypeStyler is relatively inexpensive ($199.95) and can perform extensive font manipulation in addition to creating font outlines.
Cons: None worth mentioning.

Scenario 4: FontLiner, Type 3 fonts
1. In FontLiner, open a Type 3 outline-font file.
2. Choose to make either filled or outlined characters.
3. Choose whether you want to convert the standard 94 ASCII characters or the entire character set (256 characters).
4. Select the Convert command. FontLiner converts the text to outlines directly from font-outline information, which bypasses digitizing and tracing errors. FontLiner saves the outlines as an Illustrator file.
Pros: Fast conversion. Makes editable outlines directly from font-outline information, which bypasses digitizing and tracing errors. FontLiner converts some or all characters of a font in one pass.
Inexpensive ($129.95).
Cons: FontLiner works only with Type 3 fonts that were created in Fontographer, and converting fonts to outlines is its only function. Occasional conversion errors.

Scenario 5: Metamorphosis, Adobe PostScript printer
1. In Metamorphosis, open the font file you want to convert.
2. Select EPS Format under the Options menu. If you want to convert all 256 characters of the character set (including European accents), click on that option.
3. Choose the Generate command. Metamorphosis uses the PostScript printer to create the outlines, which are saved in an Illustrator file.
Pros: Can convert an entire Type 1 or
Type 3 font set into editable outlines at the same time. Converting a font directly to outlines is a straightforward process and bypasses digitizing and tracing errors.

**Cons:** Requires an Adobe PostScript printer. Metamorphosis is somewhat pricey ($295) and has only one function. Evolution, due out soon from Image Club, will accomplish the same thing for about $200 less — and it doesn’t require a printer.

**Scenario 6:** Smart Art, Adobe PostScript printer, auto-tracing program
1. Open the Smart Art DA.
2. Choose a simple effect such as the Sample Effect.
3. Enter the character(s) you want to convert into a graphic outline. Make sure the angle is 0 degrees and the fill is 100 percent. Set the point size anywhere between 500 and 1,000 points.
4. Press the Reimage button. Smart Art will send the PostScript data to the printer and instruct the printer to return a bit map to the Mac.
5. Select the Export command, and select TIFF 600 dpi from the pop-up Format menu. Name and save the file.
6. Produce an outline with the auto-tracer of your choice.

**Pros:** Fast. Creates excellent traceable forms of a character in any Type 1 or Type 3 font.

**Cons:** Requires an Adobe PostScript printer.

**Scenario 7:** Scanner, auto-tracing program
1. Obtain crisp, well-printed text (the bigger the better), or use any suitable program and printer to output large, smooth characters (127 to 500 points).
2. Scan the output as line art. Save the scanned text as a 300-dpi TIFF image or as a 72-dpi paint or PICT file.
3. Trace the image in the auto-tracing program of your choice.

**Pros:** Straightforward method. Creates good outlines. Can use any printed material, not just available fonts.

**Cons:** Requires more steps than direct-conversion techniques such as TypeStyler or Metamorphosis.

**Scenario 8:** Digitizing tablet, drawing program
1. Obtain crisp, well-printed text (the bigger the better), or use any suitable program and printer to output large, smooth characters (127 to 500 points). When you use a digitizing tablet, the largest characters work best.
2. Open a drawing program, and trace the image with the stylus of your digitizing tablet. Use a freehand, curve, or polygon tool or a combination of these.

**Pros:** Works with any printed material, not just available fonts.

**Cons:** Quality depends on hand steadiness and tablet capabilities. Needs large characters for best results.

**Scenario 9:** QuarkXPress, Type 3 fonts, screen-capture utility, auto-tracing program
1. In QuarkXPress, open a new document.
2. Use the Render Limit command to set the limit to 25 points. This tells QuarkXPress that for all Type 3 fonts, it should create font sizes greater than 24 points mathematically (this approach produces smooth scaling with no jagged edges).
3. Select a Type 3 font in the largest point size that will fit on-screen. Enter your character(s). If you are running ATM, you can also use a Type 1 font.
4. Capture the character(s) with any screen-capture utility, and save the dump as a PICT file.
5. Trace the dump with an auto-tracing program.

**Pros:** Can capture outlines of Type 3 fonts, alone or in combination with Type 1 fonts.

**Cons:** Requires several programs. If you don’t already own QuarkXPress, this method is probably not for you.
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Creating Dynamic Maps


A colorful, detailed map of Ecuador was one of a series of tour maps produced with a PostScript illustration program for a travel-company catalog. The client wanted textured mountain ranges as well as a sense of visual excitement and adventure. Designer Jill Malena and art director John Odam created a FreeHand illustration (see Figure 1) that features layered elements of muted background color, bit-mapped texture, subtle color blends, and hot color highlights.

A palette of “safari” colors — khakis, deep greens, and muted browns — was chosen for the whole map series. The colors were specified in FreeHand as four-color process colors, but black was not used because it can cause moiré patterns.

By the editors of *Verbum* magazine
Placing a Bit-Mapped Image

The scanned drawing was saved as a MacPaint file, placed in the FreeHand document, and positioned over the map outline. It was made transparent (through the Element Info dialog box), colored blue, and sent to layer 99.

Blending to Show Mountain Elevation

To further emphasize the mountains’ topography, a dark shape was drawn around the base of each mountain range and blended in three steps to a lighter shape drawn along the ridge.

Layering Map Elements

The blended mountain shape was sent to layer 85, above the country base and beneath the bit-mapped texture. Multiple drawing layers are very useful, making it easy to interleave the map outline and mountain elements. FreeHand’s layers run from 0 at the bottom to 200 at the top.

Cloning and Cutting a Line

A two-tone blue outline was created to indicate ocean water against the coastline. To avoid drawing the coastline twice, the base map was selected, cloned, and temporarily given a 1-point black line (no fill). The clone outline was cut, with the knife tool, at the beginning and end of the coastline and then deselected. The unwanted portion was selected and deleted.

Styling the Coastline

The remaining line was specified as a 12-point line in light blue and then cloned and styled as a 24-point line in a slightly darker blue. The darker line was sent behind the lighter one and both were sent behind the country outline, which obscured half their line width.

Creating a Two-Color Line

Two-point lines in bright, hot colors made the tour routes easily visible against the muted map backgrounds. To show ancillary air and water routes, lines were combined with dingbat symbols of a plane and a boat. To create a two-color line for some routes, the route lines were cloned. The clones, which were automatically placed on top of the originals, were changed to dashed lines in contrasting colors.

When printed. Colors were given names corresponding to their use — base, ridge, rivers, and so forth — which made it easy to find the desired color in the color menu and to change colors. (Hint: To change a color spec throughout a FreeHand illustration, select an element that contains the color, choose Edit Color from the Color menu, and type the changes in the corresponding dialog box. Once edited, all elements with that color will change to reflect the new specs.)

PostScript illustration programs have flexible color specifications and multiple drawing layers that make it easy to organize and color numerous elements. The addition of a bit-mapped graphic (see Figure 4) provides a soft texture within the clean lines and flat-color precision of the PostScript illustration, as the finished Ecuador map shows (see Figure 1).

Although the artists used Aldus FreeHand for this project, similar results can be achieved with Illustrator 88, Canvas 2.1, MacDraw II, or SuperPaint 2.0.

You can contact Verbatim: The Journal of Personal Computer Aesthetics at Box 15438, San Diego, CA 92115; (619) 233-9977.

Toolbox

This map was produced in FreeHand on a Mac IIX with 4 megabytes of RAM and an 80-megabyte internal hard disk drive. Scans were made with an Apple Scanner, and initial proofs were printed on a LaserWriter LNTX. Color proofs were printed on a GMS ColorScript 100, and the color-separated film was output on a Linotronic L-300 at 2,540 dpi with a 133-line screen.
Currents

Wired for Fax

Several months ago, Solutions announced the FAXGATE gateway software for Microsoft Mail and CE Software's QuickMail. FAXGATE lets users of these mail systems utilize their mail server as a fax server as well. But users who didn't have, need, or want a full E-mail system still lacked a suitable alternative for sharing a fax modem over a network — now they have one. Solutions has announced FAXSHARE, which is due to ship in the third quarter of 1990. FAXSHARE will provide the functionality of FAXGATE — any Mac on an AppleTalk network will be able to send a fax over the network by sending it to a server. FAXSHARE will still require you to assign a Mac as a centralized server, but it won't require you to run an E-mail system on the server. The FAXSHARE server Mac must be running Solutions' BackFAX software and have a BackFAX-compatible modem connected to it. Each user must have a copy of FAXSHARE's client software, MailMaker, which is necessary to send the data over the network. FAXSHARE will cost $495 and will include a five-pack of MailMaker. Additional five-packs of MailMaker cost $195.

But just because multiple users can now use a single fax modem doesn't mean that the personal modem is any less interesting. Global Village Communications has announced its first product, the TelePort, for June release. The TelePort is a 2,400-bps Mac-only modem with Level 5 MNP error correction and compression. Another one, you ask? Ah, but this one plugs into the Mac's ADB (Apple Desktop Bus) port (the port where you attach your keyboard and mouse), which has several advantages. When the ADB is powered, the modem can get power from it. Consequently, the TelePort has only a single cable — molded into the device — and no need for an external power supply. When you take it on the road, you don't need to worry about leaving part of it behind.

The TelePort also keeps the Mac's serial port free. This may not seem immediately useful, but think about the times when you've wanted to connect more than one serial device to your modem port (say, an ImageWriter and a modem) but couldn't. There's currently no way to have more than two serial connections to your Mac simultaneously — one of them is usually taken up by a LocalTalk connection. But once Apple's Macintosh Communications Toolbox becomes more prevalent (it's available now as an add-on for System 6 and will be built in to System 7), you will be able to have multiple sessions running on your Mac. By the way, running the TelePort from the ADB will not render inoperable any other serial device that is already connected to your modem port.

The TelePort retails for $225. TelePort/Plus 2, which should be available by the time you read this article, will include software that will enable you to use the TelePort as a 4,800-bps send-only fax modem. It will also include address-book software that can serve as an automated personal phone directory when used in conjunction with the modem's dialing capabilities. TelePort owners can upgrade to TelePort/Plus 2 capability. The TelePort/Plus 2 retails for $325.

Solutions, Inc., 30 Commerce St., Williston, VT 05495; (802) 865-9220. Global Village Communication, 1204 O'Brien Drive, Menlo Park, CA 94025; (415) 329-0700.

EtherNews

Since our June lab report on Ethernet cards for the Mac (see "Are You Ready for Ethernet?" Buyer's Guide, June '90, page 20), Asante has dropped the price of its Ethernet cards by a whopping $100: SE cards now cost $395, and SE/30 and NuBus cards are $495. This price drop makes it as inexpensive to put a Mac on Ethernet as to put a PC on. All of these cards are available either with 10BASE-T and thicknet or with thinnet and thicknet connections. (10BASE-T is a standard for unshielded twisted-pair cabling for Ethernet networks.) Asante’s SE/30 and NuBus cards are available with an optional 64-K-RAM buffer for $545.

Adaptec is also shipping 10BASE-T products: a NuBus card called the EtherMac II and a 10BASE-T module for its Nodem SCSI-Ethernet adapter. The 10BASE-T Nodem lists for $595, $100 more than a Nodem equipped for thinnet or thicknet. The EtherMac II is available with 10BASE-T and thicknet connections for $595 or with thinnet and thicknet connections for $495.

Meanwhile, Farallon Computing has licensed Novell's (Kinetics) L-series Ethernet cards for NuBus and the SE/30 and has renamed them PhoneNET Cards for Ethernet. These cards support LattisNet unshielded-twisted-pair and thicknet connections but not 10BASE-T. Each

By Stephan Somogyi
Asanté has lowered the cost of putting Macs onto Ethernet to $495 a node.

Asanté Technologies offers a variety of 4-Mbps NuBus token-ring cards. Its MacConII/TR cards are full 32-bit cards that are available with LLC (logical link control) for $795 and without LLC for $695. LLC lets devices in a token-ring network determine the order in which they can talk. Having this option in firmware on the interface card improves network efficiency.

Asanté also makes MacCon+ITR cards, which have an additional Type 3 connector for unshielded twisted-pair wiring; the MacConII/TR supports only Type 1/Type 2 shielded twisted-pair wiring. The MacCon+ITR card costs $845 with LLC support and $745 without it.


Gates and Routes

Dayna Communications, Inc., 50 S. Main St., Salt Lake City, UT 84144; (801) 531-0600. Infosphere, 4730 S.W. Macadam, Portland, OR 97201; (503) 226-3515. Network Resources Corp., 2450 Autumnvale Drive, San Jose, CA 95131; (408) 263-8100. Shiva Corp., 155 Second St., Cambridge, MA 02141; (617) 864-8500.

BRIDGES

MacUser August 1990 217
What to do with Timbuktu.

Share screens.
With Timbuktu on every Macintosh, you can invite others to share your point of view. (Advanced password protection ensures privacy.) Sharing screens allows two or more users to work on any document simultaneously. It also allows user support people to help solve users' problems without leaving their desks. Combine Timbuktu with Farallon's network management software, and support people can manage computers and servers from anywhere on the network. Timbuktu/Remote functions similarly to Timbuktu, only over modems or ISDN links.

Share resources.
With Timbuktu installed on each Macintosh throughout the network, you can access any Macintosh and its databases, FAX modems, file or mail servers, or mainframe connections from any Macintosh on the network.

Transfer files. With Timbuktu 3.0, you can transfer files and folders directly from one Macintosh or file server to any other Macintosh on the network. For a small network, Timbuktu is faster and more cost-effective than other solutions, and for large networks, it's an ideal complement to a dedicated server.

Teach and Train.
With Timbuktu, you can turn your company's network into an electronic classroom. Each person uses Timbuktu to watch your on-screen presentation while listening to your description over the telephone.
Need to transfer a file from your laptop to a Mac? LapLink Mac is a great solution.

By Stephan Somogyi

You’ve been traveling. You wanted to get some work done on your trip, so you took your Toshiba 1000SE (or, if you wanted to combine business with an aerobic workout, your Macintosh Portable) with you. Now you’re back in the office. You need to get your files off the portable and onto your office Mac. There’s SneakerNet, of course. But if you have a lot of data to move, or if it’s on 5.25-inch disks, things can get tedious.

Enter LapLink Mac, release III, from Traveling Software. LapLink Mac comes in two flavors: a Connectivity Pac and a Network Pac. The Connectivity Pac ($189.95) is a complete hardware and software solution for moving files quickly and easily between two Macs or between a Mac and a PC. The hardware part is a cable. Don’t laugh: This is the world’s greatest cable! At each end, it has a DIN-8 Mac serial plug (the kind that attaches to the modem port of most Macs); the cable also has two serial connectors that are common on DOS machines, one DB-25 and one DB-9. The software consists of a single Mac disk, two 3.5-inch DOS disks, and three 5.25-inch DOS disks — everything you need to get set up.

The Connectivity Pac can also be used over AppleTalk networks, but it is limited to two users. If you plan to use LapLink mainly over AppleTalk, you may want to consider a Network Pac ($299.95), which is intended for multiple users on AppleTalk. The Network Pac doesn’t include the cable, but it allows up to five users to be active on a network. Additional Network Pacs increase this number in increments of five.

LapLink has a simple, straightforward interface. The Mac application has a Connection menu with several different options for connecting to other computers (see Figure 1). Once the connection is made, you can initiate file transfers from either side. The Mac side displays a Font/DA Mover-style dialog box that contains two file lists: One lists your local Mac volumes, and the other lists volumes that are available on the remote machine (see Figure 2). Mac users can also use the LapLink INIT, which allows another LapLink user to access your machine in the background even if you aren’t running the LapLink application. Using the INIT rather than the application degrades throughput by some 70 percent, though.
<table>
<thead>
<tr>
<th><strong>ACCESSORIES</strong></th>
<th><strong>COMMUNICATIONS AND NETWORKS</strong></th>
<th><strong>DRIVES</strong></th>
<th><strong>EDUCATION/ENTERTAINMENT</strong></th>
<th><strong>GRAPHICS AND DESIGN SOFTWARE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td><strong>ACCUACCESSORIES</strong></td>
<td><strong>CMOS</strong></td>
<td>A Lasting Impression</td>
<td>Adobe Systems, Inc.</td>
</tr>
<tr>
<td>Toner Cartridge LaserWriter II ................................ $115</td>
<td>QuickMail 2.5 (1-10 users) ................................ $355</td>
<td>MacStack 20 Meg .................. $429</td>
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<td>CPU Stand ........ $16</td>
<td>QuickMail 4.5 (1-6 users) ........ $218</td>
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<td>Dust Cover - ImageWriter II (grey nylon) ....................... $11</td>
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<td>Dust Cover - Mac SE &amp; Extended Keyboard ......................... $18</td>
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<td>MacStack 80 Meg .................. $769</td>
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<td></td>
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<td></td>
</tr>
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<td>Cutting Edge ....................... $34</td>
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<td></td>
</tr>
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<td></td>
</tr>
<tr>
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<td>Software Ventures .................. $215</td>
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<td></td>
</tr>
<tr>
<td>Teak Disk Holder - 50 ............................................. $14</td>
<td>Solutions .................................... $239</td>
<td>Printers Edge ..................... $38</td>
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<td>FoxGate Plus ............................... $339</td>
<td>Orion ................................. $419</td>
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<tr>
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<td>TOPS 3.0 Network Bundle ............ $187</td>
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</tr>
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<td>The Ultimate SE Carrying Case (black) ........................... $75</td>
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<td>Cutting Edge ....................... $34</td>
<td>Adobe Systems, Inc.</td>
<td></td>
</tr>
<tr>
<td>Cables (various) ................................................... CALL</td>
<td>Interex ......................................... $79</td>
<td>SAE .................. .......................... $519</td>
<td>Adobe Systems, Inc.</td>
<td></td>
</tr>
<tr>
<td>Anti-Glare Filter ................................................... $63</td>
<td>Mac II CPU Stand ......................... $20</td>
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<td>Mac II CPU Stand ... $20</td>
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<td></td>
</tr>
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<td><strong>BLANK DISKS</strong></td>
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<td><strong>80+ Meg</strong></td>
<td><strong>Silicon Beach</strong> Dark Castle</td>
<td>Adobe Systems, Inc.</td>
</tr>
<tr>
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</tr>
<tr>
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<td></td>
</tr>
<tr>
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</tr>
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<td>Tetris ................................. $19</td>
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<td></td>
</tr>
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<td>Beyond Dark Castle ...............</td>
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</tr>
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<td>FM2 Intermediate FileMaker</td>
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<td>FM3 Advanced FileMaker</td>
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<tr>
<td>H2 Creating Cards &amp; Stacks</td>
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<tr>
<td>A1 Beginning Illustrator</td>
<td>$36</td>
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<td></td>
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<tr>
<td>A3 Creating Special Effects</td>
<td>$36</td>
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<tr>
<td>Personal Training for Macintosh B1 Basic B2 Floppy</td>
<td>$36</td>
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<tr>
<td>B3 The Basics (Plus or SE w/HD)</td>
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Mac-to-Mac

If the computers involved in your LapLink file transfer are already on an AppleTalk network, the AppleTalk-to-Mac connection option is the easiest, but it is relatively slow at LocalTalk speeds (see Figure 3). Using the cable for a direct connection, along with the accelerator

Traveling Software provides, is roughly twice as fast as transferring over LocalTalk. The accelerator attaches to the multifunction cable’s DB-25 connector.

But LapLink Mac doesn’t stop here. As you may recall, we began with a tale of a hardworking employee on the road with a portable computer, possibly a Mac Portable. Pretend you’re that user and that you’re about to leave on a trip. You have megabytes of information on the Mac in your office that you need to transfer to the Portable before you leave so you can do a PowerPoint presentation when you arrive in Poughkeepsie. Don’t you wish you could transfer files directly from the hard disk in your office Mac to the Portable’s hard disk? With LapLink’s SCSI Disk Link application, you can.

Using SCSI Disk Link, you can mount the Portable’s internal hard disk as a SCSI hard disk on a second Mac. This feature alone justifies LapLink’s price for Mac Portable owners. During such transfers, the Portable is rendered comatose by the software, but you can copy files to and from its hard disk by using the Finder, as quickly and easily as if it were just another hard disk drive connected to your Mac’s SCSI chain. In fact, that’s precisely what it is.

There are some drawbacks to this approach. First, before connecting the SCSI cable to the Portable, you must turn off all the other SCSI devices in the chain, including the other Mac. Then, obviously, after you connect the cable, you have to turn everything back on and wait for your Mac to go through its startup process. (If your Mac has even half as many INITs as mine, that’s good for a trip to the coffee machine.) Second, if you have other SCSI devices (scanners or external hard disks, for example), you have to deal with the bane of SCSI existence: termination. The Portable must be the last device in the chain, and no other device can be terminated. Third, if you have no other SCSI devices attached, you need a 25-pin-to-25-pin SCSI cable. Traveling Software sells this type of cable for $14.95. But there’s nothing special about it: You can just as easily (and

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Figure 1: The LapLink Connection menu lets you select from among a variety of connection types for copying files to and from a remote computer.

Figure 2: LapLink Mac displays a standard Mac dialog box that shows the files on your Mac and on the computer to which it is connected. Copying a file is a simple matter of selecting it and clicking on the Copy button.

Figure 3: In our file-transfer testing, we moved a 512K file via LapLink Mac’s various routes. The disk-to-disk and SCSI Disk Link times were almost identical; the difference in throughput is due to the different hard disk mechanisms.

The direct connection with LapLink Mac’s accelerator is still superior to the network connection and the “unaccelerated” direct file transfer. Using the SCSI Disk Link is the best way of moving files with LapLink Mac.

Report Card

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<th>LapLink Mac III Connectivity Pac</th>
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<td>Requires: Mac Plus with 1 megabyte of RAM, System 5.0 or later, and DOS version 2.11 or later.</td>
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<td>Traveling Software, 18702 N. Creek Parkway, Bothell, WA 98011; (800) 662-2652 or (206) 483-8088.</td>
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LaserMAX Announces Personal Typesetting™

LaserMAX made headlines when we announced our new Personal Typesetter. The LaserMAX 1000 Personal Typesetter gives you 1000 dpi and 135 typefaces in a package that fits on your desk. Our proprietary TurboRes™ technology lets us control the size of the pixels on the printed page, eliminating the coarse steps between pixels (also known as jaggies.) With TurboRes you create originals that rival phototypesetting—so you won't need to go to Lino anymore. Halftones and graphics also benefit from this technology.

With the LaserMAX 1000 Personal Typesetter you get high quality without high cost.

The MAXimum

If you're the type who never settles for less than the MAX, you'll want the LaserMAX 1000 Personal Typesetter. With 1000 x 1000 TurboRes, you'll need a printer's loupe to prove that the output isn't traditional typesetting. But unlike phototype-setting, the LaserMAX 1000 is:

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To learn more about the magic of the LaserMAX Personal Typesetter, call us now at (612) 944-9696. We'll send you a page of actual output so you can see just how good it really is. Then you can decide for yourself which you'd rather have: the technology that lets you make tomorrow's headlines, or yesterday's classifieds?

Goodbye NTX, Hello NTQ

If you already own an Apple LaserWriter, you're in luck. With a LaserMAX MX6 controller you can boost your resolution from 300 dpi all the way up to 800 x 800 TurboRes for Near Typeset Quality.
probably less expensively) stop at Radio Shack and pick up a 25-wire ribbon cable with male DB-25 connectors at each end.

If the amount of data you need to move justifies the hassle involved in setting up a SCSI transfer, you can amaze your friends and neighbors with its speed.

**Mac-to-PC**

Previous versions of LapLink Mac required that all transfers between a PC and a Mac be initiated and controlled from the PC side. With LapLink Mac III, either a Macintosh or a PC can now initiate a file transfer in either direction, although some of the special features available for PC-to-Mac transfers are available only from within the PC LapLink application. Mac-to-PC transfers are not as fast as Mac-to-Mac transfers, but the former are certainly a much cheaper solution than attaching an external DOS disk drive, such as a DaynaFile, to a Mac.

Several features of LapLink Mac III enhance the product beyond simple file transfer. Perhaps the best one is its built-in format translation. If you are transferring to the Mac a file that was originally created by a DOS word processor, you can convert its format to MacWrite as you transfer. For text-file transfers, LapLink provides a basic set of file-clean-up options, such as the ability to strip line feeds (PCs use them for line endings; the Mac doesn't) and high-order bits, which WordStar uses for formatting.

LapLink also supports Mac icons. When you copy a PC file to a Mac, you can choose from a list of Mac file-format types (such as Word/text) and applications. LapLink Mac assigns the correct Type and Creator to the Mac file, so the file appears on the Mac desktop with a double-clickable icon for the file type you choose. In the next version, it'd be nice to see LapLink "learn" to always associate a PC file with a specific file extension (for example, .wp for WordPerfect) with the same Mac icon.
Networks: Under New Management

Doing surgery on a network is about to get a lot easier, thanks to a host of new network-management hardware and software.

Although the Mac brings with it the promise of plug-and-play networking, all but the smallest networks need management to be effective, whether they are solely AppleTalk or, as is common in large corporate environments, mixed networks of AppleTalk and other protocols, such as TCP/IP and DECnet. Some powerful tools, such as Network General's Sniffer, have been able to examine the inner workings of mixed networks, but these have been both expensive and far from user-friendly. Some slightly more friendly and less expensive tools, such as Apple's InterPoll and Farallon's TrafficWatch, have also been available, but they have usually been limited in the types of information they provide and have been restricted to AppleTalk. Powerful Macintosh-based point-and-click network-management tools for mixed networks have, until recently, remained items on a network manager's wish list.

A group of network-management applications due for release this summer — some new, some upgrades — aim at overcoming this problem. There is something to please everyone here, regardless of the type of network, spanning the entire range of prices from $500 to $60,000.

The most significant come from Farallon, which has upgraded its current stable of network-management software and has added some useful new products. Even better is that Farallon now offers everything in a single package called the Network Manager's Toolkit ($995). In addition to new versions of TrafficWatch, CheckNET, and StarCommand, the Network Manager's Toolkit contains two new applications: NetStats and NetAtlas. Also included are instructional videotapes for tips on doing it yourself.

TrafficWatch reads packet-header information, giving you a live graph of how much traffic users are creating. You can save and analyze the data, using the included Excel macros. Now in color, TrafficWatch II can look at a variety of packet types, including EtherTalk packets. You can look for a specific type of packet or error or watch the traffic from a single node. If you want to track down router use, for example, you can look for the ZIP and RTMP packets commonly used by routers. TrafficWatch II can also recognize non-AppleTalk packets, such as DECnet, TCP/IP (UNIX), XNS (3Com), and SPX/IPX (Novell NetWare) packets, although it doesn't provide as much detail for these protocols as it does for AppleTalk.

A new companion to TrafficWatch is NetStats, a scaled-down version of TrafficWatch that works as a DA to give a quick indication of network traffic. NetStats doesn't take over a Mac as TrafficWatch does, and it is limited to monitoring LocalTalk networks.

NetAtlas is a much appreciated addition to the network tool chest. It draws a map of an AppleTalk internet, identifying routers and nodes. It uses different...
icons to identify user workstations, file and mail servers, Timbuktu hosts, and printers (see Figure 1). It even identifies the types of Macs on a network. Clicking on icons gives you more-detailed information, such as network, node, and socket ID numbers for a network device.

You can run tests to a specific node or between two nodes. NetAtlas can also compare two maps of the internet made at different times and tell you the differences, such as added, missing, or changed node or zone names. It is completely media-independent and works on LocalTalk, Ethernet, token ring, Arcnet, or any other network. Although it can identify TCP/IP nodes, NetAtlas is mostly AppleTalk-based at this time.

A good companion to Farallon's Network Manager's Toolkit is StatusMac from Pharos Technologies. StatusMac lets network managers troubleshoot from the desktop by collecting information on the configuration of individual workstations. This information includes CPU data, such as the ROM version, the amount of RAM installed, the version numbers of system-software files (System, Finder, LaserWriter, and so on) and applications, whether MultiFinder is running, what SCSI devices are attached, and what NuBus boards are installed. It can even list installed INITs and DAs.

Some users might resent having the eyes of Big Brother on them, but Pharos has taken steps to prevent misuse of StatusMac. For instance, StatusMac doesn’t give any information on data files. It also prevents spying by requiring that managers have to ask a user to run a general routine before they can gather information about the user’s workstation. Pharos calls this information a Profile. Profile requests can be sent via file transfer or by Microsoft Mail. In either case, the Profile is automatically sent to the network manager when the user runs the appropriate routine. This information is stored in a database against which the network manager can run queries such as “List all the users who have Word installed but are using a version earlier than 4.0” (see Figure 2).

Information on how much StatusMac will cost and when it will ship was not available at press time.

**Below the Surface**

Developers and others often want to get their hands dirty by digging deeper into protocols. In the past, the only way to do this was to wrestle with expensive DOS-based network analyzers. Now there are similar packages that run on the Mac. Two are programs for monitoring Ethernet networks — NetMinder Ethernet from Neon Software and EtherPeek from The AG Group — and one — MacToken from EDI Communications — is for token-ring nets.

An advantage of software network analyzers over dedicated systems (such as the Novell LANalyzer and the Network General Sniffer) is that you need only carry around a floppy disk instead of a portable PC. You’ll also spend much less time reading your manual for Mac software solutions. And they are a great deal less expensive.

Like dedicated hardware tools, NetMinder Ethernet ($495) collects data, decodes it for analysis, and displays it. AppleTalk, TCP/IP, and XNS protocols are supported. NetMinder Ethernet can either sample data or read all the data on a network — Neon calls the latter option the “promiscuous mode.” In this mode, NetMinder can read the data in files being transferred over the network that would otherwise be inaccessible to anyone but their creator — a potentially dangerous tool in the wrong hands.

Neon claims that NetMinder Ethernet offers most of the analysis and troubleshooting features of dedicated-hardware competitors. Packet filtering lets you look at specific types of packets. Triggering is a feature that begins data collection at a certain time or upon receipt of a particular filtered packet. Unfortunately, a big drawback of version 1.0 of NetMinder Ethernet is that you can’t save or print any of this information. NetMinder Ethernet runs on a Mac II with an Ethernet card from Apple, Asanté, 3Com, or Novell.

The feature set of EtherPeek ($475.99), which was scheduled to ship at the end of July, was not yet final at press time. Still, it appears that this product will be very similar to NetMinder Ethernet and will run on the same Ethernet cards. One difference is that it will run on an SE/30 as well as on a Mac II.

MacToken ($1,500) is a diagnostic tool for a standard 802.5 token-ring network. It can capture or terminate data frames for the whole net or just one node, and it can also display device, zone, and network address and status as well as the time an event occurred. MacToken includes a HyperCard stack that reproduces ring-sequence forms, which IBM-system

**Figure 1:** Farallon's NetAtlas draws a map of an Internet with routers, servers, printers, and nodes. The first two icons on the left represent a TCP/IP gateway and a non-Mac IP workstation.

**Figure 2:** StatusMac, from Pharos, provides network managers with a wealth of information about system software and applications installed on users' Macs. This information is stored in a database against which the network manager can run queries.
SOLUTIONS

managers use to maintain information about a token-ring network. At press time, MacToken can run only on a Mac II-family machine with Apple's TokenTalk NB card.

DOS Hardware

Network General's Sniffer, a high-end LocalTalk, Ethernet, and token-ring analyzer (which includes support for EtherTalk and TokenTalk protocols), has also been upgraded. Although prices start at $2,500, configurations can cost anywhere up to $60,000. (Network General says the typical configuration, which includes a Toshiba or Compaq 386-based portable and network-interface cards, costs around $20,000.) The new capability, called the Advanced Monitoring Upgrade, currently works for Ethernet only and is free. The monitoring software can be set up to trigger alarms when certain conditions are met, such as idle time for a server or excessive usage by a node on the network. The alarm can be a beep, a printed report, or a logged file.

For those who don't have Sniffer, these monitoring features are available separately as a new program called Watchdog Network Monitor ($1,995), which runs on any AT-class machine. Alarms can be set for up to 1,024 nodes. You can also get information such as average packet size, bytes per second being transferred, and the types of protocols being used on the network — although not the detailed information about protocols and the contents of data packets that Sniffer provides. Watchdog Network Monitor is a bit expensive compared with the Mac software available, and it supports only Ethernet.

Novell's LANalyzer is available in two configurations — as a complete stand-alone unit (an altered NEC Powermate for $19,995) or as an AT board and DOS software ($9,980). Novell uses a specialized board that can capture information about all activity on the network, including collisions as well as valid data packets.

Novell plans a major update this summer that will add keystroke macros to simplify commands, launch applications such as Lotus 1-2-3, and plot data. The function keys are user-configurable and will support an application library. Users will also be able to set alarm thresholds to monitor individual nodes. The alarm can be an audio or visual signal or an automatic phone call to the network.

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August 1990 MacUser
manager's beeper. LANalyzer operates on Ethernet, token ring, and Starlan.

Finally, a third hardware analyzer—the LANView Network Analyzer ($11,995) from Cabletron—is now available. The company claims that it provides around 80 percent of the functionality of Sniffer but at a much lower cost. LANView supports Ethernet and token-ring networks.

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Directory

The AG Group
Station B, P.O. Box 26728
San Francisco, CA 94117
(415) 826-7664
EtherPeek, $475.99

Cabletron
35 Industrial Way
Rochester, NH 03867
(603) 332-9400
LANView Network Analyzer, $11,995

EDI Communications
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Cupertino, CA 95016-0657
(408) 996-1343
MacToken, $1,500

Farallon Computing
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(415) 596-9000
Network Manager's Toolkit, $995

Neon Software
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Lafayette, CA 94549
(415) 283-9771
Net/Manager Ethernet, $495

Network General
4200 Bohannon Drive
Menlo Park, CA 94025
(604) 952-6300
Watchdog Network Monitor, $1,995
Sniffer, $2,500 to $60,000

Novell
2180 Fortune Drive
San Jose, CA 95131
(800) 243-8526
LANalyzer, stand-alone, $19,995
LANalyzer, PC kit, $9,990

Pharos Technologies
4243 Hunt Road
Cincinnati, OH 45242
(800) 548-8871
StatusMac, price unknown at press time

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If you have access to a PostScript printer, you can add flair to your word processing with these short routines.

Are you getting your money's worth out of your PostScript printer? People sometimes forget that PostScript is more than a type of printer — it's also a programming language. If you have access to a PostScript printer and can type a few short routines, you can have an instant library of special printing effects.

OK, so you don't really need (or can't afford) all the bells and whistles of a special PostScript utility such as Adobe's SmartArt. That doesn't mean that you can't slip a few PostScript special effects into your word-processing documents. Here's a collection of short but snazzy PostScript routines to choose from, along with some hints on how to use them in your favorite word-processing program. Warning: Be prepared to share the code with all the people who'll be impressed by your fancy printing.

At the end of this article, you'll find details on how to use these routines in different word processors. If you've got Microsoft Word 4.0, these routines are as easy to implement as typing them in and selecting the PostScript style. You may need to make some simple changes to the code so it can work with other word-processing programs.

By Gregory Wasson
This swatch places a gray screen behind any paragraph. Paste it in just before the paragraph. Enter the percentage gray screen you want by substituting a number for the 10 after the word /PERCENT. 10 = 10%, 20 = 20%, etc. This swatch operates correctly only in Word 4.0.

**Grayed Paragraph**

This routine places a gray screen behind any paragraph. Paste it in just preceding the paragraph. Enter the percentage of gray screen you want by substituting a number for the 10 after /PERCENT (10 = 10%, 20 = 20%, and so on). This routine operates correctly only in Word 4.

**Shadow Text**

This routine places text with a shadow behind it wherever you want it on the page. The default font is Helvetica Bold. You can change this by altering the /font variable. The default point size is 48. Another way to change it is to insert another point size in the /points size variable. To specify where the text begins, type the top and left position you want, measuring in points from the top left edge of the page. If you want the text to begin at one inch from the top and left sides of the page, for example, enter 72 for both the /top and /left variables. If you feel more comfortable working in inches or picas, type the word inch or pica after the measurement and be sure to put a space between them. Enter the text you want between the parentheses in the /text variable.

**Memo**

This simple routine places a (somewhat egotistical) typographical joke at the top left of a letter-sized page. Customize it by substituting your name for the words "Your Name" in the last line of the code.

**Reversed-Text Paragraph**

If you've ever wanted to make a paragraph appear to be in reversed type, try this simple routine for doing it in Word 4. Just place the code before the desired paragraph, and format the text in the paragraph itself with the Outline style (Command+Shift+D).
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Some Hints

- These effects won’t preview on-screen, and they don’t generate the desired effects on a non-PostScript printer.
- If you want to change the default font in one of these effects, be sure to use the correct PostScript name for the font. The documentation that came with the font should tell you what the name is.
- If you use a downloadable font in the routine, make sure you download the font before you print. The routines don’t support auto-downloading.
- Turn background printing off; otherwise the placement of the graphics might be imprecise in some word processors.
- Save each routine as a separate fully formatted Glossary item (if your word processor supports glossaries), and paste it in as needed.
- If you want an effect to appear on every page (the draft-page routine, for example), place the code in the document’s header.
- If you don’t want to type code, check our MacUser on-line service for downloadable copies. You’ll find all these routines, plus a bonus routine that corrects the cropping example included in the PostScript Glossary that comes with Word 4.

PostScript and Your Word Processor

If you use Word, incorporating PostScript code is easy: Type the text of the code, and then apply the PostScript style to it. (PostScript is one of Word’s “automatic” styles.) The default for the PostScript style is Normal + Font: 10 Point, Bold: Hidden. You can modify the definition of the PostScript style in any way you like, as long as you keep the Hidden attribute. Word prints these PostScript effects only if you use one of Apple’s PostScript laser printers.

For accurate page breaks in Word’s Print Preview, be sure to turn Show Hidden Text off by using the Preferences command.

For details on Word 4’s special PostScript commands and variables such as /para., /dict., or \psbox, see your Word manual or “Word 4.0 and PostScript” (September ’89, page 245).

The FullWrite Way

Ashton-Tate’s FullWrite Professional offers another way to support PostScript, although its method is not as elegant as Word’s:

1. Type in the routine (not one that works only with Word, of course), but add the line /initmatrix at the top of the file.
2. Save the file in ASCII format (Text Only with Line Breaks).
3. Launch ResEdit, select the text file you’ve just created, and choose Get Info from the File menu (Command-I). Change the file type to EPSF (the Creator should remain FWRT). Close the file (click on OK at the prompt to save the changes).
4. Open the FullWrite document in which you want to use the routine, and choose Print from the File menu. Click on the Print Background Picture box in the Print dialog box. A standard Open dialog box appears. The text file you’ve just turned into a pseudo-EPSF file should appear in the list. Double-click on it and click on OK in the Print dialog box to print your document.

Sold-Out Paragraph

This can be useful if you are producing a catalog or similarly formatted document. Paste it in above any paragraph or product entry, and the words “SOLD OUT” will be printed in gray diagonally across the main text. The default font is Helvetica-Bold and the point size is 24 point. You can change either of these by changing the variables /font and /pointsize below. You can change the text by replacing the words “SOLD OUT” with your own in the /text variable. This switch works only in Word 4.

Draft Page

This routine prints the word DRAFT across a letter-sized page in large gray type. You can change the word to SAMPLE, PROOF, or whatever you want. Just change the text between the parentheses in the /text variable. You can also change the default point size (72) or font (Helvetica Bold) at the /pointsize or /font variables. Two versions are given: one for Word 4 and one for other word processors.
PostScript code fed into FullWrite in this way will print on every page if you're printing a multipage document. If you want an effect on only one page, you must follow these directions and print that page by itself with the Print Background Picture box checked. If you want an effect on only one page, you must follow these directions and print that page by itself with the Print Background Picture box checked. If you want the effect only on the first page of the document, though, check the First Page Only (Letterhead) box in the Print Background Picture dialog box.

Like Word, FullWrite has some special PostScript features, but they aren't covered in the documentation. For information, call Ashton-Tate's Macintosh technical support at (213) 768-1717 and request Technical Notes 4 and 5 on PostScript and FullWrite.

**Other Word Processors**

If your word processor doesn't offer PostScript features like Word's and FullWrite's, don't despair. You can probably still use the routines that aren't specific to Word. Simply place or type the code on a page. Type the word `gsave` on the line before the code, and then type the word `grestore` on the line after the code. Select everything, and format it with the PostScript Escape font. This special font is available from the usual freeware sources such as Zmac and CompuServe (look in Library 8 of the MAUG MacDesign Forum. The filename is PSTESC.FNT). The code will become invisible.

When you print the page, the printer interprets the code but doesn't print it. If the effect prints out mirrored, put the code back into a regular font (so you can see it) and type `initgraphics` after the `gsave` (leave a space between them). Select the code again, and change it back to the PostScript Escape font.

Make sure the location specified for the special effect in the code is within the margin of the current page — otherwise the effect might not print.

---

**All the Code That's Fit for Printing**

**Grayed Paragraph**

```latex
\% -----CUSTOMIZE THE EFFECT HERE----
\% /PERCENT 10 def
\% -----END CUSTOMIZE----
\% /convert (100 exch sub .01 mul) bind def
\% PERCENT convert setgray
\% wp$box fill
```

**Shadow Text**

```latex
/\inch {72 mul} def
/pica {12 mul} def
0 792 translate
\% -----CUSTOMIZE THE EFFECT HERE----
\% /font /Helvetica-Bold def
\% /pointsize 48 def
\% /top 72 neg def
\% /left 72 def
\% /text (Your Text) def
\% -----END CUSTOMIZE-----
\% left top translate
\% font findfont pointsize scalefont setfont
\% gsave
\% [1 0 0 1 0 0] concat .8 setgray
\% 0 0 moveto text show
\% grestore
\% 0 0 moveto text show
```

**Memo**

```latex
/Helvetica-Bold findfont 24 scalefont setfont
56 736 moveto
gsave
(ME) show
.5 setgray
\% (FROM) dup stringwidth rmoveto
-.1 1 scale show
\% grestore
\% (ME: Your Name) show \%Put your name here
```

**Reversed-Text Paragraph**

```latex
\% -----CUSTOMIZE THE EFFECT HERE----
\% /font /Helvetica-Bold def
\% /pointsize 48 def
\% /text (DRAFT) def
\% -----END CUSTOMIZE-----
\% /center (dup stringwidth pop 2 div neg 0 rmoveto) def
\% wp$ix 2 div wp$iy 2 div moveto
\% .5 setgray
\% font findfont pointsize scalefont setfont
\% 45 rotate
\% text center show
```

**Sold-Out Paragraph**

```latex
\% -----CUSTOMIZE THE EFFECT HERE----
\% /font /Helvetica-Bold def
\% /pointsize 48 def
\% /text (SOLD OUT) def
\% -----END CUSTOMIZE-----
\% /center (dup stringwidth pop 2 div neg 0 rmoveto) def
\% wp$ix 2 div wp$iy 2 div moveto
\% .5 setgray
\% font findfont pointsize scalefont setfont
\% 45 rotate
\% text center show
```

**Draft Page**

**Word 4.0 Version:**

```latex
\% -----CUSTOMIZE THE EFFECT HERE----
\% /font /Helvetica-Bold def
\% /pointsize 72 def
\% /text (DRAFT) def
\% -----END CUSTOMIZE-----
\% /center (dup stringwidth pop 2 div neg 0 rmoveto) def
\% wp$ix 2 div wp$iy 2 div moveto
\% .5 setgray
\% font findfont pointsize scalefont setfont
\% 45 rotate
\% 24 0 text center ashow
```

**Generic Version (letter-sized paper):**

```latex
\% -----CUSTOMIZE THE EFFECT HERE----
\% /font /Helvetica-Bold def
\% /pointsize 72 def
\% /text (DRAFT) def
\% -----END CUSTOMIZE-----
\% /center (dup stringwidth pop 2 div neg 0 rmoveto) def
\% wp$ix 2 div wp$iy 2 div moveto
\% .5 setgray
\% font findfont pointsize scalefont setfont
\% 45 rotate
\% 24 0 text center ashow
```

**Reversed-Text Paragraph**

```latex
\% -----CUSTOMIZE THE EFFECT HERE----
\% /font /Helvetica-Bold def
\% /pointsize 72 def
\% /text (DRAFT) def
\% -----END CUSTOMIZE-----
\% /center (dup stringwidth pop 2 div neg 0 rmoveto) def
\% 306 396 moveto
\% .5 setgray
\% font findfont pointsize scalefont setfont
\% 45 rotate
\% 24 0 text center ashow
\% grestore
```
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LPS-MAC
What You Don't See . . .

Looking at Data on Your Disk

One useful tool for examining what’s on a disk is Disk Editor, a part of Norton Utilities for the Mac that allows you to examine the structure of your files in ever-increasing detail — from the catalog structure to the bits of the data fork.

The first thing you need to know when you use Disk Editor is that the data on a Macintosh disk resides in consecutive 512-byte sectors. The sector is the basic physical unit of disk storage. As you’ll see, the physical arrangement of information on a disk bears little resemblance to the file structure that the Finder presents to you. Visible objects don’t necessarily exist on a disk as coherent entities, files may be scattered in pieces all over the disk, and there are invisible objects without which the disk would be useless.

The major invisible objects on a disk are the boot blocks, volume-information blocks, volume bit map, extents tree, and catalog tree. Each of these contains a rich collection of disk attributes. Disk Editor lets you examine each, either by stepping through them sector by sector or by narrowing the focus to examine each individual attribute. Disk Editor not only shows you the values of all these attributes but also explains the function of each.

The first sector on a Macintosh disk contains the boot blocks. This area is read when the Mac is started. The first thing you see in the boot blocks is an item called the signature bytes, which tells the system whether this is a bootable Mac disk; if it is, a special code is stored here. Using Disk Editor, you see that the special code is LK, which happens to be the initials of Larry Kenyon, the designer of the original Mac file system.

Various other information is stored in the boot blocks: the name of the System, Finder, StartupScreen, and Clipboard files (normally, but not necessarily, “System,” “Finder,” “StartupScreen,” and “Clipboard”); the maximum number of files that can be open simultaneously; and the event-queue size, which controls how many events, such as key presses and mouse moves, can be active at one time.

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volume-information blocks. Here you can see what type of disk you have: an old MFS volume or a new HFS one. You can see how many files, including hidden ones, are on the disk and how many are on the desktop layer. (The desktop layer is where things reside when you place them out on the desktop. The current version of the operating system doesn’t fully support the desktop layer, but see the “System 7 Dog-and-Pony Show” sidebar for a glimpse of how System 7 will handle it.)

The volume bit map shows which sectors of the disk are free and which are assigned, showing a 0 bit for each free sector and a 1 for each assigned one. This can be vital information for recovering deleted or corrupted files. The 0 bits represent available, but not necessarily empty, sectors. A deleted file remains on the disk until it’s written over with another file, so there is normally a lot of deleted information still around in the sectors represented by 0s in the bit map. Disk Editor doesn’t teach you how to recover deleted files, which is a complicated process, but it gives you all the prerequisite information you need for a course in file recovery. Perhaps I’ll hold such a course in this space soon.

The visible objects on a disk exhibit surprising complexity when examined under Disk Editor. A single file does not necessarily occupy a contiguous block of disk space: Large files that have been modified many times are often highly fragmented and scattered over discontinuous blocks of disk segments. The extents tree is the data structure that tracks this fragmenting, and the catalog tree keeps track of the names and locations of files. Both trees are necessary to map the directory structure that you think represents the organization of your disk onto its true organization. Disk Editor lets you follow the branching of these trees.

Files themselves have hidden components, and Norton Disk Editor is useful for examining and modifying them.

First, there are the file attributes of every application, document, and folder on your disk. A file has an attribute indicating whether or not it is visible (the Desktop file is normally invisible); if the file is in the desktop layer (that is, on the desktop); and whether it is locked, protected, in use, cached, open, or a System file. Among these attributes, you find the Bundle bit and the Bozo bit: The former tells you whether the file has an icon associated with it; the latter is an early form of copy protection that is no longer used.

Every file also has forks. The structure of a Macintosh file distinguishes between and physically separates two types of

<table>
<thead>
<tr>
<th>Table 1: How Heavy Is a Megabyte?</th>
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<tbody>
<tr>
<td>Capacity</td>
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<tr>
<td>-----------</td>
</tr>
<tr>
<td>Paper</td>
</tr>
<tr>
<td>Helleth card</td>
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<tr>
<td>Paper tape, 10 feet</td>
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<tr>
<td>Typewriter pages, 1 ream</td>
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<tr>
<td>Newspaper, without photos</td>
</tr>
<tr>
<td>Softcover book, no pictures</td>
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<tr>
<td>Telephone directory</td>
</tr>
<tr>
<td>Street map</td>
</tr>
<tr>
<td>Film</td>
</tr>
<tr>
<td>Microfiche of typewriting</td>
</tr>
<tr>
<td>Microfilm, 1 roll</td>
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<tr>
<td>Linotronic 300 film, 5 x 7</td>
</tr>
<tr>
<td>2.000-dpi 35mm slide</td>
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<tr>
<td>Soltex res-24 film, 5 x 7</td>
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<tr>
<td>133-tal halftone neg.</td>
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<tr>
<td>Continuous-tone B&amp;W 35mm neg.</td>
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<tr>
<td>35mm color slide</td>
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<tr>
<td>Magnetic</td>
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<tr>
<td>Baroulli drive</td>
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<tr>
<td>5.25-inch floppy disk</td>
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<td>3.5-inch floppy disk</td>
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<tr>
<td>9-track IBM tape</td>
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<tr>
<td>5.25-inch HD floppy disk</td>
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<tr>
<td>1-inch videotape, 1 hour</td>
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<tr>
<td>Cassette tape, 90 minutes</td>
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<tr>
<td>SyQuest cartridge</td>
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<tr>
<td>VHS tape, 2 hours</td>
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<td>8mm videotape</td>
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<td>4mm DAT</td>
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<tr>
<td>Optical</td>
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<tr>
<td>Rewritable optical disk</td>
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<tr>
<td>WORM disk</td>
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<tr>
<td>12-inch videodisc, 2 hours</td>
</tr>
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<td>CD-ROM disc</td>
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<tr>
<td>Electronic</td>
</tr>
<tr>
<td>Relay switch</td>
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<tr>
<td>Vacuum tube</td>
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<tr>
<td>Transistor</td>
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<tr>
<td>256K RAM chip</td>
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<tr>
<td>1-MB RAM chip</td>
</tr>
<tr>
<td>Miscellaneous</td>
</tr>
<tr>
<td>Clay tablet</td>
</tr>
<tr>
<td>33-rpm phonograph record</td>
</tr>
<tr>
<td>Human brain</td>
</tr>
<tr>
<td>Xenon atoms on nickel</td>
</tr>
</tbody>
</table>

Contest Winners

In May I asked, “How heavy is a megabyte?” (see “Pound for Pound” in Beating the System, page 307.) George Tanigaki wins the T-shirt for submitting the stats in Table 1, but the competition is not yet closed.

If anyone satisfactorily removes the question marks in George’s table, provides significantly more (or better) numbers, or supplies comparable figures on the cost of a megabyte, I have a second T-shirt waiting.

It’s worth noting that, by the criteria used here, a 256K RAM chip is only about six times as efficient as typewritten text on good bond paper and roughly equivalent to newspaper text.

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POWER TOOLS

information. The data fork of a file contains all the running text, for example, of a word-processing document, plus formatting information and other data. The resource fork contains packets of information in forms the Mac knows about, such as fonts, dialog boxes, text strings, and code. Every application has a resource fork and may have a data fork; every document has a data fork and may have a resource fork. Disk Editor lets you examine files and follow either fork.

This brief look at one component of Norton Utilities for the Mac doesn’t do justice to the product. Count on seeing a review soon, and also count on a further exploration of the Mac via Norton Utilities right here next month.

The System 7 Dog-and-Pony Show

You’ve grown bored with the routine of innovation, jaded with change. You sense when the next rev is due and grow testy if it’s late. Too many demos, too many sneaks, too many nondisclosure agreements. Not only can’t you have it yet, half the time you can’t even talk about it. You have seen the future, and it has warped you for mundane life. You scorn any technology you can actually have.

Is this the attitude for Northern California, or what?

Tonight you’ll attend another Silicon Valley alpha demo; you’ll drive the Honda one more time from Eichlerville to Hermann Millerland; you’ll drink the coffee that you know you’ll regret, take the notes that will be indecipherable in the morning.

Tonight you’re going to see System 7. You’ll like what you see, you’ll want it now, and tomorrow you’ll have to force yourself to use your computer with its insufferably archaic operating system.

There’s still time to call a friend and spend the evening stargazing. It’s a clear night. You don’t have to do this.

All right then. I warned you.

Pronounce It Seven Dot Oh

The first thing you notice is that the demo is being conducted on a 1fx. Typical. You tell yourself to dampen your enthusiasm for the software by a factor of 3 to allow for the fast hardware, but you know you won’t.

The demo starts with little things: subtle changes in the way windows act. When you zoom a window now, it doesn’t fill the entire screen; it leaves the disk and Trash icons visible. Band selecting can extend beyond the border of a window now; the window borders are hot, and the window scrolls when it’s appropriate without making you use the scroll bars. There are more ways to navigate on the desktop. The arrow keys jump you from icon to icon in a window, and typing one or more letters of a file’s name will select it.

There are bigger issues involved, but the demonstrator keeps the discussion on the level of particular features and capabilities. The Control Panel is now a folder, and all the cuds have clickable icons. He pulls down a menu from the icon on the right end of the menu bar and gets a list of available applications. This menu can hold more than applications, though: DAs, documents, and the Control Panel can be installed here without rebooting.

You’re pleased to see that the desktop layer is now recognized by the standard file dialog. This means that a request for a file under the Finder — or any application — recognizes that certain files are on the desktop. Select the desktop layer, and you see these files, as well as all the mounted volumes.

The new Trash can gets a lot of attention. The Trash no longer empties on its own; you must consciously empty it, and even then you must confirm your decision. The confirmation dialog lets you know what you’re eliminating.

The demonstrator says that the Trash is now a folder like any other, and someone wants to know if its window will stay put when you reboot. The demonstrator doesn’t know, so he reboots the machine, and . . . yes! There’s the Trash window, opened and positioned exactly as it was before the reboot. There is applause. These people need a night off.

Some features deserve more demonstration than they get: You know that file sharing, the Help Manager, and the finding capability of the Finder are significant new features, but the demonstrator slips through them quickly. Apparently they are not yet fully functional. You see only the naming function of the Help Manager. Turn on Help, point at anything, and you are told what it is. Applications will have the same use of the Help Manager, and it will have other functions, so the ultimate effect will be a uniform system of on-line documentation. You see only a glimpse of that tonight.

You know that you can search on various criteria under the Finder, but the labeling aspect is news. You can, for example, assign names to colors, assign colors to icons, and then search on the names. File sharing is now built into the Finder too, but you don’t see that tonight.

Aliasing is a feature that should be very useful. You can create an alias file that is just a pointer to another file. The alias has an icon and can be placed in a different folder from that of the file it aliases. Click on either the original or the alias, and the effect is the same: You invoke the original. Someone asks if you can alias alias, and this is demonstrated.

The information stored in a file’s Get Info box is no longer lost when you rebuild the desktop. This gets applause too.

The demonstrator finally gets to fonts. Fonts, it becomes clear, are placed in the System file. This arouses some consternation. Most of the attendees use Suitcase or some such utility for managing fonts; will these be incompatible with System 7? The answer is not a simple yes or no. The new TrueType (a.k.a. Royal) fonts use less space than bit-mapped fonts, and anyway they aren’t stored in the System file but are registered there and loaded into memory when needed. What’s not clear from this demo and, you suspect, will not be clear until System 7 is released, is how the new system will work with old fonts.

But then, you plan to convert immediately to the new fonts. This is not your first look at TrueType fonts, and you continue to like what you’ve seen.

That’s it. The demo’s over. There are a lot of features you didn’t see: interapplication communication, for example. This, though, is plenty. You’ll be miserable tomorrow.

A ValSpeak Glossary

Sneak: Sneak preview. An advance look at a product, for the press.

Honda: A car company whose 1990 ads in Northern California always end with the slogan, "Is this the perfect car for Northern California, or what?"

Rev: Revision. A version of a product.

Eichler: A Northern California architect whose open-courtyard designs are ubiquitous in Silicon Valley.

Hermann Miller: The manufacturer of the beige office cubicles in which most Silicon Valley employees work.

Alpha: A prerelease version of a product that precedes even the beta version, which is released only to certain outside testers.
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- **Report Layout Window**: Define the different areas within your report, using FoxReport's new "band" system. Start with the default bands: Page Header, Body, and Page Footer, then bring in other bands like Title, Summary, Column Headers and Footers, etc.
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Author of "The Macintosh Way" and renowned Apple Evangelist.

Quality and Support "The Macintosh Way"
A Beginner's Guide to Daisy Chains

You need knowledge, patience — and voodoo — to connect SCSI devices properly.

My computer system is starting to look like a giant plasticized pyramid. At the base, you'll find the wide polycarbonate case of a Mac II. Just up from that is the slightly less wide case of a dual-drive Bernoulli Box. (Sure, it has metal sides and top, but all I can see is the cheap plastic bezel on the front.) On top of the Bernoulli sits an SE-width Cobra 215c hard-disk drive. And at the very top, you'll find a narrow little CD-ROM drive.

Cute, eh? Sure, but don't look behind the pyramid — you'll find 14 cables of varying types, all tangled into a mess that makes a plate of spaghetti look organized. Don't ask how long it took to get all four of my SCSI devices talking the way they're supposed to. Well, maybe you should ask, since connecting SCSI devices is the subject of this month's missive.

By Thom Hogan

When your SCSI chain doesn't work, only one of these choices offers the best chance of getting it running.

1. Your psychiatrist, for a renewal of your Valium prescription.
2. Your former spouse, because you could use a little less harassment today.
3. Apple, to see if it has started a customer-service organization yet.
4. The folks at your Apple dealer, just to see what inane suggestion they'll come up with.
5. The spirit world, through the medium of a voodoo practitioner.

And just like most pyramids, this month's topic is full of intrigue, mystery, and awe-inspiring wonder.

The Apple Way

Apple's directions are short and to the point: You can connect up to seven SCSI devices by simply plugging in the cables correctly and making sure that only the first and last devices in the cable chain are terminated. Apple simplifies even that statement by adding that it has already terminated its own internal hard-disk drives.

Great — plug in the cables and remove the termination packs from all but the last device. This should take all of about ten minutes, even if you have a full complement of SCSI goodies.

Well, forget Apple's advice. It doesn't work. To make matters worse still, SCSI-device-addressing and -termination methods vary from manufacturer to manufacturer, making even supposedly trivial installations a half-day job for the un-/way. And if that isn't enough, wait until you find out that your Mac works properly only with the middle device in the chain terminated! (Yes, I've run into at least two combinations of equipment that worked only this way. Curiously, both involved SCSI-equipped scanners.)

Forget the Apple Way

Frank Sinatra was right — you should do it My Way. First, make sure you have the right tools. Anyone experimenting with SCSI connections should have two things: a couple of
extra daisy-chain cables of varying lengths and a termination-pack connector (a SCSI-port connector with the resistors built into it and no cable emanating from it). Why? Well, the varying cable lengths can sometimes make a difference, although I'm at a loss to explain exactly why. Second, using the external termination pack is handier than fiddling with internal terminations, and it allows you to experiment with termination in various places in the chain.

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Now on to the task at hand:

1. Assign SCSI IDs. The Macintosh is device 7. Make sure that each SCSI device you install has a unique ID. Don't forget the internal drive, if you have one (you can't always set it, but it does have an ID!).

2. Remove the termination from all the external devices you're going to connect. Most vendors use external terminators, which you plug into or unplug from the external SCSI connector. Other manufacturers force you to perform surgery by removing an internal terminator. The internal terminator varies from device to device, but it's usually a small, black, rectangular object that has ten or more pins plugged into a socket on a circuit board. To those companies: Boo. hiss! Stop paying lip service to the words "customer support," and give us some real support for a change: Make equipment that we don't have to dismantle to install.

3. Start your daisy chain from the Mac. Perhaps I'm a bit overzealous, but I usually chain devices in the order of their SCSI IDs. This shouldn't make any difference in actual use, as SCSI standards don't specify that devices must be in order in the cable chain; doing it this way pleases me, however, and provides me with a sense of order just prior to my screams of "Why doesn't it work?!?"

On the second set of connectors of the last SCSI device in the chain, plug in your termination pack.

4. If everything works, fine — consider yourself lucky and think of me as the boy who cried wolf. Experience tells me that more than half of you are still reading, however.

If things aren't working, there's a whole subclass of things you need to check to make sure that you haven't made any kind of mistake:

A. Recheck the IDs.

B. Reseat all the cable connections and make sure that they're all snugly in place, with the retainers locking them into the connector.

C. Measure the total length of your cable — Apple doesn't mention a maximum length, but anything more than about 15 feet is likely to start causing you problems, because the line drivers Apple uses in the computer are easy to overload.

D. Make sure all the devices have their power turned on.

E. Check to see if the device you're having problems with uses a software
driver; if it does, make sure the driver is properly installed in your System Folder, as some devices (such as my CD-ROM drive) won't appear on the desktop without the driver's being activated.

5. Try reordering the devices by changing the order in which the cables are sequenced. I've often found that putting an oddball device such as a scanner at the end of the daisy chain suddenly makes it work. Simply moving cables around or trying cables of a different length also sometimes makes a setup function.

6. OK, things are getting serious. Just for fun, I decided to check out Apple's Macintosh Family Reference to see if its description of SCSI control had any interesting tidbits to offer. Surprise, surprise — it did: "A SCSI network with multiple peripheral devices, or more than approximately three feet of total cable length, may require two sets of termination resistors: one set at either end of the SCSI network."

May require? Not does require? All right, so the next thing to try is to remove all external termination, especially if you have only two external devices hooked up. Still no go? Check the internal drive if you have one. Is it terminated? Yes. Well, remove that termination. Try again. Still no go? Replace the termination at the external end of the daisy chain. Still no? Where's Sherlock when you need him?

7. You're now outside of "official Apple policy." First, let me state that under no circumstances should you have three or more terminations active in the SCSI chain, lest you damage the driver chips on the motherboard — and you know how much motherboards cost. Try moving the terminator on the last device from the empty connector to the connector with the cable. If this doesn't work, your only other option at this point is to start moving the termination point around on the chain. Keep moving it from device to device until you get the system to work. Remember, I know of several cases in which the middle device in the chain had to be terminated to get the whole thing to work. If this doesn't solve the problem, you need professional help (your local Apple dealer, for example) or you need to go back through these steps to make sure that you didn't overlook something.

Tell Me Why

Usually the first question I get after someone goes through the SCSI installation Dance is "why?" (The Mac seems to have a way of getting everyone to sound like a four-year-old, doesn't it?) I rarely ask such questions, since I'm basically a pragmatist at heart. But let me take a shot at the answer (no guarantees that I'll hit the mark, however).

Computer makers tout the "digital" nature of their beasts, but there's really no such thing as digital if you take a real close look at what's happening inside your machine. When nothing's happening on a SCSI line, that line is supposed
Introducing the Kodak Diconix M150 plus printer. It travels with any portable or desktop Mac computer, so you can print anytime, anywhere.

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Macintosh computer and new Kodak Diconix printer

WHAT'S ONE
WITHOUT
THE OTHER?

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to be kept at exactly 5 volts (that’s what the termination packs are supposed to do: pull the voltage up to that level when nothing is happening).

When a digital bit travels down the line, the voltage drops. At issue are several things: How fast the voltage drops to the new level, whether all devices see the drop at the same time, how fast the voltage returns to 5 volts after a signal has passed, and several other “analog” types of things.

Apple didn’t help matters by leaving off several of the ground wires in the connector at the back of the Mac (which explains why the Mac has a DB-25 connector on it while all other SCSI devices tend to have 50-pin cinch connectors). Ground is a reference value against which all other signals can be compared.

The result is that all kinds of factors play a part in whether or not a voltage drops and returns to 5 volts in a manner that the electronics recognize as “a bit” of information. A poorly insulated or poorly grounded cable can have an effect, as can the actual resistance of the termination pack (electronic parts are available in a wide range of tolerances) and marginal resistors in the termination pack. A really long daisy chain can introduce side effects, because electricity has to traverse the distance, and by the time it does, another device (such as the termination pack) might be trying to send a new signal over that line. Some SCSI-device vendors provide a voltage to the SCSI connector, and others don’t.

Get the idea? Electronics is not a care­ fully ordered world in which something is always on or off. Instead, electronics is a voodoo art of dealing with timing, sequencing, trigger valuing, and a whole range of other varying factors. And SCSI connections are voodooier than, say, printer connections.

There, did that satisfy you? You al­ ways knew that things weren’t quite as black-and-white as the manuals made them out to be. Now you have the expla­ nation: It’s voodoo. All of which brings me to my last suggestion. If your SCSI devices still aren’t working, maybe you should try calling a doctor. Which doc­ tor? Why the witch doctor, of course.

Thom Hogan practices amateur voodoo at Macreations and is the publisher/editor of The Macintosh 8 Report. You can obtain a sample copy by sending $2 to Macreations, 929 Horizon Way, Pacifica, CA 94044.
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1125 MacProject II 2.1... 365.

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4481 StatView II 1.03... 279.
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Dow Jones... 30 day MBG
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6383 Market Analyzer 1.013... 189.

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Fox Software... 30 day MBG
5572 FoxBASE II/Mac 2.0... 292.
4844 FoxBASE + Multi-User 2.0... 389.

Franklin Software... 30 day MBG
7070 Language Master 2.0... 59.

Individual Software
4720 101 Macros for Excel 2.0... 35.

Informix
4955 Wing2 1.1... 245.

Intuit... 30 day MBG
2452 Quickener 1.5... 35.

Layered... 30 day MBG
2461 Insight OneWrite 1.0... 85.
5207 atOnce 1.01... 285.

Marketing Expert Series... each 395.
2606 FrontDesk 6.10 Multi-User (single)... 59.
6372 FrontDesk 6.10 Multi-User (3 users)... 134.
6373 FrontDesk 6.10 Multi-User (10 users)... 299.

Reference Software... 30 day MBG
6268 Grammatic Mac 1.0-New Powerful writing aid. Checks for grammar, style, usage, punctuation and spelling errors in one pass. Detects over 10,000 writing errors and gives you instant, complete advice... $51.

Lifetree Software... 30 day MBG
6984 Correct Grammar 1.0... 51.

Lundeen & Assoc... 60 day MBG
2684 WorksPlus Spell 2.0A... 56.

MECA... 60 day MBG
2791 Managing Your Money 3.0... 122.

Microlytics... 60 day MBG
2733 WordFinder 2.0A... 34.

Microsoft... 30 day MBG
2866 File 2.0A... 123.
2884 Works 2.00B... 179.
4057 Works on Apple Mac Book... 15.
4669 Word 4.0A... 245.
4668 Working with Works Book... 18.
2865 Excel 2.2A... 245.
2864 Excel in Business Book... 18.
5434 The Microsoft Office... 525.
6382 The Microsoft Office (CD-ROM)... 599.

Monogram... 30 day MBG
2790 Dollars and Sense 5.0... 81.

New Horizons... 30 day MBG
6262 WordMaker 1.0.1... 65.
Now Software ... 30 day MBG
6925 New Utilities 1.0—A powerful collection of 12 system enhancement utilities that help you get more from your Macintosh. ... $89.
6924 ScreenLector 1.0—The easiest and most convenient password protection system. ... 45.

* Nile's & Associates ... 30 day MBG
5048 EndLink 1.1.3 ... 58.
5082 EndNote 1.2.1 ... 75.

* Nolo Press ... 60 day MBG
4226 For the Record 1.03 ... 28.
2981 WillMaker 3.0 ... 32.

* Odesta ... 30 day MBG
5621 Double Helix III 3.0 ... 339.
6489 DataDesk 3.0 ... 349.

* Paracompass
4664 Milo 1.0 ... 156.
190U

* Paragon Concepts
5683 Nisus 2.1 ... 245.

* Portfolio Systems ... 30 day MBG
6916 Dynodex 1.1 ... 57.

* Preferred Publishers ... 30 day MBG
4781 Vantage 1.5 ... 52.
4780 Database 1.5 ... 68.

* ProVEUE ... 60 day MBG
4582 Panorama 1.5 ... 156.

* Reference Software ... 30 day MBG
6268 Grammatik Mac 1.0 ... 51.

* Satori Software
3320 BulkMailer 3.25 ... 75.
3321 BulkMailer Plus 3.25 ... 179.

* Sensible Software ... 30 day MBG
3375 Sensible Grammar 1.6.0 ... 51.

* Software ... 30 day MBG
4692 Bookends 1.2 ... 51.

* Softsync ... 30 day MBG
5439 Endeavour Planner 1.0 ... 95.

* Spinnaker ... 30 day MBG
7129 Accountant, Inc. Professional 1.03 ... 345.

* Survivor Software ... 30 day MBG
6097 Invoit 1.01 (reqs. MacMoney) ... 49.
3289 MacMoney 3.5 ... 59.

* Symantec ... 30 day MBG
3422 More II 3.0 ... 265.

* Symmetry ... 30 day MBG
4504 Acta Advantage 1.02 ... 63.
6089 KeyPlan 1.0 ... 243.

* Synergy ... 30 day MBG
6617 KaleidaGraph 2.0.2 ... 145.

* TIMESLIPS ... 30 day MBG
2986 Timeslips III 2.0 ... 195.

* T/Maker ... 30 day MBG
3639 WriNow 2.2 ... 117.
7360 WriNow 2.2 Corporate 3-Pack ... 245.

* WordPerfect ... 60 day MBG
3800 WordPerfect Mac 1.0.3 ... 229.

* Working Software ... 30 day MBG
4699 QuickLetter 1.02 ... 72.

* Zedcor ... 60 day MBG
6742 Desk 1.0 ... 229.

GRAPHICS & DESIGN
Aapps
6509 MicroTV ... 265.
7117 DigiVideo 1.0 ... 399.
7114 DigiVideo Color

Adobe Systems
MacConnection carries the entire
Adobe Type Library.
6957 Adobe Type Reunion 1.0 ... 39.
5750 Adobe Type Manager 1.2 ... 55.
6053 Adobe Plus Pack ... 109.
6156 Adobe Plus Pack/ATM ... special.
6098 TypeAlign for ATM 1.0.4 ... 59.
6865 Adobe ATM/TypeAlign Pack ... 80.
6931 Adobe Type Set 1 or 2 ... each 58.
1137 Adobe Illustrator 1.9.3 (w/ATM) ... 275.
6644 Adobe Photoshop 1.0 ... special.
1138 Collector's Edition I (Symbols, etc.) ... 79.
4816 Collector's Edition II (Patterns, etc.) ... 129.
5605 TrueForm 2.0 ... 225.
5001 StreamLine 1.2 ... 225.

Curtis Manufacturing
1683 Command Center—Push button control & surge protection of up to 16 peripherals: AC & phone line protection, EMI & RFI filtering, diskette storage, swivel base, anti-static bars & a UL 1449 rating of 350 volts peak ... $93.

Altys
1195 Fontographer 3.1—Now reads and writes Type 1 PostScript fonts! Create and edit downloadable PostScript fonts. Features auto-trace function, automatic hinting, Bezier curves and easy-to-use Mac tools. ... $249.

Bitstream
MacFont mice Typeface Pkgs. each $89.

Bright Star Technology
3962 HyperAnimator 1.5 ... 98.
6093 InterFACE 1.0 ... 249.

Broderbund Software
1427 The Print Shop 1.3.1 ... 35.
6281 TypeStyler 1.01 ... 115.

Claris
1123 MacPaint II 2.0 ... 93.
4815 Smart Font Designer 1.01V ... 289.
1117 MacDraw II 1.1 w/ATM ... 289.
4814 Claris CAD 1.0V3 ... 579.

Computer Associates/Cricket
1668 Cricket Graph 1.3.2 ... 125.
1670 Cricket Presents 2.0 ... 319.

Creative Software ... 30 day MBG
6645 Easy Color Paint 1.1 ... 42.

Custom Applications ... 30 day MBG
6517 Freedom of Press 2.1A ... 255.

DeltaPoint ... 60 day MBG
6095 DeltaGraph 1.5 ... 97.

Deneba Software ... 30 day MBG
6365 UltraPaint 1.0 ... 125.
1769 Canvas 2.1 ... 169.

Publishing Pack 1: Newsletters ... $229.
4556 Pub. Pack 2: Forms and Schedules ... 279.
4566 Publishing Pack 3: Presentation ... 279.

Smart Art I, II, III, or IV ... each $88.

* Aldus ... 30 day MBG
4751 Persuasion 2.0 ... 329.
1530 FreeHand 2.02 ... 329.
7088 PageMaker 4.0 ... 499.

* Altys
1194 Fontastic Plus 2.02 ... 51.
5425 Art Importer 2.0 ... 89.
6499 Metamorphosis 1.0 ... 149.
1195 Fontographer 3.1 ... 249.

* Antic Software ... 30 day MBG
FlexForm Bus. Templates I or II ea. $45.

* Arista Software
Now reads and writes Type 1 PostScript fonts! Create and edit downloadable PostScript fonts. Features auto-trace function, automatic hinting, Bezier curves and easy-to-use Mac tools. ... $249.

* Bitstream
MacFont mice Typeface Pkgs. each $89.

* Bright Star Technology
3962 HyperAnimator 1.5 ... 98.
6093 InterFACE 1.0 ... 249.

* Broderbund Software
1427 The Print Shop 1.3.1 ... 35.
6281 TypeStyler 1.01 ... 115.

* Claris
1123 MacPaint II 2.0 ... 93.
4815 Smart Font Designer 1.01V ... 289.
1117 MacDraw II 1.1 w/ATM ... 289.
4814 Claris CAD 1.0V3 ... 579.

* Computer Associates/Cricket
1668 Cricket Graph 1.3.2 ... 125.
1670 Cricket Presents 2.0 ... 319.

* Creative Software ... 30 day MBG
6645 Easy Color Paint 1.1 ... 42.

* Custom Applications ... 30 day MBG
6517 Freedom of Press 2.1A ... 255.

* DeltaPoint ... 60 day MBG
6095 DeltaGraph 1.5 ... 97.

* Deneba Software ... 30 day MBG
6365 UltraPaint 1.0 ... 125.
1769 Canvas 2.1 ... 169.
Just forget all...

Kent Marsh Ltd. ... 30 day MBG
5457 QuickLock 2.0—Now with NightWatch Connection and a new price. Gives password protection for your screens and network links, colorful displays, and a connection to The NightWatch for information security. ... $34.

MicroMaps ... 30 day MBG
5616 MacAtlas 2.0 (MacPaint) ... $45.
5514 MacAtlas EPSF 1.0 (PostScript) ... 105.
5513 MacAtlas Professional 1.0 (PICT) ... 105.

Microsoft ... 30 day MBG
2878 PowerPoint 2.0 ... 245.
Mindscape
5768 ZING 1.0 ... 125.
NEC
Image Gallery, Photo Gallery, Type Gallery PS (CD-ROM titles) ... each 246.
6825 Clip-Art 3D (CD-ROM) ... 246.
Olduvai
7120 VideoPaint 1.0 ... 279.
Paracomp
4497 Swivel 3D 1.1 ... 395.
5026 ModelShop 1.0 ... 375.

Preferred Publishers ... 30 day MBG
5751 Exposure 1.03 ... 52.
Quark
3230 QuarkXPress 2.12 ... 469.
4621 QuarkStyle 1.01 ... 169.

Bogas Productions ... 60 day MBG
6135 Super Studio Session & Complete Music Library—Beginners and professionals can compose music on 8 tracks then play back using over 300 digitally sampled instruments and sound effects. ... $99.

Silicon Beach ... 60 day MBG
3506 SuperPaint 2.0 ... 125.
6674 Personal Press ... 192.
3980 Digital Darkroom 1.1 ... 248.
3507 Super3D 2.1 ... 315.

Solutions, Inc. ... 60 day MBG
3448 The Curator 1.05 ... 71.

Springboard ... 30 day MBG
3530 Certificate Maker 2.0 ... 22.
4500 Springboard Publisher II 2.0 ... 107.

Strategic Mapping
6511 Exelatix ... 219.
6518 ATLAS-MapMaker 4.0 ... 269.

SuperMac Tech. ... 60 day MBG
3380 Individual Software 2.0 ... 225.
5625 PixelPaint Professional 1.0 ... 369.

3G Graphics
3942 Images with Impact: Graphics 1 ... 50.
4583 Images with Impact: Business 1 ... 65.
6379 Images with Impact: Accents ... 65.

TimeWorks ... 30 day MBG
7115 Publish It! Easy 1.1 ... 113.
5908 Publish It! 1.2 ... 223.

T/Maker ... 30 day MBG
6900 ClickArt Business Cartoons ... 32.

ClickArt Christian Images ... $39.
5167 EPS Business Art ... $69.
3635 EPS Illustrations ... 82.

Wayzata Tech. ... 60 day MBG
6576 Vietnam Remembered (CD-ROM) ... 69.
6370 Quick Art (CD-ROM) ... 175.

Wildflower ... 30 day MBG
6512 SnapShot 2.0 ... 32.

Zedcor ... 30 day MBG
3986 DeskPaint & DeskDraw 3.0 ... 115.

PROGRAMMING & HYPERMEDIA

Antic Software ... 30 day MBG
6100 HOTSPOT ... 42.

Apple Computer
118 HyperCard 1.2.5 ... 42.

Beacon Technology ... 30 day MBG
6426 Gems of The Word 1.0 ... 25.
4967 HyperBible 1.0 (King James) ... 145.
4968 HyperBible 1.0 (New International) ... 175.
Borland
1511 Turbo Pascal 1.1 ... 68.
1512 Turbo Pascal Tutor 1.0 ... 46.

Broderbund Software
5237 Whole Earth Catalog (CD-ROM) ... 89.
5166 SmallTalk/V Mac 1.1 ... 125.

Digital Talk ... 60 day MBG
4415 MacGallery (HyperCard) ... 27.

Dream Maker ... 30 day MBG
7131 Foundation Publishing ... 60 day MBG
6701 HyperSpeller 1.0 ... 29.

HyperPress Publishing
4233 Icon Factory 1.0 ... 45.
5089 Script Library 2.0 ... 57.

ICOM Simulations
5681 HyperTMON 1.0 ... 58.
4085 TMON 2.8.4 ... 87.

Individual Software
4719 101 Scripts & Buttons HyperCard 1.0 ... 35.

Leister Productions ... 30 day MBG
7126 Reunion ... 89.

Manx Software ... 60 day MBG
4075 Aztec C + SDB 3.6B ... 95.

Microsoft ... 30 day MBG
5512 HyperAtlas 1.0 ... 59.

QuickBasic 1.0 ... 64.
your Mac education.

★ Millenium Software ... 30 day MBG
6105 HyperX 3.0 ... 200.

★ Now Software ... 30 day MBG
6739 Prototype 2.1 ... 185.
★ Silicon Beach ... 60 day MBG
5100 SuperCard 1.5 ... 189.
6703 Inside SuperCard (Microsoft Press) ... 45.

★ Softstream Int'l., Inc. ... 30 day MBG
6513 Authenticate & Migrate ... 79.

★ Somak Software ... 30 day MBG
5897 ScriptEdit 1.1 ... 49.
★ Spinmaker ... 30 day MBG
6692 PLUS 2.0 ... 115.
★ Symantec ... 30 day MBG
4644 Just Enough Pascal 1.0 ... 52.
3421 THINK Pascal 3.0 ... 165.
3420 THINK C 4.0 ... 165.

★ Symmetry ... 30 day MBG
3318 HyperDA 1.2 ... 45.
★ TGS Systems ... 30 day MBG
6667 Prograph 1.2 ... 125.
5349 TML Pascal II 3.1 (w/MWP 3.1) ... 109.
True BASIC, Inc.
3597 True BASIC 2.0 ... 55.
★ Zedcor ... 60 day MBG
3985 ZBasic 5.0 ... 88.

Virex ... 30 day MBG
4903 Virex with the Virex INT!—Both detects and repairs files infected by all known Macintosh viruses. The Virex INT continuously monitors the computer to prevent infection. $56.
5885 Virex 10 Pack ... 329.

UTILITIES
★ Abbott Systems ... 30 day MBG
5236 CanOpener 1.1 ... 63.
★ Affinity Microsystems ... 30 day MBG
1016 Tempo II 1.02 ... 93.
★ Aladdin Systems ... 30 day MBG
6169 Shortcut 1.0 ... 46.
6740 StuffIt Deluxe 1.0 ... 63.

★ JAM Software ... 30 day MBG
6089 Smart Alarms w/Print. Diary 2.9.1 ... $49.
6088 Smart Alarms 3.0.2 (1-4 users) ... 99.
6087 Smart Alarms (5-8 users) ... 149.
6086 Smart Alarms 3.0.2 (9-15 users) ... 199.
★ Kent Marsh Ltd. ... 30 day MBG
5457 QuickLock 2.0 ... 34.
2591 The NightWatch 1.03 ... 85.
6134 MacSafe II ... 107.
★ Kiwi Software ... 60 day MBG
6267 KiwiEnvelope 3.0 ... 34.
★ Loop Software ... 30 day MBG
5442 PictureBook 3.2 ... 39.
Magic Software
7267 AutoSave II 1.1 ... 28.
7266 POWERPics 1.0 ... 39.
7269 POWERmenus 1.1 ... 39.
7270 Backmac 1.1 ... 50.
★ Microlytics ... 60 day MBG
2732 GCIver 2.0 ... 45.
★ Microseed's Pub. ... 60 day MBG
7068 INITPicker 2.0 ... 35.
4210 Screen Games 1.0 ... 39.
2913 Redux 1.62 ... 49.
7116 Rival 1.1 ... 49.
★ Now Software ... 30 day MBG
6824 ScreenLocker 1.0 ... 49.
6825 Now Utilities 1.0 ... 89.
Olduvai
4502 MultiChip 2.0 ... 49.
★ ON Technology ... 1 year MBG
6385 On Location 1.0 ... 75.
★ Peter Norton ... 30 day MBG
6748 Norton Utilities for the Mac 1.0 ... 84.
★ Software Innovations ... 30 day MBG
5869 HandOff 1.1 ... 31.
6647 HandOff II ... 52.
★ Solutions, Inc. ... 60 day MBG
3448 SmartScreen & Clipper 2.1 ... 45.
3449 SuperGlue II 2.01 ... 61.

Lifetree Software ... 30 day MBG
Pointing is rude,

ASD Software ... 30 day MBG
7085 FileGuard Extended 2.5—Protect your hard drives, applications, files/folders (including system folder) from unauthorized access, deletion, and/ or illegal copying. Now with system usage audit trail. .............. $145.

SuperMac Tech ... 60 day MBG
3383 SuperSpool 5.0 .......... 58.
3382 SuperLaserSpool 2.02 ... 87.
3378 SuperLaserSpool 5-Pack 2.02 .... 289.
3377 DiskFit 1.5 ............. 58.
3379 Network DiskFit 1.5 .... 225.
3381 Sentinel 2.0 ........... 87.

Symantec ... 30 day MBG
5726 Symantec Antivirus for Mac (S.A.M.) .... 67.
5724 Symantec Utilities for Mac (S.U.M.) ... 99.

Syxen ... 30 day MBG
6655 MacPhonebook 2.0 ....... 51.
7147 MacEnvelope 5.0 ......... 57.
6666 MacEnvelope Plus 2.0 ...... 159.

Williams & Macias ... 30 day MBG
6226 myDiskLabeler III Pack (Qty. 25) .. 49.
3780 LaserWriter Label Pack (Qty. 25) .... 15.
3781 LaserWriter Label Pack (Qty. 25) ... 18.
4976 StickyBusiness 1.2 .... 149.
6927 StickyBusiness Plus 1.2 ...... 149.
XTree
5177 XTreeMac 1.02 ........... 50.

LEARN & PLAY
Access Software
4655 World Class Leader Board Golf ... 25.
Accolade
1194 Hardball (CP) ............ 26.
4484 Mean 18 (CP) ............ 26.
4485 4th and Inches (CP) ..... 26.
6760 Test Drive II-The Duel (CP) .... 31.
Activation
4475 Quarterstaff (CP) ......... 28.
4486 Manhole .................. 28.
5127 Manhole (CD-ROM) ....... 34.
5517 Cosmic Osmo .............. 40.

Bogus Productions ... 30 day MBG
1215 Practica Musica 2.2 ........ 69.

Bogus Productions ... 60 day MBG
4255 Super Studio Session 2.0 ..... 65.
Bright Star Technology
3961 Talking Tiles 1.0 ......... 30.
1402 Alphabet Blocks 1.0 .. 30.
3964 Broderbund Software .... 18.

5886 Star Wars (CP) ........... $23.
4059 Shuffletop Cafe (CP) .... 23.
1421 Ancient Art of War (CP) .... 26.
4540 Ancient Art of War at Sea (CP) ... 26.
6516 The Playroom (CP) ..... 29.
4229 Where/World Carmen Sandiego? (CP) ... 29.
5755 Where/World Carmen Sandiego? (CP) ... 29.
5223 Where/World USA Carmen Sandiego? (CP) ... 29.
6384 PlayMaker Football (CP) .... 29.
4966 SimCity 1.1 (CP) ........ 29.
5871 SimCity Supreme ........ 47.
6515 SimCity Terrain Editor .. 16.
1422 Geometry 1.2 (CP) .... 58.
4067 Calculus 1.2 (CP) .... 58.
1426 Physics 1.2 (CP) ........ 58.

Bull City Software ... 30 day MBG
5841 Myrt's Revenge (CP) ... 32.

Bullseye
1645 Foldier Trampoline 2.0 (CP) .... 23.
1544 Ferrari Grand Prix (CP) ... 31.
4074 PS1 Mustang Flight Simulator (CP) .... 31.
Carina Software
5726 Voyager 1.2 .............. 89.

Custom Applications ... 30 day MBG

Casady & Greene ... 60 day MBG
2268 Crystal Quest 2.2X .......... 25.
4119 Crystal Quest w/Critter Editor 2.2X .... 39.

Coda Music Systems
5854 MusicProse 1.01 ........ 187.
5604 Finale 2.0 ................ 559.

Davidson & Associates
1754 Math Blaster! 1.0 (CP) .... 29.
6128 Math Blaster Mystery (CP) .... 29.
4976 Speed Reader II 1.0 (CP) .... 29.

Electronic Arts ... 30 day MBG
6716 Pipe Dreams .............. 17.
1850 Reach for the Stars 3.0 .. 26.
6297 Halls of Montezuma .... 32.
6683 Sands of Fire ............. 32.
5584 Bard's Tale .............. 32.
4064 Chuck Yeager Flight Simulator .... 32.
4981 Starflight 1 ............. 36.
6594 Starflight .............. 39.
1846 Deluxe Music Construction Set 2.5 ... 84.

First Byte ... 30 day MBG
5294 Puzzle Storybook 1.0 (ages 3-8) ...... 27.
5233 Dinosaur Discovery Kit 1.0 (ages 3-8) .... 27.
3941 Smooth Talker 3.0 .... 32.
3936 KidTalk 2.0 (ages 5-15) .... 32.

Great Wave ... 30 day MBG
2276 KidsTime 1.2 (ages 3-8) .... 26.
4334 NumberMaze 1.1 (ages 5-12) .... 26.
2270 American Discovery 2.3 (ages 9+) .... 38.
2273 ConcertWare + 4.0 ........ 38.
2271 ConcertWare + MIDI 5.1 .... 98.

HyperGlot ... 30 day MBG
Word Traveler—Beginner to Advanced (Spanish, French, German) ea. 29.
Prunciation Tutor—Beginner (Spanish, French, German) ea. 35.
Verb Tutor—Intermediate (Spanish, French, German) ea. 42.

In-line Design ... 30 day MBG
5870 Bomber 1.3 (includes headphones) ... 26.

Knowledge Revolution ... 30 day MBG
7310 Interactive Physics .... 169.

Learning Company ... 30 day MBG
2670 Reader Rabbit 2.2 (CP) (ages 4-7) .... 30.
5453 Talking Math Rabbit 1.0 (ages 4-7) .... 30.

MicroProse
4697 Pirate! (CP) ............. 35.

Microsoft ... 30 day MBG
2868 Flight Simulator (CP) ...... 32.

Miles Computing
5253 The Puzzle Gallery ........ 26.
2765 Fool's Errand ............ 32.
2797 Harrier Strike Mission II (CP) .... 32.

Mindscapes
4083 Balance of Power 1990 (CP) ... 29.
3987 Colony (CP) .............. 29.
4596 Deja Vu II (CP) ........ 31.
2743 Crossword Magic (CP) .... 29.
2749 Shadowgate (CP) ........ 29.
2751 Uninvited (CP) ........... 29.

Penton Overseas ... 30 day MBG
5864 Vocabularis French (level I) .... 29.
5887 Vocabularis French (level II) .... 29.
5885 Vocabularis Italian (level I) .... 29.
5889 Vocabularis Italian (level II) .... 29.
5867 Vocabularis Spanish (level I) .... 29.
5891 Vocabularis Spanish (level II) .... 29.
5868 Vocabularis German (level I) .... 29.
5898 Vocabularis German (level II) .... 29.
6839 Vocabularis Russian (level I) .... 29.

Microsoft ... 30 day MBG
Mail 2.0—Allows you to send & receive messages and files, & share the job of creating information within a small workgroup or a large network.
5855 Microsoft Mail 2.0 workstation ... $83.
5856 Microsoft Mail 2.0 server .... $245.
Clicking is crude,

Franklin Software ... 30 day MBG
7070 Language Master 2.0—Provides definitions for 80,000 words plus the largest thesaurus available with 1.4 million responses. Add this DA to all of your Mac applications... $59.

6640 VocabuLearn/ce Russian (level II) ... 29.
6638 VocabuLearn/ce Hebrew (level II) ... 29.
5866 VocabuLearn/ce Japanese (level II) ... 35.
5864 VocabuLearn/ce Japanese (level II) ... 35.

**Personal Training Sys. ... 60 day MBG**
MacConnection carries the entire line of PTS modules. A partial listing follows. Personal Training for Excel 2.2

5573 XL1 Beginning Spreadsheets ... 36.
5574 XL2 Intermediate Spreadsheets ... 36.
5575 XL3 Advanced Spreadsheets ... 36.
5576 XL4 Creating Business Graphics ... 36.
6021 XL5 Building Databases ... 36.
6020 XL6 Beginning Macros ... 36.
6387 XL7 Advanced Macros ... 36.

1900A Personal Training for Macintosh
5263 B1 The Basics (for 2 floppy drives) ... 36.
5264 B2 The Basics (for Plus or SE w/HD) ... 36.
5265 B3 The Basics (for Mac II w/HD) ... 36.
5266 B4 Beyond the Basics ... 36.

Personal Training for Word
4947 W1 Beginning Level ... 36.
4954 W2 Intermediate Level ... 36.
5036 W3 Advanced Level ... 36.
5416 W4 Additional Features ... 36.

Personal Training for Persuasion
5269 LP1 Beginning Persuasion ... 36.
5270 LP2 Intermediate Persuasion ... 36.
5271 LP3 Creating Auto Templates ... 36.
5272 LP4 Creating Artwork ... 36.

Personal Training for HyperCard
5194 H1 Using HyperCard ... 36.
5195 H2 Creating Cards & Stacks ... 36.
5287 H3 Basic Scripting ... 36.
5268 H4 Advanced Scripting ... 36.

Personal Training for PageMaker
4852 P1 Beginning PageMaker ... 36.
4853 P2 Intermediate PageMaker ... 36.
5093 P3 Tips & Techniques ... 36.
5097 P4 Advanced Features ... 36.

Personal Training for Works
5196 M1 Database & Form Letters ... 36.
5197 M2 Advanced Databases ... 36.
5273 M3 Spreadsheets ... 36.
5274 M4 Word Processing ... 36.

Personal Training for Illustrator 88
5259 A1 Beginning Illustrator ... 36.
5260 A2 Intermediate Illustrator ... 36.
5261 A3 Creating Special Effects ... 36.
5262 A4 Precision Drawing Techniques ... 36.

Personal Training for FileMaker
5278 FM1 Beginning FileMaker ... 36.
5279 FM2 Intermediate FileMaker ... 36.
5280 FM3 Advanced FileMaker ... 36.
5281 FM4 Tips & Techniques ... 36.

Personal Training for FreeHand
6353 FH1 Beginning Level ... 36.

Postcraft
6466 Citadel ... 27.

Premier Technology
5773 Strategic Conquest Plus 2.0 ... 34.
5774 NetTrek—The Real Version 2.3 ... 34.

Sierra On-Line
3397 Leisure Suit Larry (CP) ... 23.
5694 Manhunter: San Francisco (CP) ... 26.
5458 Manhunter: New York (CP) ... 26.
3394 King's Quest (CP) ... 26.
3396 King's Quest III (CP) ... 26.
3398 Police Quest (CP) ... 26.
3399 Space Quest (CP) ... 26.
3400 Space Quest II (CP) ... 26.

**Silicon Beach ... 60 day MBG**
3501 Apache Strike 1.1 ... 32.
3502 Beyond Dark Castle ... 32.
3503 Dark Castle 1.1 ... 32.

**Softstream Int'l, Inc. ... 30 day MBG**
4071 Mac•Man ... 23.
4995 Cribbage Tutor ... 26.
6258 Mac•Rummy ... 32.
4073 Colour Billiards ... 38.

**Software Toolworks ... 30 day MBG**
4945 The Hunt for Red October 1.1 ... 20.
1842 Chessmaster 2100 1.1 ... 28.
4619 Mavis Beacon Typing 1.3 (CP) ... 32.
4588 Life & Death (CP) ... 32.
6111 Cribbage King-Gin King ... 39.

**Spectrum Holobyte ... 30 day MBG**
4001 Solitaire Royale (for Mac II & SE) ... 19.
3464 Tetris 1.1 (for Mac II & SE) ... 19.
3462 PT-109 ... 25.
3459 Falcon 2.2 ... 30.

Preferred Publishers ... 30 day MBG
5751 Exposure 1.03—The only screen capture utility that offers full black and white and color paint editing of your screen. Captures virtually any image on all Macintoshes... $52.

**Spinnaaker ... 30 day MBG**
2328 Sarcon IV (CP) ... 28.
2329 SAT Score Improvement 1.0 (CP) ... 57.

**SubLogic ... 60 day MBG**
4698 Jet (CP) ... 31.

**Think Educational ... 60 day MBG**
3615 MacEdge II 1.0 (CP) (ages 6-12) ... 27.
True BASIC, Inc.
3571 Algebra 3.02 (with workbook) ... 45.
3580 Pre-Calculus 3.02 (with workbook) ... 45.
3575 Calculus 3.02 (with workbook) ... 45.
6110 Algebraic Proposer 2.0 ... 45.

**Unicorn ... 30 day MBG**
3751 Animal Kingdom (CP) (ages 6-12) ... 27.
3756 Math Wizard (CP) (ages 5-10) ... 27.

**Wayzata Tech. ... 60 day MBG**
6389 The World Factbook 1989 (CD-ROM) ... 69.

**XCR ... 30 day MBG**
6152 TaskMaker (CP) ... 27.
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**Under the Hood**

Memory is the Mac’s prime commodity — the currency of the computer. Here’s what you need to know about managing it.

Programs need memory for their instruction store — the processor executes instructions from this in-RAM store — as well as memory in which to store data. Memory makes the Mac go round. You can’t run a program without it.

The goings-on in memory ordinarily lie below the consciousness of application programmers. Usually we can ignore the details of low-level actions such as the allocation of automatics on the stack, but as certainly as death, taxes, and the ubiquitous bomb box, there comes a time when things go wrong, the source code is slow in revealing its secrets, and your only recourse is to dig in at the machine level. That’s when you need an intimate knowledge of what’s happening “under the hood.” Knowing how your code and data look in RAM at run time is the most important facet of the black art of debugging.

This month we’ll take a look under the hood of a Mac application. We’ll explore the stack and heap as they relate to C programming, keeping an eye out for the potential pitfalls of working with data objects.

**Program Code in Memory**

Under the hood, code consists of the lists of machine-language instructions, created by THINK C’s compiler and built-in assembler and derived from your source code. An instruction is a binary word that instructs the machine to do something simple, such as load a value into a register, move data from one

---

**Figure 1: Pushing and Popping**

Figure 1: The stack grows as objects are pushed onto it (A) and shrinks as objects are popped off it (B).

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memory location to another, or add the contents of two data objects.

We’ve known people who could read and edit machine code, poking bits here and there into RAM to fix a problem, but most people think of these instructions in terms of their mnemonics. The set of mnemonics for a processor is called its assembly language. Machine-level debuggers such as ICOM Simulations’ TMON and Jasik Designs’ Debugger contain a disassembler that converts the binary form of an instruction into its mnemonic. Using a debugger is the only practical way to view machine code.

Machine code is kept on-disk, as a part of your application file, in CODE resources, which are created by THINK C when it links the project. Each resource corresponds to a code segment that you define in the compiler’s Project window.

Machine code must be in RAM while it is executing, and segments are limited to 32K, so it’s necessary to segment a program. A Toolbox manager called the Segment Loader is responsible for automatically moving these segments from disk as they are needed. THINK C’s Get Info menu selection reports the size of your code segments.

Large applications manage memory by controlling which code segments are in RAM at a given time. This is how a program with 600K of segmented code can run in a MultiFinder partition of 512K — some code segments are removed from RAM when others are moved in. The Toolbox call UnloadSeg marks a CODE resource as “purgeable,” making it a likely candidate for being replaced when another resource is brought into RAM. Some applications call UnloadSeg on a set of program segments each time through the event loop. Another strategy is to call it before attempting to save a document. You may notice that Generic App, our sample application of the past three months, never calls UnloadSeg — small applications usually don’t.

**Program Data in Memory**

The data of a running program is a dynamic collection of values associated with the program, kept in known locations of the computer’s memory. The program reads and writes a location with its address, loading the contents of a 32-bit address register with this address and using an instruction to fetch or store the value. Memory is organized with its beginning at address 0 and the maximum possible address at 4,294,967,295, which corresponds to 232 − 1. Addresses are usually specified in hexadecimal, so the address space of a 32-bit machine is 0x00000000 through 0xFFFFFFFF; Apple uses only the lower 24 bits of an address, limiting the Mac’s address space to 16 megabytes, although System 7 is slated to allow the use of all 32 bits.

The Mac’s processors have eight 32-bit address registers, named A0 to A7, and eight 32-bit data registers, named D0 to D7. Address registers are used to do address calculations and to access values in RAM. Data registers are used as scratch space for arithmetic calculations. Register access is faster than RAM access, and clever use of register variables in your C program can dramatically speed up a sluggish application.

A data object or variable begins at its address and occupies zero or more of the bytes that follow. The number of bytes that a data object occupies depends on its type. If you’re looking at data objects in RAM, there are no visible boundaries between consecutive variables. To know where one object ends and another begins, you need to know the sizes of these basic types. Table 1 lists these data types and their sizes in both C and Mac-based Pascal. You should know this material as well as you know your multiplication tables or the alphabet.

### Table 1: C and Mac Data Types

<table>
<thead>
<tr>
<th>C type</th>
<th>Mac (Pascal) type</th>
<th>Size (bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>unsigned char</td>
<td>Byte</td>
<td>1</td>
</tr>
<tr>
<td>int</td>
<td>Integer</td>
<td>2</td>
</tr>
<tr>
<td>short</td>
<td>Integer</td>
<td>2</td>
</tr>
<tr>
<td>long</td>
<td>Longint</td>
<td>4</td>
</tr>
<tr>
<td>float</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>double</td>
<td>Extended</td>
<td>8</td>
</tr>
<tr>
<td>Size</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Fixed</td>
<td>Fixed</td>
<td>4</td>
</tr>
<tr>
<td>char</td>
<td>Ptr</td>
<td>4</td>
</tr>
<tr>
<td>char **</td>
<td>Handle</td>
<td>4</td>
</tr>
<tr>
<td>char (256)</td>
<td>Str255</td>
<td>256</td>
</tr>
<tr>
<td>unsigned char</td>
<td>Boolean</td>
<td>1</td>
</tr>
<tr>
<td>Boolean</td>
<td>Integer</td>
<td>2</td>
</tr>
</tbody>
</table>

1Pascal-language-defined (Toolbox)

2C-language-defined (application)

The scope of an object is the length of time it contains valid data. The scope of a global object is the entire program, since it is initialized when the program is loaded and space for it is reserved in the application heap until the program exits. The other hand, variables declared inside a function — the local, or so-called automatic, variables — have a scope that is limited to the life of that function. Local variables are not initialized when they’re created; their values are unknown, and you must initialize them before using them — not doing so is a common mistake of beginning programmers.

Another common programming error is using a variable outside its scope. For instance, foo (), in Example 1, copies a null-terminated string of characters (the string ends with a byte whose content is 0) and returns a pointer to the copy.

foo () has a serious flaw: The destination buffer is defined inside the function as a local variable. The function returns a pointer to a buffer that ceases to exist as soon as foo () returns. This function really needs to be passed a pointer to the destination buffer, declared in the caller. The fix appears in Example 2, and while we’re at it, let’s call foo () by its real name, strcpy ()

Notice that strcpy () returns a pointer to one of its arguments, so it
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knows the address of this string. Why would a function return a pointer to a variable that was passed to it as a parameter? So that you can write one-line programs that look like LISP programs, as in Example 3.

The Stack

Automatic variables come into and go out of existence with a function because they're created on the application stack. A stack, sometimes called a push-down list, is known as a LIFO (last in, first out), an acronym that describes how it gives and receives data. The stack grows and shrinks as data objects are pushed onto and popped off the stack. Access to these objects is through the top of the stack.

Figure 1 uses a stack of baseball cards to demonstrate the stack mechanism.

On the Mac, the top of the stack is maintained in register A7. The stack base starts in high memory and grows downward — thus register A7's value decreases as items are added to the stack.

In the normal sequence of a running program, one function calls another and that called function in turn calls another. This process proceeds according to the program's design. Programs use the stack to keep track of the flow.

A quick note on terminology: If function foo () calls function bar (), then foo () is the caller and bar () is the callee, or called function, as in Example 4.

The stack is used to store three kinds of data for each function call. To illustrate this, we'll use the foo-bar code fragment. Say that bar () is about to be called from foo (). Before bar () is called, foo () first saves the machine's current state on the stack. The state data includes all machine registers that bar () will use and the return address in foo () at which the instruction stream should continue when bar () returns.

Next, the values of the parameters arg1 and arg2 are pushed onto the stack. (C compilers push parameters in last-to-first order — arg2 before arg1 in our example — and Pascal compilers push their parameters first to last. There are also other differences in the calling conventions of the two languages. Look up calling conventions in the index of Symantec's THINK C User's Manual if you're interested.)

Finally, the space required for local variables of bar () is added to the top of the stack.

This collection of stack objects — the caller's state, the function's parameters, and the automatic variable space — is called the current stack frame and is pointed to by 680x0 register A6. All of a function's local variables are accessed as offsets from A6. The compiler generates the code responsible for creating the frame and, when the function returns, for updating both the stack and frame pointers. This is the reason why local variables have a scope limited to their own function's lifetime — the stack frame in which they reside disappears after the function returns.

The Heap

Whereas the stack mechanism is rigidly structured and its contents are limited to function-call-related data, the heap contains a varied collection of data objects. The Mac actually has at least two heap zones: one for the system and the other for the application. The system heap is off-limits to your application. It contains the System code, fonts, DAs, INITs, device-management data, and other esoteric stuff important to the health of your Mac. The application heap is yours to use as needed, but step lightly: It contains your application resources, including the code segments of your application. Many a bomb box is the result of writing over a code resource in the heap. We'll refer to this application heap zone as "the heap," but remember that multiple heap zones can be resident in RAM and that the following discussion can apply to any one of them.

A heap consists of blocks — groups of contiguous memory locations — that are accessible to your program indirectly, through the Macintosh Memory Manager. They come in three flavors: free, nonrelocatable, and relocatable. You must allocate a block of memory from the heap before you can use it, a process analogous to renting a locker at the bus station — only one application can use a block at a given time.

Free blocks are those that aren't allocated. Most blocks in the heap fall into this category when an application begins. Free blocks are allocated with the Memory Manager procedures NewHandle or NewPtr, which accept a parameter that specifies the size of the block, in bytes. The calls DisposePtr and DisposeHandle free an allocated block (Apple disposed of the e in dispose).

Nonrelocatable blocks are allocated in the heap, and their location never changes. You allocate one of these blocks with NewPtr, which returns a pointer to the block. Those of you familiar with the library function malloc() will recognize its similarity to NewPtr. Nonrelocatable blocks are undesirable, because of the Mac's memory-allocation method.

Relocatable blocks are preferable and are allocated with NewHandle, which returns a handle to the object. A handle is
In a user-interface-intensive Mac application, allocations happen all the time without your knowledge.

Example 5
typedef struct List {
  short count;
  ListElm elm;
} List, *ListPtr, **ListHdl;

ListHandle theList;
Size listSize;
listSize = sizeof (List) + 3 * sizeof (ListElm);
/* allocate a list of 4 elements */
if (theList = NewHandle (size))
  (**theList).count = 4;
else
doMemError ();

Example 6
TEHandle teh;
TEPtr tep;
...
teh = TENew (&aRect, &aRect);
tep = &teh;
textHdl = NewHandle (120L);
tep->hText = textHdl;
tep->just = teJustLeft;
tep->selStart = 0;
tep->selEnd = 0;

Example 7
(**teh).hText = textHdl;
(**teh).just = teJustLeft;
(**teh).selStart = 0;
(**teh).selEnd = 0;

avoid the problem, because the Memory Manager can move them out of the middle of long runs of free blocks.

Because your data is moved around in RAM, you need a method for keeping track of it. Apple's solution relies on a bank of system-maintained master pointers that hold the addresses of relocatable blocks. After the Memory Manager moves a block, it changes the value of the master pointer to point to the block's new location. The handle returned by NewHandle points at the master pointer, which never moves, and an application can find its data with a double-dereference of the handle.

Example 5 demonstrates this double-dereference: We've created a list structure of four ListElm elements. Note the double-dereference of the handle to assign the value 4 to the count member of the List structure. No matter where the block ends up in the heap, we can always get to the contents with a double-dereference.

In a user-interface-intensive Mac application, allocations happen all the time without your knowledge as a result of calls to the Toolbox. A dialog box is a good example. Your application may have called GetNewDialog and ModalDialog, but the various Toolbox Managers involved in creating, displaying, and tracking user events for the dialog box are calling NewHandle behind the scenes and the heap is being scrambled.

Another cause of block movement is an intersegment function call. We mentioned earlier that the Segment Loader makes sure that code is in RAM when it needs to be. The process of loading a CODE resource just might move relocatable objects in the heap, to make room for the new code segment.

Many bugs are due to this relocation of heap objects. One example occurs when your program calculates the address of an object, calls a function or Toolbox call that scrambles the heap, and then uses the no-longer-valid address.

Example 6 demonstrates such a loca-

Figure 2: The Heap Before and After Compaction

Figure 2: Here's how the heap looks before and after a compaction by the Memory Manager. Because of the nonrelocatable blocks in the heap, the maximum block size in this heap is limited to half the amount of free memory.
Value Is More Than Skin Deep.

Buyer beware. There are those that would have you believe that all external hard drives are essentially the same. But smart consumers know that looks can be deceiving.

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<table>
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<tr>
<td>180MB</td>
<td>$1,499</td>
</tr>
</tbody>
</table>

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Check your code against a list of all the Toolbox calls that can potentially reorganize the heap.

The address becomes invalid.

At times it's necessary to do what we attempted in Example 6. How do you pass an address of a relocatable object when the object has the potential to move? The easiest solution is to lock the object in the heap with HLock, which has the effect of turning a relocatable object into a nonrelocatable one. Of course, doing so opens the door to heap fragmentation, so it's a good idea to first move the object from the center of things to the top of the heap with MoveHIls before you lock it.

Example 10 demonstrates the process.

You can pass the address of a relocatable object to a Toolbox call that will move memory if you first lock the handle. Remember to unlock the handle with HUnlock as soon as possible.

Not all Toolbox calls move memory, and locking a handle is not always necessary. Certain Toolbox calls, such asOffsetRect, SetPort, FixMul, and InfoScrap, perform operations that really have no business moving relocatable objects in the heap, and locking handles when using these calls is a waste of time. Another class of Toolbox calls, such as NewRgn, GrowWindow, and TESetText, are used for indirectly creating objects in the heap, and when appropriate, handles should be locked.

Inside Macintosh lists all the Toolbox calls that can potentially reorganize the heap. They're listed as "Routines that may move or purge memory," which is not strictly accurate — memory doesn't really go anywhere, but the objects in the heap are relocated. This information is also available from other sources, such as Thom's The Programmer's Apple Mac Sourcebook. It's a good idea to check your code against these lists if you're going to do things with dereferenced pointers to relocatable heap objects.

Now that you know the circumstances under which the heap is scrambled, you don't need to lock a block every time you assign one of its fields. You probably won't be returning pointers to local variables anymore either. We hope you haven't misunderstood this month's message — we're not advocating assembly-language programming; rather, we're trying to make you a more effective C programmer.

Example 8

```
Example 8

... register TERec *tep;
TCHandle teh;

textHdl = NewHandle (128L);
tep->hText = textHdl;
tep->just = teJustLeft;
tep->selStart = tep->selEnd = 0;
```

Example 9

```
Example 9

MenuHandle theMenu;

... theMenu = GetMenu (kMenuID);
GetIndString (**theMenu)->menuData, BUFSIZ, kMenuStr3);
```

Example 10

```
Example 10

theMenu = GetMenu (kMenuID);
MoveHIIs (theMenu);
HLock (theMenu);
GetIndString (**theMenu)->menuData, ...
```

Using this form, you can point to the nth item in an array, as in

```
short n;
p = &destStr [n];
```

Don't forget to initialize p!

The copying occurs inside the while statement. When a null value (0L on the Mac) is assigned to the buffer, the test fails and the loop exits. The function completes by returning a pointer to the first character, again by using the name of the buffer without the square brackets.

The copying loop executes about four times faster than it would if we didn't use the register pointer. Note the use of pointer arithmetic to step through the two strings.

This is the essence of fast C code. The while loop has no loop body, and the expression p++ = *sourceStr++ is commendably terse. This loop fosters the rumor that C programmers sleep on cold cement slabs and wear hair shirts under their Woolrich flannels. It's just not true (ouch!).
In today's computer marketplace, the mail order field is crowded with fierce competition. Therefore, to succeed for over a decade, there must be a foolproof formula for gauging which publications pull in business — and which don't.

For CDA Computer Sales, a computer mail order veteran, the publication that works best for them is MacUser.

"Buyers read MacUser," says Marc Daniels, president of CDA, which sells complete computer systems. "They use it as their guide.

"We've been analyzing the numbers very carefully," added Mr. Daniels, "and we've found that the dollars we invest in MacUser perform twice — sometimes three times — as well as the dollars we spend in other publications. We also track the number of catalog requests we get from each magazine, plus the orders those catalogs produce. We find that the MacUser customers have a better response rate."

Since CDA sold its first products over a decade ago, Mr. Daniels and CDA have advertised in many different publications. Yet the Macintosh publication he uses most frequently is MacUser. CDA depends on it now, and plans an even greater investment in the future.

All of which goes to show that to build better business, MacUser is the perfect resource.
Tip Sheet

Readers Share Their Tips and Tricks

Send tips to Tip Sheet, c/o MacUser
950 Tower Lane, 18th Floor
Foster City, CA 94404
MacUser pays at least $25 for every tip used, and the Tip of the Month earns $100.

Finder

If you’re a neatnik like lam, it probably drives you crazy that the icons for frequently updated files such as Word’s User Dictionary or White Knight’s “stuff” file constantly move to the upper left corner of the window, often overlapping the icons already there. These icons do so regardless of their location when you started the application.

You can lessen the aggravation of these jumping icons by placing a cluster of them in the window’s upper left corner. Hold down the Command key while you drag the icons into place, thus automatically aligning them to an invisible grid.

Once the icons are there, no room is left for the floating icon. It still moves as close as possible to the upper left corner, but at least it doesn’t overlap the other icons.

David Vallulis
Scotts Valley, CA

If your Mac takes too long to copy a folder full of small files from a floppy disk to your hard disk, open the folder first, use the Select All command, and drag all the files to the hard disk. This technique cuts the copying time by up to 85 percent.

J. C. Steinhoff
Phoenix, AZ

Multifinder

Users with 1-megabyte Macs rarely use Multifinder. But they may occasionally want to test some small applications in the Multifinder environment, and they generally assume this means setting the Special menu’s Set Startup option to Multifinder and restarting the Mac.

To restart this way is a nuisance and can be excruciatingly slow, especially if your System Folder contains many INITs.

Switching to Multifinder temporarily (without altering the Set Startup option or restarting) requires the same procedure used when switching from one Finder to another. Hold down both the Command and the Option keys, and then double-click on the alternative Finder’s (or Multifinder’s) icon. In this way, when you restart, you are in the Finder again. There’s no need to utilize the Set Startup option, restart, and then restart again to get the Finder running solo.

José Carlos Cossio
Santander, Spain

Have you ever received the message “the file is busy” when trying to get information (Command-I) about an open file? This can be annoying, but there is a way to access the file without having to close the file or reboot (in case you’re prying into some INITs).

For example, suppose that while using an application, you have problems you suspect may be memory-related. You go to the Finder to check the memory size (with Command-I) and learn that this information is “n/a” (not available) because the application is open. Your only recourse is to save your work and quit the application in order to check it. Or suppose you want to check the version number of an application or an INIT/cdev such as MacroMaker that’s always “busy.” Quitting the application or relocating the INIT and then rebooting takes some time.

There is an easier way of obtaining the information you want with minimal disruption — at least if you’re running under Multifinder. Simply duplicate the file (Command-D) you’re interested in and then use Command-I to get the data you need from the copy. When you’re finished, you can trash the duplicate file.

Steve Charonovitz
Falls Church, VA

You may often have trouble capturing a spooled PostScript print file when pressing Command-K (immediately

Compiled by Gregory Wasson

268 August 1990 MacUser
Figure 1: PageMaker’s Image Control command on the Options menu lets you create gray shades with a finer texture than what is obtainable with PageMaker’s built-in graphics tools, using a 300-dpi printer. This dialog box also controls linked TIFF gray-scale images such as photographs.

Figure 2: The gray screen on the left was created within PageMaker and defaults to 53 lpi on a 300-dpi printer. The imported MacPaint screen on the right was modified with the Image Control command to print at 75 lpi.

PageMaker Tip

Use the following method to make a key-line trap for color around your PageMaker document:

- On the master page, make a rectangle all the way around your page. Keep it 1/8-inch away from the outside — actually on the pasteboard. Give it a line weight of .5 point and a fill of “paper” (white). If other objects appear on the master page, send the rectangle to the back with Command-B. Note: This will not work unless you fill the rectangle.
- Now when you print the page, the keyline will show up outside the live page area, but without obscuring the crop marks.

Sue Ann Sanders
Milwaukee, WI

Figure 3: You can create key-line color traps in PageMaker that print outside the live area of a page as shown here. The dotted lines define the edges of the page.

PageMaker

The quality and texture, or fineness, of PageMaker’s gray shades leaves something to be desired. The default 53-lpi (lines per inch) screen is much too coarse for most 300-dpi printers. Since you cannot change this 53-lpi setting for graphics created within PageMaker, most users have simply settled for second-rate output.

You can create custom gray boxes in Aldus FreeHand by using the Special command to specify a higher lpi in the halftone screen. You can also accomplish a similar effect by using the ubiquitous MacPaint and special controls available in PageMaker:

1. In MacPaint, create a black box the size you want.
2. Place the box into a PageMaker document, and while the box is still selected, use PageMaker’s Image Control command (see Figure 1) to alter the lightness or contrast with the sliding scale. Change the halftone screen from 53 lpi to 66 or 75 lpi.

The result is a much tighter and finer dot pattern when you print the document on a 300-dpi printer (see Figure 2).

Bradley Schwartz
Saline, MI

When using PageMaker to set up a double-sided form, you don’t have to set the starting page number to 1 and then flip between pages 1 and 2. Just set the starting page number in the Page Setup dialog box to 2 and create two facing pages.

This lets you work with both sides of the form on the screen at the same time (and the master pages correspond to the on-screen form).

Scott and Anne Butcher
Bischofsforshon
West Germany

[You can later reset the Page Setup dialog box, of course. Remember also that many DTP programs offer automatic page-numbering tricks, which become useful when your documents start to grow. — Ed.]

WriteNow 2.0

You might have problems when trying to open files with WriteNow 2.0 that were originally saved in the RTF (Rich Text Format) format by Word 4.0. Specifically, WriteNow displays the error message “Bad RTF number” and then refuses to translate the file.

WriteNow 2.0 has “filters” that are supposed to translate a RTF file to the WriteNow format. All RTF files start with the symbols {rtf0} followed by a number. For earlier versions of Word (Word 3.01, for example) the number was 0, so you see {/rtf0}. However, Word 4.0 RTF files begin with {rtf1}. Apparently, the WriteNow 2.0 translator checks this number, and if it is not what it expects, it refuses to translate the file.

The fix is easy: Open the RTF file in Word (you must make sure that you click on the Do Not Interpret button), and change the 1 to a 0; follow this procedure with a Save command. WriteNow 2.0 can then translate the file without difficulty.

Leonard Gordon
Bayside, NY
POWER TOOLS

Excel

Figure 4: Thick rules in Excel are a snap if you know how to cut rows down to size.

<table>
<thead>
<tr>
<th>6</th>
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</table>

Word 4.0

When you're working with a table-laden document in Word, it can take forever to scroll through the table sections. If you frequently use tables in your work, here's a trick that can eliminate scroll crawl:

1. Select the entire table, and choose Copy as Picture from Commands in the Edit menu (and while you're at it, place this command on your Edit menu). Click on Do.

2. With the table still selected, perform a Paste (Command-V). The text table will be replaced by a graphic version of the same table. Now that the table has been changed to a graphic, you can scroll it much faster.

3. Go back to the Commands menu and choose Use Picture Placeholders (you can add this to the Edit menu as well). Click on Do.

Caution: If you ever expect to revise the table, you should first save a copy of the text version in a separate file. Once you have replaced a table with its graphic image, you can no longer edit it, with one exception: You can cut rows from the bottom up and columns from right to left if Show Paragraph (Command-Y) and Use Picture Placeholders are off. Just grab one of the handles on the graphic and drag to crop it.

Kiernan Burke
Boston, MA

Excel 2.2

Have you ever wondered how Microsoft does it in its ads — gets those nice thick rules in a spreadsheet (see Figure 4)? There's nothing in the manual about how to do this. You can't specify border thickness anywhere in the program.

Here's the trick:

1. Select just the cells around which you want thick rules. Don't select an entire row. Use the Border command on the Format menu to add top and bottom borders in those cells.

2. Now select the entire rows that contain the bordered cells by Shift-clicking on the row numbers or dragging through the numbers of the desired rows.

You can also make gray lines by not bordering the cells first. The result will look like gray bands on the screen but will not print out unless you decide to print all the worksheet's grid lines.

Robert B. Woodward
Atlanta, GA

SimCity

Here's a slick way to bring a SimCity village to metropolis status within five years—a maneuver that should delight even the most jaded politico.

Set the tax rate down to 0 percent (see Figure 5), starting with the January Budget Report that automatically flashes on the screen each year. Sims will flock to your apparently tax-free village.

Leave the tax rate at this setting until December rolls around. When it does, select Budget from the Windows menu (or press Command-B) and set the tax rate to the highest allowable level, which is 20 percent.

When the January Budget Report appears, you'll see a sudden influx of cash for your coffers. Now set the tax rate to 0 and wait until December — when you again set it back to 20 percent.

If you keep your eyes on the calendar, you will generate enough tax revenues this way so that you'll never have to embezzle funds again! And the Sims, who never seem to catch on to the devious ways of the mayor, just keep on moving in.

Klap Kim
New Town, PA

[If you think taxes aren't enough, try SimCity's giant reptile! — Ed.]

SimCity

Figure 5: You can't escape taxes, but you can put them off — as proven by this trick for raising revenues while keeping the populace happy in SimCity. Your wealthy villagers will be without complaints, even when their tax rate suddenly jumps.
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Now you can unlock the awesome power in your Mac and use it to its full potential with a Memory Upgrade from MacWarehouse. 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.

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?

Well, added memory is a must! Join the thousands of Mac users who are taking advantage of low SIMMs prices right now.

And quite apart from the ability to do multi-tasking, added memory speeds up your disk access time and eliminates delay when selecting menu items.

**WHAT DO I NEED?**

It couldn't be simpler. Call and we'll help you select the right Memory Upgrade for your Mac. We'll rush it to you overnight for just $3. You'll find installation at home is easy when you use our "step-by-step" instruction manual. Or, receive our new video, and watch the process being done step-by-step. The video is free with the purchase of 2 or more SIMMs modules. ($29 if purchased separately.) The whole job should be completed in less than one hour. You'll need a simple tool kit, which is available for just $9.

If you prefer, you can have a computer store install your SIMMs for you. Their service technicians have the necessary tools and expertise. The total cost shouldn't exceed $50.

Now only $85 each.*
The Mac Plus and Mac SE have four available slots on the motherboard, which originally contain four 256K SIMMs modules — totaling 1 megabyte (1MB) of memory. To upgrade, you can replace each 256K module with a 1MB module, but you must do this in pairs.

Replace two 256K modules and you will have a total of 2.5MB of memory. (That’s the two new 1MB modules plus the original two 256K modules.) Replace all four modules and you’ll have 4MB. (You should save the 256K modules for later use if you want to pass your Mac on to someone else.)

### FAST, FASTER, FASTEST

SIMMs come in different speeds and are calibrated in nanoseconds (ns) from 70ns to 120ns. Anything faster than 120ns doesn’t much help any Mac but the IIci. The system doesn’t respond any faster anyway. But you can always take your memory chips with you when you move on to a new Mac, so there may be an advantage to speed at a later date.

### QUALITY CONTROL

MacWarehouse buyers and agents scour the world in search of top quality components for our SIMMs modules. They’re supplied only by top grade manufacturers like Samsung, Siemens, Texas Instruments, Fujitsu, Intel, etc. Each unit is tested for performance, quality and noise, in temperatures from freezing to 158°F.

### MACINTOSH PLUS/SE CONFIGURATIONS

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<tr>
<td>After 4 Meg Memory Upgrade Kit has been installed</td>
<td>$109</td>
<td>CHP0008</td>
<td></td>
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</tr>
</tbody>
</table>

The Mac II, IIx, IICx and SE/30 each come with a total of eight slots. The standard configuration has four 256K SIMMs modules, or a total of 1MB. Here, memory must be upgraded in multiples of four. This allows for expansion from 1MB to 4MB, 5MB or 8MB.

Remove the four 256K modules and replace with 1MB modules and you have 4MB. Leave the original modules and add four 1MB modules and you get 5MB. Removing the original modules and adding eight new 1MB modules will bring you to 8MB of memory.

Install a MacWarehouse Memory Upgrade and working with your Mac will never be the same again! Call MacWarehouse now and we’ll help you select the right Memory Upgrade.

### HOW TO UPGRADE YOUR MAC... NOW ON VIDEO!

with the purchase of any two SIMMs modules.

*Check the chart for the number of modules you may need. Price and item availability are subject to change without notice.

©1990 Micro Warehouse Inc.
FileMaker Pro (Claris Corporation)

Great new version of the top-selling database manager from Claris, is now more powerful and even easier to use than FileMaker III. Choose from an additional 100 features including improved design capabilities, drawing tools from Claris CAD, and MacDraw II. A Save dialog for precision layouts and support for 64 colors. The program is more user-friendly than before with a revised data file. Multi-user capabilities have also been enhanced through improved password protection and screen layouts. (database) $249. Upgrades from FileMaker II are FREE after April 1.

NEW!

Mobius Products

SE Speaker .................. 39.
Targus, Ltd. .................. 39.
Deluxe Plus(SE-XKB Case (black)) .... 69.
ImageWriter II Case (black) ........ 45.
Mac Plus SE Case (black) ........ 59.
Iox /R9 Case .................. 75.

NuMouse (Micro Touch)
The NuMouse does everything a mouse can - only faster, easier, and in less space. To move the cursor, simply slide your finger over the glass surface. To make a selection, merely press down. The NuMouse also serves as an extended keyboard. Tap the lage red button and you have a Power Keypad with 16 keys instantly available to execute macros (60 in advanced mode). With its own trackball, the NuMouse also performs as a small graphics tablet. Requires a Mac with ADB port. (input/output) $189

ACCOUNTING & PERSONAL FINANCES

Aatrix

Checkwriter II 2.8 ............... 37.
Payroll 3.5 .................. 109.
Payroll PLUS or TimeMinder ........ 175.
Absolute Solutions...

Computerized Classic Accounting .... 225.
Intuit

Quicken 1.5 .................. 35.
Layered, Inc. at Once ........... 285.

Blank Media

B.A.S.F., made in U.S.A

DS/OD (box of 10) ............ 14.
DS/HD High Density (1.44 Meg) .... 24.

Sony

DS/OD (box of 10) ............ 13.
DS/HD (1.44 mb) .............. 24.

Enhance (Micro Frontier)

Picture Perfect. Advanced image analysis and enhancement package for the Mac II family. Enhance offers true 16 bit grey level support. It's the first program to offer an assortment of masking buffers and real time on-screen filters. Allows user's to paint, filter and precisely adjust gray scales within isolated parts of image. (graphics) $235

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(See details below)

FileMaker Pro

(Accessories)

Abcrom (full line available)

American Power Conversion

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370 UPS ............................. 315
Avery Labels (full line available) (Call)

Basic Needs, Inc.

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HardTop ImageWriter Covers ...... 17.
Keyboard Flip .................... 6.
Dust Covers - Grey Nylon Ripstop ... 11.
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Mac SE &/or req. keyboard ...... 11.
Mac II and extended keyboard ... 12.
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Curit.............................. 89.
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Disk Holder (holds 40) ........... 9.
Ergotron ........................ 68.
MacKit-SE ....................... 75.
MacKit II-10 Designs

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Macintosh II Carrying Case .... 85.
Macintosh II Carrying Case .... 99.
Macintosh Plus Carrying Case ... 64.
Macintosh SE Carrying Case ... 75.
Monitorware Apple RGB Case ... 79.
The Ultimate SE Carrying Case ... 79.
Kensington

Anti-Glare Filter ............... 33.
Apple Security System .......... 34.
MasterPiece Mac II ............. 105.
PowerBacker 360 UPS Line ...... 269.
PowerBacker 800 UPS Line ...... 749.
System Saver .................... 63.

Enhance (Micro Frontier)

Picture Perfect. Advanced image analysis and enhancement package for the Mac II family. Enhance offers true 256 grey level support. It's the first program to offer an assortment of masking buffers and real time on-screen filters. Allows user's to paint, filter and precisely adjust grey scales within isolated parts of any image. (graphics) $235

ScriptEdit (Somak Software, Inc.)

If you use HyperCard, you need ScriptEdit, the critically acclaimed replacement for HyperCard's editing window. ScriptEdit lets you view one script while you edit another, search-and-replace, and much more! 4 mice! (MacUser 12/88). (price) $49

SharpenUP

See what you've been missing! The SharpenUP utility installs quickly and easily, and makes the printed output from graphics programs like MacDraw, SuperPaint, and others look better than before, with smoother, finer lines, and thinner lines! Works on any PostScript-compatible printer. (graphics) $59

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Monogram

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Nolo Press

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WiltMaker ..................... 32.
Reality Technologies

WealthBuilder .................. 165.
Survivor

MacMoney 3.5 .................. 59.

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Claris

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Deltatime

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Informix

Wing 1.1 ....................... 245.
Kerion

Top Down 2.0 ................. 199.
Mainstay

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Microsoft

Excel 2.2 or PowerPoint 2.1 .... 245.
The Microsoft Office ....... 525.
The Microsoft Office-CD .... 658.
Works 2.0 ...................... 185.
Portfolio Systems

Dyndex w/bind & paper ....... 60.
FREE!

If you found the first two versions of the popular Power User's Tool Kit useful, you'll be delighted to know that the very latest version, 3.0, is now available.

The new edition includes BOOMERANG 2.0, an ingenious utility, which makes it much easier to use the SF Dialog (the dialog box that appears when you choose Open or Save from the file menu).

You'll also find the latest version of DISINFECTANT (anti-viral freeware) and REMEMBER?, a handy reminder of the day's events when you start up your Mac.

The POWER USER'S TOOL KIT 3.0 is FREE from MacWAREHOUSE when you order from us. If you want the disk, you pay only $1.50 for shipping and handling. The programs are shareware, so you can try them free of charge. If you wish to continue using them, some authors ask that you pay a fee ($10-$35). Many of the programs are absolutely FREE. All of the details are explained on the disk, which is yours to keep.

WIN A TRIP TO LONDON!
There's still time to enter our latest contest and win an all-expenses-paid trip to the MacUser U.K. Show in London, November 7-10, 1990. Your name is automatically entered in to the drawing when you order from MacWAREHOUSE. Or, just fill out and mail the entry coupon below.

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<thead>
<tr>
<th>Drive Type</th>
<th>Capacity</th>
<th>Price</th>
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<tbody>
<tr>
<td>MacStack 20 Meg</td>
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<td>MacStack 44 Meg Removable</td>
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<td>Cutting Edge</td>
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<td>800K External floppy Drive</td>
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<td>Kennect Technology</td>
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<td>Rapport</td>
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<td>Infinity Dual 40 Meg Turbo</td>
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<td>Quantum 40 MB Raw Drive</td>
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<td>Quantum 80 MB Raw Drive</td>
<td>$735</td>
</tr>
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</table>

### White Knight 11
Successor to the legendary Red Ryder telecommunication program. New features list alone is more than 20 pages long! Comes bundled with Odyssey, a revolutionary Mac-to-Mac file transfer program. Free subscription to Gnome network provided. (Communications) $85.

### BluePrint
BluePrint, rated best in 2D CAD by recent Macworld review of 21 CAD products (July 1990). Offers professional 2D at an unbeatables $499. Get all the features you need—advanced dimensioning, symbol library, color, high precision, hatching, rasterning, DXF translation plus much more—at a price you can afford. (CAD/CAD) $219.

### FastLabel 2.0
**Vertical Solutions**
*Stick to the chore of simple label printing in three easy steps!* Import addresses, lists and graphics then use FastLabel's preformatted templates (or create your own) to produce everything from disk, VCR and cassette labels to name badges, signs and more. (Business) $599

### BluePrint
BluePrint: high performance, prints text and graphics at your printer's maximum resolution. The cost effective print option for your Mac. (Utilities) $85.

### FastEnvelope Software
- This handy DA lets you import lists and graphics to print eye-catching envelopes, then adds postal bar codes saving you time and money on bulk mailings. (Business) $50

### Educational/Personal

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artworx Bridge 6.0</td>
<td>$24</td>
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<tr>
<td>Daily Double Horse Racing</td>
<td>$19</td>
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<tr>
<td>Broderbund Ancient Art of War At Sea</td>
<td>$27</td>
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<tr>
<td>Shuffluscue Pony</td>
<td>$24</td>
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<tr>
<td>Where in Time is Carmen Sandiego? Call Bull City Software</td>
<td>$32</td>
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<tr>
<td>Morris's Revenge</td>
<td>$32</td>
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<tr>
<td>Bullseye Ferrari Grand Prix or PS1</td>
<td>$32</td>
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<tr>
<td>Fokker Tr千古</td>
<td>$24</td>
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<tr>
<td>Centron Software, Inc. BlackJack or CrapsMaster</td>
<td>$27</td>
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<tr>
<td>Blackjack Strategy Tester</td>
<td>$65</td>
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<tr>
<td>CasinoMaster (5 pack)</td>
<td>$49</td>
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<tr>
<td>CasinoMaster Deluxe Mac II version</td>
<td>$52</td>
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<td>MicroLeague Sports MicroLeague Baseball II</td>
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<td>Nemesis Go Master</td>
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<td>Joeski Tutor</td>
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<tr>
<td>Softstream 22nd St. Whiz Tutor or MacRummy</td>
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### RasterOps
- Raster-Ops Colorboard 264
- RasterOps Pro

### Beacon Technology
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<td>GEMS of the Word</td>
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<td>BrightStar Alphabet Blocks</td>
<td>$30</td>
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<td>Talking Tiles</td>
<td>$26</td>
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<td>Davidson Math Blaster or Speed Reader</td>
<td>$26</td>
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<td>Fair Time Technologies</td>
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<td>Navigatormono</td>
<td>$199</td>
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<td>Learning Company Math Rabbit or Reader Rabbit</td>
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<tr>
<td>Nordic Software (full line available)</td>
<td>$55</td>
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<td>Mackids Turbo Math Facts</td>
<td>$28</td>
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<td>Mackids Preschool Pack</td>
<td>$35</td>
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<td>Benton Overseas Vocabulary: Learn English, French, Spanish, German, Italian, Russian, or Hebrew</td>
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<td>Vocabulary: Learn Japanese</td>
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<td>Voice &amp; Video Instruction Videos</td>
<td>$35</td>
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<td>HyperCard or Pagemaker 3.0</td>
<td>$ea.35</td>
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<tr>
<td>Word 4.0 Video Tape</td>
<td>$35</td>
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</table>

### The ULTIMATE SE Carrying Case
**(I/O Design, Inc.)**
The ULTIMATE SE Carrying Case is designed with the same high quality standards as other MacLuggage products. This case offers internal, patchwork compartments for ANY Macintosh keyboard, mouse, external hard disk and cables. It also features 2 additional exterior pockets for everything from disks to umbrellas. Combine these features with sturdy DuPont Condura nylon and 1/2 inch high density foam padding and you'll see why this is the "Ultimate" carrying case for your Mac. Available in black and navy blue. (accessories) $79.
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Now spools to HP DeskWriter. One of the best self-sell print spoolers for the Mac is here! You get your Mac back seconds after sending a document to the printer. Places in background. Handles large and complex graphics, spreadsheets or database documents. Special desk accessory allows you to see and manipulate the print queue, delete documents, re-order documents to another printer. Also works with all Apple printers and postscript devices using the Apple printer drivers. (Utilities) Single-user $87, 5-pack $289.

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SuperPaint gives you the freedom of paint and the precision of draw in one easy-to-use program! Features powerful AutoTrace to automatically convert bitmapted paint graphics into high resolution draw objects, an adjustable Artnet, and a freehand tool to quickly sketch editable Bezier curves. You can mix fonts, styles and sizes within text blocks, and freely rotate, scale, or slant text and graphics with the precision of draw in one easy-to-use program! Features powerful AutoTrace to automatically convert bitmapted paint graphics into high resolution draw objects, an adjustable Artnet, and a freehand tool to quickly sketch editable Bezier 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. Overlaid documents automatically "tile" over multiple pages, in either "Portrait" or "Landscape" orientation. (Graphics) $125.

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A computer enhanced foreign language learning system for the Mac. A versatile, interactive HyperCard Stack available in five languages and beginner level users. Carries a full one-year warranty from the manufacturer. An LED indicates disk access. Its compatible with the Mac Plus, SE, and Mac II. It's light weight and portable. The SuperPaint system provides a fun and easy way to learn a language.

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MacPaint 2.0............. 93.
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UltraPaint............. 125.
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Computer Eyes Pro Color............. 349.
Dream Maker Ciptures, Business Images............. 59.
MacGalleria............. 27.

Mac Writes

SuperDoc............. ea. 240.
SuperCal............. ea. 105.
SuperDraw............. ea. 225.
SuperPaint............. ea. 125.
Scriptography............. ea. 44.

MacPaint

SuperPaint............. ea. 125.

MacPaint

SuperPaint............. ea. 125.

MacPaint

SuperPaint............. ea. 125.

MacPaint

SuperPaint............. ea. 125.

MacPaint

SuperPaint............. ea. 125.
Strategic Mapping, Inc. (Select Micro)
Map Maker 4.0 .................................. $295.
SuperMac
Colorset 1.5 .................................. 229.
PixelPaint Professional ......................... 389.
Tactic Software
Art Clips Vol. 1 or Vol. 2 ...................... Call.
T/Maker
Click Art Business Images .................... 32.
EPS Illustrations ................................ 85.
Business Cartoons ............................. 33.

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MicroTV ....................................... 285.
Cutting Edge
Two Page 10 Monochrome Monitor 959.

General Computing Company
WriteMove Ink Jet Printer ..................... 575.
MegaGraphics
Rivel SE Monitor ............................. 1275.

DoveFax Desktop
(Dove Computer Corp.)
With the sensational New DoveFax, you can turn your Mac into a Worldwide Communications Center. Send and receive letters with this multi-featured 9600 baud facsimile/2400 baud data modem. You don't have to interrupt work on your applications. DoveFax works quietly behind the scenes. Auto Answer lets you receive faxes without interruption, and redial guarantees faxes are sent. Limited Offer to the first 2000 customers! A 2 month FREE trial subscription to USA TODAY P.M. News Alert when you buy the DoveFax. Now you can follow the news as it is monitored by USA TODAY. We've even arranged for you to get $100 of FREE MCI usage credit, just for signing up with MCI fax service. (modems/fix) $279.

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HyperAtlas ................................... 59.
Silicon Beach
SuperCard 1.5 .................................. 189.
Softstream International
Hyperfit ....................................... 125.
Somak
Script Edit ..................................... 49.
Symmetry
HyperDA 1.2 ................................... 45.
TimeWorks
HyperWorks Organizer ....................... 57.

HyperDialer
(DataDesk International)
Now you can connect your Macintosh to your existing business or home telephone for automatic dialing with Apple's HyperCard. HyperDialer is designed specifically for HyperCard's touch-tone dialing capabilities and works with all business phones without requiring an modem or dedicated phone line for automatic dialing. Automatically dials HyperCard, SideKick, Focal Point, C.A.T., SuperCard and QuickDex phone numbers. It connects to the speaker port - not a special serial port. Hyperware $39.

The Microsoft Office
(Microsoft)
The Microsoft Office gives you everything you need to increase productivity, word processing (Microsoft Word), spreadsheet (Microsoft Excel), desktop presentations (Microsoft PowerPoint), and electronic mail (Microsoft Mail) - in one compact package! Each program is a top-selling stand-alone product, and when used together, will make your entire office more efficient and productive. (Business) $525 Also available on CD-ROM $669.

The Somak CD Series:
ClipArt 1 or 2
Each CD-ROM contains hundreds of EPS images ready to use with PageMaker, Freehand or other DTP software, a 32-page booklet illustrating every image, and 20 to 30 downloadable PostScript fonts. Disc 1: Maps, real estate, food, office and more. Disc 2: Sports, nautical art, silhouettes, board games. (graphics) $59 each.

Remote Mouse
Forte's Remote Mouse is an infrared wireless device that emulates the Macintosh mouse and extended keyboard. Just plug the receiving unit into the standard ADB port and operate any Macintosh application from 50 feet away. Remote Mouse enhances all multimedia and presentation products. (input/output) $269.

WriteNow
WriteNow 2.2
Incorporates many new user-requested functions, such as mail merge, a larger dictionary (over 100,000 words), cursor key support, a Windows Menu, dedicated dialog tabs, a Hide Pictures option, ability to save files directly in text only, MacWrite, or RTF (word option) formats. WriteNow has all the power features you want-Hyphenation, horizontal scrolling, automatic foot-noting, and getting for left and right pages. Display up to four columns at once. (word processors) $119.
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(See details below)

GUARANTEE
Many of our products come with a thirty day money back guarantee, if you are not completely satisfied... Ask for details when you place your order.

TOPS 3.0 Network Bundle (TOPS)
TOPS 3.0 provides a complete network/E-Mail solution for any combination of Macs, IBM PCs and Sun workstations. With TOPS, every computer is a server and each user decides which files are public or private. TOPS follows AppleTalk File Protocol, so AFP-compatible Mac applications will run properly. Includes TOPS Spool for background printing on the network, and a 20-user package of InfoBox 3.0 (networking) MAC $187 or DOS $185.

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DoveFax NuBus....449.
Notebookable NuBus....749.

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Power User
2400 baud modem....99.
Promethius
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Travel Modem....205.

Supra Modern 2400....129.

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Low Profile, 100ns High Quality Single In-Line Memory Modules for MacPlus, SE, II, fx.
2 yr. Warranty: Low Price $85.
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For II fx - 60ns....119.
For Laser/Writer II NTX - 80ns....119.

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MacSnap 4S....399.
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Shana Corporation
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Symantec
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Zedcor
ZBasic 5.0....38.

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MIDI interface....59.
Coda
Finale....569.
MacDrums....31.
Perceive....48.

Electronic Arts
Deluxe Music Construction 2.5....85.
Deluxe Speaker....99.

Farallon Computing
MacRecorder (records sound)....159.
Screen Recorder....125.

Passport Designs
NoteWriter....325.
Passport MIDI Interface....85.

Primera Software
Different Drummer....59.

Repertoire
Music Publisher....359.

Resonate
Listen 2.0....62.

Tactic Software
Sound Clips Vol. 1 or 2....ea. 49.

KeyPlan (Symmetry)
PLAN WITHOUT PAIN! Meet the new challenge in planning and design. Now you can turn fast lists into successful dead lines. With the speed and ease of use for the Mac user, power and sophistication for the professional manager (PERT and Gantt charting capabilities) KeyPlan allows you to plan and budget your way to success. From outline to deadline! Creates plans quickly and easily, tests feasibility of ideas, helps implement and track plans, communicates your strategies and plans more effectively. (business) $275.

AutoSave II (Magic Software)
This very important utility is a CDRA. Just drag it into your system folder, and AutoSave II will issue a periodic Save command to the running application. You can set the interval between saves from one to 99 minutes. AutoSave II keeps your current work safe on disk. (utilities) $29.

BackMagic
BackMagic automatically backs up your files at a time you specify, including when you shut down your Mac. You can configure it to backup only the files you've changed, or all your most important files. Makes backups easy, fast, and sure. With a built-in disk error check, BackMagic always makes backups safe and sure. (utilities) $50.

SECURITY & VIRUS PROTECTION

AsD Software, Inc.
FireGuard Office 5-pack....435.
FireGuard Office 10-pack....885.

Fifth Generation
Disk Lock....106.

HJC/Microcom
Virus 2.8....52.

SMARTONE 2400 MODEM
(For beginners and experienced modern users. If you need a 2400 baud modem, the SmartOne 2400 Modern provides a economical alternative. For less than the cost of some 1200 bps units, you get a Hayes compatible modem with auto answering/originating, 300, 1200 and 2400 baud operation, pass through phone jack, speaker with programmable volume, and a manufacturer's two-year warranty. All user options are stored in non-volatile memory on the modem. Includes Smartsoftware and SmartOne modem cable. (modems) $145.

STALE ARCHITECTS

Deneba Software
BigStaurs....64.
Spelling Coach Pro 3.1....128.

Electronic Arts
Thunder II....49.
Lexpertise
MacProof 3.2.1....115.

LifeTree
Correct Grammar....49.

Microlytics
Word Finder 2.0....34.

Sensible Software
BookEnds or Sensible Grammar....51.

STATISTICAL ANALYSIS

Abacus Concepts
StatView II....279.
StatView SE + Graphics....199.
SuperANOVA....309.

Wolfram Research
Mathematica (SE)....450.

UTILITIES

Abbott Systems
Car/Operator 1.1....364.
MacPro Keyboard (Keytronic)
The MacPro Keyboard offers a full, 105-key professional keyboard for any Mac with an ADB connector. In addition to the main typewriter-like section, it has a four-key cursor keypad, screen control keys, a full numeric keypad, and 15 user-programmable function keys. You'll appreciate the tight touches, like an LED indicator on the Mac II power switch key, a large, L-shaped return key, and adjustable legs with rubber grippers. Comes with the manufacturer's three-year warranty. (IntrTrust) $118.

Abcom Dust Covers (Abcom)
Abcom dust covers are made of attractive, waterproof nylon packcloth for protection against dust, spills, and other forms of contamination. Each is designed to fit properly and slip on and off with ease. Dust covers come in navy blue, and are accented with a rainbow ribbon logo. Covers are available for all Mac models and most peripherals, including Radius monitors. (accessories) Starting at $10.

Dantz Development
Retrospect 149.
Dayna Communications
DOS Mounter 55.
Fifth Generation
FastBack II 106.
PowerStation 2.5 33.
Suitcase II 43.
ICOM Security
On Cue 35.
Insight Development
MacPrint 95.
Magic Software
AutoSave II 29.
BackMate 40.
POWERIcons or POWERMenus ea. 39.
Mainstay
Capture 2.0 49.

FileGuard Extended (ASD Software)
"FileGuard stands out, especially for corporate users," MacUser May, 1990 issue. Protect your Hard Drives and Partitions from unauthorized access (including security bypass with a disk editor), copying and erasing. Applications and File Folders (including system folder) from unauthorized access, deletion, and/or illegal copying. Desktop (including system folder) from alterations by unauthorized users. Keep an eye on System Usage with the system logs which continuously tracks user/group activity. (security) $45.5

CONTEST RULES: 1. Entries must be received no later than 9/30/90. 2. Winner selected n random by drawing by attorneys for MicroWarehouse Inc. (MWI), whose decisions are final. 3. Concur up to London and MacUser UK show subject to availability. MWI reserves the right to substitute equivalent cash value of $1000. 4. Winner responsible for taxes. 5. Odds of winning depend on number of entries. 6. MWI will announce the winner on or around 10/20. Winner notified by mail. All entries must be postmarked by date of drawing. 7. Contest open to U.S. citizens, except as prohibited by law. Employees of MWI and suppliers not eligible. 8. Prizes not redeemable at London. Including NY London by Concorde, Hotel reservations for duration of MacUser UK Show, November 1990, are made for the winner's use during the contest. 9. All entries become the property of MWI. Inquiries: 908-367-0440. FAX: 908-903-9279.
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Write to
Help Folder, c/o MacUser
950 Tower Lane, 18th Floor
Foster City, CA 94404

Turn 'Em Off First
Q. Conventional wisdom has it that one should never connect or disconnect anything when the Mac is turned on. But isn't this a leftover from the early days, when cables had connectors that could temporarily make the "wrong" contact? It hardly seems possible that connecting or disconnecting a keyboard or a mouse while the Mac is turned on could cause any damage. Isn't unnecessarily turning the Mac on and off worse?

George Vogel
Newton, MA

A. No! Never connect or disconnect anything without first powering everything down.

The ADB (Apple Desktop Bus — the connection for the mouse and keyboard on all Macintoshes from the SE on) is particularly sensitive. You should, without fail, turn off your Macintosh before plugging anything at all into the ADB.

Don't worry about turning your Macintosh on and off a few extra times. As I always say, an ounce of prevention is worth a pound of cure. And as long as I'm on my soapbox, don't forget to use the Shut Down command before you turn off the power.

The Word about Word Dictionaries
Q. In Papua, New Guinea, few people can answer my questions about Microsoft Word. Perhaps you'll be able to...

The most widely spoken language here is Tok Pisin (New Guinea Pidgin), which is written with roman letters. I would like to put together a dictionary that I could use to perform spelling checks on Tok Pisin documents created with Word 4.0.

Obviously, it would be preferable if I were able to check the documents in Word, but it appears that Word does not allow you to choose dictionaries. If this is not possible, is there a standalone spelling checker that has a Tok Pisin dictionary available?

Ben Miles
Papua, New Guinea

A. Good news and bad news: The good news (according to Microsoft) is that there are indeed tools available for assembling a Tok Pisin dictionary. The bad news is that they are very expensive — about $25,000. I was unable to uncover any product — spelling checker or otherwise — with a Tok Pisin dictionary. It appears that your only option is to create a Tok Pisin User Dictionary in Word 4.0. Good luck!

Shrinking PageMaker Files

Figure 1: Save As shrinks PageMaker files considerably. In this case, using Save As instead of Save reduced the file by 135K.

Q. I've noticed that when I use the Save command on a PageMaker file several times, it takes up considerably more disk space than if I had used the Save As command and used a different filename. Why is this, and is it common to all programs? It gets troublesome when I'm trying to archive old projects on floppy disks.

Steven Smith
Stoughton, MA

A. You're absolutely right. Using Save As instead of Save can reduce the amount of disk space your PageMaker document occupies by a significant amount (see Figure 1). This is because when you do a Save, PageMaker retains a great deal of excess information, such as recently deleted text and graphics, to support its Mini-Save function.

According to C.J. Weigand's excellent book Using PageMaker: Macintosh Version (Cue Books, 1989), "Every time you add or delete pages, change Page Setup specifications, or turn to a new page of your publication, PageMaker does a mini-save. This mini-save produces a complete copy of your publication as the publication exists then. You can revert to the last mini-saved version of your file by choosing Revert from the File menu while pressing the Shift key. Using the Save As command deletes all excess data needed for mini-saving and shrinks the file to a fraction of its previous size."

This shrinkage is not common to all programs. Although some other programs will also shrink your file if you use the Save As command instead of Save, the amount of disk space saved is very rarely as dramatic as it is with PageMaker.
supplemental foreign-language, medical, and legal dictionaries for Word 4.0. The foreign languages currently available are French, German, Dutch, British (is British really considered a separate language?), Italian, Spanish, and Swedish. Each dictionary costs $75 plus $5.50 for shipping and handling. To order, call Editor's Choice at (800) 646-1116.

**Windows: What a Dump**

**Q.** I write software documentation and am currently documenting a PC program that runs in the Microsoft Windows environment. Do you know of a program that will capture Windows screens in a file that I can use on a Mac? I want to paste the pictures into Word.

**A.** I don't know a PC from an Amiga, but I know where to go to find your answer—Computer Database Plus, available through CompServe. (Log on and type GO COMPLIB). It contains citations and full-text articles from more than 130 magazines, newspapers, and journals, including *MacUser*, *BYTE*, and *PC Magazine*.

To find the product you described, I performed a keyword search for “screen and capture.” Of the 14 articles the search turned up, one—entitled “Screen-Capture Programs Help Get It All Down on Paper”—stood out as a likely candidate. That article was described as an evaluation of four screen-capture programs, and it appeared in *PC Week*, November 27, 1989.

Not having that particular issue handy, I downloaded the full text of the article and discovered that the product you need is called Hotshot Graphics 1.5 ($249 from Symsoft; [415] 941-1552). It can capture screen images from Windows applications and save them in your choice of formats—TIFF, EPSF, PCX, or IMG. It also has a graphics editor that, according to the article, includes a "range of tools that rivals those in most paint packages."

Computer Database Plus costs $4.00 per minute, plus $1 per abstract and/or $2.50 per abstract with full text. The search described here cost less than $10.

**A Clean Screen**

**Q.** I have a Mac Ilex with an AppleColor 13-inch monitor. For some reason, it seems to attract even more than its share of dust. I wipe the screen off, as per the manual's instructions, but within days another wonderfully disgusting coating reappears. Not only that, but so much dust has bonded to the monitor's case that it's currently an ugly grayish-black hue.

**Q.** Could you suggest some way to remove this gloop without damaging the tube or case finish? And is there any way to “demagnetize” the thing to keep the dust from building up again so quickly?

**A.** I have an Apple color monitor too, and it's always attracting gloop and goop. I hate it (the gloop and goop, that is), so I use commercial monitor-cleaning wipes (available at good office-supply stores everywhere).

I've got two brands sitting on my shelf: Screenwipe and Liquid Paper. They clean your screen and reduce static buildup. Both work as promised—I use one or the other at least once a week.

To clean the case of the monitor and the computer itself, I use a commercial spray such as Formula 409 about once a month. Be sure you don't spray it directly onto the case; instead, spray a bit on a cloth. I've found that paper towels don't hold up well, so use real cloth. Be extremely careful not to get any cleanser on the monitor glass.

Finally, I cover my monitor when it's not in use. I use an old ski scarf. You can buy custom covers for most monitors, but my scarf was cheaper and works fine. (And it looks cool too!)

---

**Replacing Styled Text in Word**

**Q.** Here's a Word 4.0 question for you. Say you're working in the Utilities menu because you've written the name of a boat as Dyon throughout your manuscript and now you want to go back and change it to Dyon or Dynon. Is there any way to do this?

The underline and italics settings from the Format menu don't work when the Change dialog box is open.

**A.** Yes, it's easy to make that sort of change. Just type the word, apply any styles (such as italic or underline) to it, and then copy it to the Clipboard. Next open the Change dialog box and type Dynon in the Find What field and \p in the Change To field (see Figure 2). This replaces occurrences of Dyon with the contents of the Clipboard.
Where There's a Will . . .

Q. I recently purchased the program WillMaker from Nolo Press. The program does not produce a text file. I have wasted hours trying to figure out how to get a text file of my will from this program so I can alter some of the wording and change its arrangement on the page, the font that it uses, and the quality of the printing (it prints out only in the Faster mode).

I called Nolo to ask about it, and they just told me to retyp[e the whole will. If it were just for me, that might be OK, but I'd like to use this program with other members of my family. Any suggestions?

Steve Dutton
Harwood Heights, IL

A. According to the folks at Nolo Press, there's no way to extract a coherent version of your will from the saved file, using any of the current versions of WillMaker. If you try to use a program such as Can-Opener or 1st Aid Kit, you'll get only disjointed pieces of text in random order, so don't bother.

Nolo says that it designed the program this way to prevent users from making changes that might invalidate their will. That makes sense, but the company has had so many users ask for text export that it's included the feature in version 4.0, which should be available by the time you read this.

Registered users will get a card or letter with details for obtaining an upgrade. No price had been set at press time.

Get a Grip

Q. Here in earthquake country, we all know to bolt our bookshelves to the wall, but how can we keep our Macs on our desks? I'd hate to see my SE take a nosedive.

Pamela Gausman
Los Gatos, CA

A. You might find the answer to your needs in one of everybody's favorite space-technology spin-offs: Velcro. Velcro USA is manufacturing a superstrong fastener under the label Quake/Grip Desktop Fastening Systems. It might sound crazy, but it's actually a good way to keep your equipment from sliding around in the event of a quake.

A kit designed for classic Macs such as your SE has a suggested list price of $15.95. For further information, call Velcro USA at (800) 950-3233 (in New Hampshire, it's [603] 669-4880).

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<table>
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<tr>
<th>Product</th>
<th>Quantum</th>
<th>Seagate</th>
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<th>Combo Drives</th>
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<td>45R (Syquest)</td>
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<td>Teac CT600H</td>
<td>Award-winning Retrospect included FREE with 60T, 150t, DATdrive™, OptiDisk™, and all Combo drives!</td>
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Quantum internals are for SE, SE 30, II series. W밴 internals for IIx/ix. 45R includes one cartridge, 45DR includes two cartridges. 60T/150t and DAT include one tape each. Combo drives include one tape or cartridge external termination, and Retrospect. Two year warranty on Quantum, Syquest, one year on WangDAT. Sony, Seagate. *12ms effective with DisCache.
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Imprimis

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<tr>
<th>Model</th>
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<tr>
<td>Imprimis MacWren 170 16ms</td>
<td>$1,125</td>
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<td>Imprimis MacWren 300 16ms</td>
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<td>Imprimis MacWren Runner 330 10.7ms</td>
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<td>Imprimis MacWren 600 16ms</td>
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<td>Imprimis MacWren 1.2 Gigabyte 16ms</td>
<td>$4,499</td>
<td>$4,599</td>
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</tbody>
</table>

FREE Back-Up Software with the purchase of any Seagate, Quantum, or Imprimis Hard Disk Drive. A $199 value FREE

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<table>
<thead>
<tr>
<th>Total Value, Hardware, Media &amp; Purchased Software</th>
<th>Annual Premium</th>
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<tr>
<td>$11,001–$14,000</td>
<td>$129</td>
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</table>

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ClearVue (Mac II) ........................................ 1149
ClearVue SE w/16MHz 68000 Accelerator .......... 1379
ColorBoard 208 .................................... 349
ColorBoard 224 .................................... 2850
ColorBoard 232 .................................... 2149
ColorBoard 264 II ................................... 539
ColorBoard 264 SE030 .............................. 649
ColorBoard 364 ..................................... 1395
SE030 8-bit 19" Trinitron .............................. 3995
SE030 24-bit 14" Trinitron ............................ 1295
SFX (NTSC) ........................................ 1065
FrameGrabber (NTSC) ............................... 1065
14" Trinitron 24-bit .................................. 1069
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Magnavox 14" w/8-bit .................................. 899
NEC Macsync 14" w/8-bit ............................... 859
Radius 19" B&W Display .............................. 1565
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Radius 21" B&W Display ............................. 1865
Radius Pivot ......................................... 1295
Sony Trinitron 1304 14" w/8-bit ....................... 1879

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Réal Provencher
President

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FREE CONSULTATION to help configure a system to your exact requirements.

SYSTEMS

<table>
<thead>
<tr>
<th>System</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac IIx B&amp;W Full-Page System, 2 Mb RAM, 40 Mb Quantum, Mac 101 Keyboard</td>
<td>4595</td>
</tr>
<tr>
<td>Mac IIx B&amp;W Dual Page Monitor, 2 Mb RAM, 40 Mb Quantum, Mac 101 Keyboard</td>
<td>4995</td>
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<tr>
<td>Mac IIx 14&quot; Trinitron 24-bit Color, 5 Mb RAM, 105 Mb Hard Drive, Mac 101 Keyboard</td>
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<tr>
<td>Mac IIci 14&quot; Trinitron, 5 Mb RAM, 105 Mb Hard Drive, Mac 101 Keyboard</td>
<td>6525</td>
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<tr>
<td>Mac SE030 14&quot; Trinitron 24-bit Color, 5 Mb RAM, 105 Mb Hard Drive, Mac 101 Keyboard</td>
<td>5375</td>
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<td>Mac SE030 System, 5 Mb RAM, 105 Mb Hard Drive, Mac 101 Keyboard</td>
<td>4065</td>
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<td>Mac SE w/2-Floppy Drives, FP Display, 2.5 Mb RAM, 40 Mb Quantum, Mac 101 Keyboard</td>
<td>3050</td>
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<td>Mac SE w/2-Floppy Drives, 2.5 Mb RAM, 40 Mb Quantum, Mac 101 Keyboard</td>
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<tr>
<td>Mac IIx 19&quot; Trinitron 8-bit Color, 5 Mb RAM, 105 Mb Hard Drive, Mac 101 Keyboard</td>
<td>8665</td>
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<tr>
<td>Mac IIx 16&quot; Trinitron 8-bit Color, 5 Mb RAM, 105 Mb Hard Drive, Mac 101 Keyboard</td>
<td>8195</td>
</tr>
</tbody>
</table>

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- Software
  - LapLink Mac.......................... 84
  - Liaison.................................. 174
  - MacLink Plus.......................... 139
  - MacNet Starter Kit................... 51
  - Microphone II.......................... 225
  - QuickMail (10 Users).................. 262
  - White Night........................... 81
  - Timbuktu............................... 99
  - TOPS (Mac).............................. 209

- Hardware
  - Abaton InterFax 2400/5600.............. 419
  - Everex 2400............................ 195
  - Hayes Personal Modem 2400............ 159
  - MacFax.................................. 449
  - Shiva NetModem 2400.................. 439
  - Shiva NetSerial......................... 295
  - SmartModem 2400M Bundle............... 429

**ACCELERATORS**

<table>
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<td>AOX DoubleTime SE</td>
<td>$199</td>
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<td>Macellerate SCSI Acc</td>
<td>$469</td>
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<td>Orchid MacSprint</td>
<td>$245</td>
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<td>Radius 16SE</td>
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<td>Radius 25SE</td>
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<td><strong>SICLONE</strong></td>
<td>$1295</td>
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<td>IV (6802D)</td>
<td>$1439</td>
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**TARGUS PREMIUM CASES**

- 1 Megabyte SIMMS........... Call

**WORD & PAGE LAYOUT**

- QuarkXPress..................... $479

**UNINTERRUPTABLE POWER SUPPLIES**

<table>
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<tr>
<th>Model</th>
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<tr>
<td>450 AT</td>
<td>$375</td>
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<td>AP 110 SE</td>
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<td>AP 360 XT</td>
<td>$279</td>
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<td>MinuteMan 300....</td>
<td>$429</td>
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<td>MinuteMan 600.....</td>
<td>$695</td>
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**ACC & OTHER PERIPHERALS**

- Kurta 11 x 8.5 Tablet.... $299
- Kurta 12 x 12 Tablet..... $399
- Kurta 17 x 12 Tablet..... $619
- MacFlip (80 diskettes).... $8
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- Microtek MS 300GS (256GS).... $1599
- Microtek MS 400GS (256GS).... $2859
- ScanMan..................... $399
- Sharp JX 300 Color......... $395
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  - Priced too low to print! Call.

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- At Once....................... $335
- Cricket Presents.......... $289
- Double-Helix III.......... $349
- Excel 2.2...................... $269
- Foxbase....................... $309
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- MicroPlanber + 6.0........ $359
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**SYSTEMS**

<table>
<thead>
<tr>
<th>MAC IIfx</th>
<th>MAC IIcx</th>
<th>MAC SE/30</th>
<th>MAC SE</th>
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<tbody>
<tr>
<td>Ilfx, 170mb Quantum, 8 bit color, 4mb RAM, Apple Extended Keyboard, Apple 13&quot; RGB Monitor.</td>
<td>Ilcx, 40mb Quantum, 8 bit color, 5mb RAM, Extended Keyboard, NEC 14&quot; Color MacSync Monitor</td>
<td>SE/30, 105mb Quantum, Mouse, 5mb RAM, Keytronic 105 Extended Keyboard</td>
<td>SE, 40mb Quantum, FDHD, 2mb RAM, Standard Keyboard</td>
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**HARD DRIVES**

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<thead>
<tr>
<th>QUANTUM PRO SERIES</th>
<th>2 YEAR WARRANTY!</th>
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<td>Internal</td>
<td>External</td>
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<td>$338</td>
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<td>$998</td>
<td>$1085</td>
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**OPERATING SYSTEMS**

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<td>MAC Ilci</td>
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<td>Ilci, 105mb Quantum, 5mb RAM, Apple 13&quot; RGB Monitor, Keytronic 105 Extended Keyboard.</td>
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**FREE SHIPPING ON SOFTWARE**

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<tr>
<th>1mb SIMMs</th>
<th>PRINTERS</th>
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<td>$69</td>
<td>$2269</td>
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**PRINTER**

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<th>TI MicroLaser/PFS</th>
<th>Qume Crystal Print</th>
<th>OMS ColorScript 100</th>
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<td>$3729</td>
<td>$2459</td>
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**VIDEO SOLUTIONS**

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<th>RASTEROPS</th>
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<td>ColorBoard208</td>
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<td>ClearVue (Mac II)</td>
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<td>$359</td>
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**MAC-STUF SOFTWARE**

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<th>NOVY Quik 030</th>
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**ACCELERATORS**

<table>
<thead>
<tr>
<th>ExpanSE/30</th>
<th>Second Wave Expands your SE/30 to a lllc by adding 4 MiBus Slots so you can utilize inexpensive Mac II peripherals.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$995</td>
<td>-</td>
</tr>
</tbody>
</table>
To pick this up for $2,645 just pick this up.

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---

**SYSTEMS**

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
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<td>Mac SE 30</td>
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<td>Mac SE 60</td>
<td>1020</td>
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<td>Mac iici</td>
<td>4395</td>
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<td>Macintosh Portable</td>
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**HARDWARE**

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<td>RasterOps 264/64</td>
<td>499</td>
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<td>All RasterOps products</td>
<td></td>
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<tr>
<td>SIMM’s: all types/best prices</td>
<td>call</td>
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<tr>
<td>AAP Micro TV Professional</td>
<td>349</td>
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<td>Apple ImageWriter II</td>
<td>415</td>
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<td>Abaton Interfax</td>
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<td>Dove Fax 24/96</td>
<td>263</td>
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<td>Dove MacSnap All Models</td>
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<td>FastNet III/SE</td>
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<td>Hayes Smart Modern 2400</td>
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<td>Hewlett Packard Printers</td>
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<td>Mac 286</td>
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<td>Mac Ima</td>
<td>684</td>
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<td>Mac Recorder Digitizer Only</td>
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<td>Magnavox 14 &quot;Color&quot;</td>
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<td>Motorola PMMU 66651</td>
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<td>NEC Monitors - all models</td>
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<tr>
<td>Nowy Quik-30 Accelerator</td>
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<tr>
<td>PhoneNet Star Controller</td>
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<td>PhoneNet 10 Pack</td>
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<td>Practical Peripherals 2400b</td>
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<td>Quick Mail 10 User</td>
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<td>SilverView 54/58</td>
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**DRIVES & TAPEs**

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<th>Product</th>
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<td>CMS Tape 60/150</td>
<td>599/799</td>
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<tr>
<td>Cutting Edge all models</td>
<td>call</td>
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<td>DayneFile 350</td>
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<td>Quantum 40 mb/80 mb</td>
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<td>Quantum 105 mb/110 mb</td>
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<td>Internal/External Drive Kit</td>
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**SOFTWARE**

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<tr>
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<td>WriteNow 2.0</td>
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   - [ ] Mac SE
   - [ ] IBM PC
   - [ ] Mac IIX
   - [ ] Mac II

2. For how many microcomputers do you buy products?
   - [ ] 1
   - [ ] 2
   - [ ] 3
   - [ ] 4
   - [ ] 5
   - [ ] 6
   - [ ] 7
   - [ ] 8
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   - [ ] 49
   - [ ] 50

3. Your primary job function is:
   (Check one)
   - [ ] Administrative/General Management
   - [ ] MISDP, Communications Systems, Programming
   - [ ] Engineering/R&D
   - [ ] Finance/Accounting
   - [ ] Marketing/Sales
   - [ ] Computer Dealer/VAR

4. For which of the following products are you involved in selecting brands/models to be bought by your company or organization?
   (Check all that apply)
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   - [ ] Spreadsheets
   - [ ] Financial Planners
   - [ ] Project Managers
   - [ ] Word Processors
   - [ ] Database Managers
   - [ ] Graphics
   - [ ] CAD/CAM
   - [ ] Communications

5. Are you involved in the purchasing of microcomputer equipment at your company?
   - [ ] Yes
   - [ ] No

6. If so, what function do you serve in the buying process?
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- [ ] Mac SE
- [ ] IBM PC
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- [ ] 3
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HARDWARE 310-319
BAR CODE .................................................. 311
CD-ROM .......................................................... 311
COMPUTER SYSTEMS ...................................... 310-312
DATA ACQUISITION .......................................... 312
DISKETTES ..................................................... 312
DISK DRIVES .................................................. 313-314
GENERAL ....................................................... 314-315
INPUT DEVICES ............................................... 316
INSURANCE ................................................... 316
MEMORY UPGRADES ........................................ 316-318
PERIPHERALS ................................................. 319
PRINTERS ..................................................... 319
SECURITY ..................................................... 319

SOFTWARE 319-325
ACCOUNTING ................................................. 319
BAR CODE ..................................................... 319
BUSINESS ..................................................... 319-320
BUSINESS TIME MANAGEMENT ......................... 320
DATA BASE ................................................... 320
DESKTOP PUBLISHING ..................................... 320-321
EDUCATIONAL ............................................... 321
EMULATION ................................................... 321
ENGINEERING .............................................. 321
ENTERTAINMENT/GAMES ................................. 322
FINANCIAL .................................................... 322
FUND RAISING ............................................... 322
GENEALOGY .................................................. 322
GRAPHICS ..................................................... 322-323
HEALTH ....................................................... 323
LANGUAGE TOOLS .......................................... 323
LOTTERY/GAMBLING ....................................... 323
MEDICAL/DENTAL .......................................... 323
MUSIC/MIDI .................................................. 323
PUBLIC DOMAIN ........................................... 323
RELIGION ..................................................... 324
SHAREWARE .................................................. 324
STACKWARE .................................................. 324-325
STATISTICS .................................................. 325

MISCELLANEOUS 325-327
ACCESSORIES ................................................. 325
DATA CONVERSION SERVICES ............................. 326
DESKTOP PUBLISHING SERVICES ....................... 326-327
FURNITURE .................................................. 327
INSURANCE ................................................... 327
MAILING LISTS ............................................... 327
SERVICES .................................................... 327
SUPPLIES ..................................................... 327

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- 1.44 FDHD
- Apple 40MB Hard Disk
- Extended Keyboard & Mouse
- Hewlett-Packard DeskWriter
- Microsoft Word
- Microsoft Excel
- You save 2,629!

<table>
<thead>
<tr>
<th>Description</th>
<th>RAM (MB)</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>Mac+In+Stock</td>
<td>$7,224</td>
<td>Only $4,695</td>
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### Career Starter System
Macintosh SE
- 1MB RAM
- 1.44 FDHD
- Apple 20MB Hard Disk
- Apple Keyboard & Mouse
- ImageWriter II & Cable
- Microsoft Works
- You save $1,223!

<table>
<thead>
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<th>Description</th>
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<td>Mac+In+Stock</td>
<td>$4,018</td>
<td>Only $2,795</td>
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### Large Screen Color 8-Bit System!
Mac II CX, 5MB RAM, 80MB HD
- New Extended Keyboard & Mouse
- SuperMac 16" Trinitron Color Monitor
- SuperMac Spectrum 8 Series III Card
  - Hewlett-Packard PaintJet+ Printer w/Int
  - You save $4,976!

<table>
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### Word Processing & Publisher System!
Mac II CX, 5MB RAM, 80MB HD
- Extended Keyboard & Mouse
- Apple Laserwriter II SC
- Microsoft Word, Aldus PageMaker
- Adobe Type Manager
- You save $5,393!

<table>
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<tr>
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### Brand New CPUs & Configured Systems!
Mac IIIFX/4MB
- $5,499; 80/4MB: $6,999; 160/4MB: $7,799

<table>
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<th>Description</th>
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<tr>
<td>w/40MB HD</td>
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<td>$3,699</td>
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### Microsoft Specials!

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<td>Apple 12&quot; Mono-$289</td>
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<tr>
<td>New: 8-24 bit video card-$655</td>
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<td>Radius 2-Pg Dist-$1099</td>
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<td>Radius FPD-$1,299</td>
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### Pragmatic Peripherals
- Apple Laserwriter II NT: $3199
- Apple Laserwriter II NTX: $4299
- Apple Imagewriter II: $437
- Hewlett-Packard Deskwriter: $879
- HP PrintJet+: With Int: $1199
- HP PrintJet+ XL: With Int: $1999
- HP ScanJet: Scanner & Int: $1649
- Abaton 300GS Scanner & Int: $1395
- Abaton 96/24 Fax Modem: $449
- EMAC 2400B Modem w/MNP5: $199
- Apple CD-ROM Drive: $649

### Affordable Portables!
- w/1.44 FDHD
  - Retail: Our Price $4799 $3,199
- w/40MB HD
  - Retail: Our Price $5499 $3,699

<table>
<thead>
<tr>
<th>Description</th>
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<tr>
<td>1MB Upgrades</td>
<td>$399</td>
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<table>
<thead>
<tr>
<th>Capacity</th>
<th>Access Time</th>
<th>Int.</th>
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<tr>
<td>100MB</td>
<td>25ms</td>
<td>699</td>
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<tr>
<td>200MB</td>
<td>18ms</td>
<td>919</td>
<td>1,049</td>
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<td>360MB</td>
<td>14.5ms</td>
<td>1,645</td>
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<tr>
<td>680MB</td>
<td>16.5ms</td>
<td>2,700</td>
<td>2,850</td>
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</table>

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<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Quantum 12ms Access</th>
<th>SyQuest</th>
<th>Impremis WREN Drives</th>
<th>Dual Drive Combo's</th>
<th>General Category</th>
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<td>$599 internal</td>
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<td>$999 120Meg</td>
<td>$899</td>
<td>$299</td>
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**New Quantum ProDrives**

- 11.4 ms effective seek time
- 4.0 MB/s burst transfer rate

**Quantum**

<table>
<thead>
<tr>
<th>Model</th>
<th>Access Time</th>
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**Seagate**

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**SyQuest**

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<td>60MB</td>
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**Impremis WREN Drives**

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**Dual Drive Combo's**

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<td>$2295</td>
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<td>300/Teac 155</td>
<td>$2295</td>
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<tr>
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<th>Price</th>
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<td>800K Floppy Drive</td>
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<tr>
<td>Teac 155MB Tape</td>
<td>$679</td>
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<td>Smart Label Printer</td>
<td>$185</td>
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<tr>
<td>Fujitsu Laser Printer</td>
<td>$2595</td>
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<tr>
<td>APC UPS</td>
<td>Call</td>
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- 251
- 223
- 222
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- 223
- 222
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<thead>
<tr>
<th>Component</th>
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<tr>
<td>Upgrades &amp; Accelerators</td>
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<td>Mac SE to Mac I</td>
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<td>Super Floppy Upgrade</td>
<td>$572</td>
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<td>NewBridge - NewLife I</td>
<td>$199</td>
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<td>DayStar Digital 50 MHz PowerCard</td>
<td>$2245</td>
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<tr>
<td>Dune Marathon (200) 30MHz for Plus, SE, SE/30, II, IV, with SUMI &amp; SUM 2</td>
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<td>Displays &amp; Video Interfaces</td>
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<td>Raster Ops ClearVue 19&quot; Display w/ card (SE or II)</td>
<td>$1099</td>
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<td>Raster Ops ClearVue GS</td>
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<td>Computer Eyes Professional</td>
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<td>NEC CDR 5251 Portable CD-ROM with interface</td>
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<td>Abaton 300G Flat Bed</td>
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<td>Sharp JX 100 Color</td>
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<td>Logitech - ScanMan model 32-400CP1</td>
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<td>512K - Plus</td>
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<td>QUANTUM 170 MB</td>
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executives. Worldwide even, that's still a lot. Well at least these developers think big. I'm reminded of the Gavilan portable and the Mindset and Dynabook computers. All machines with a better idea and a huge perceived market. All flopperoos.

Well, before I get too cruel, let's go through the point-by-point reasons such a technology will never succeed:

1. It's counter to a major societal trend: computer literacy. Most 12-year-olds nowadays can use a keyboard. Why develop something for a dying breed of people who can't use a keyboard? It's a bottom-feeder technology. It reminds me of the fad a few years back to develop word processors for people who didn't like computers. It's like designing a car for people who can't drive.

2. It's counter to a major cultural trend — flawed penmanship. While people can use keyboards, few can write well. In fact, in the past few decades, typical penmanship has deteriorated to the point of illegibility. Suddenly computers are expected to read this gibberish when they could never read even good handwriting in the past. This is not an insignificant problem. I'm told that the new algorithms for reading handwriting are fabulous. But as a heavy user of OCR — optical character recognition, used for scanning typed and typewritten text — I can tell you that this simpler technology still has too many problems; even the best systems aren't close to perfect. How technology designed to read handwriting is supposed to somehow leapfrog OCR technology is a mystery to me. The word crock comes to mind.

3. What are the applications? Is this technology really better than a sheet of paper for transcribing notes? It can't be used to write columns. I can't imagine writing large articles without risking writer's cramp. As for those 25 million executives who can't type, I suspect they'd still rather dictate directly to a secretary than pass a computer pad with scribblings on it back and forth.

4. It has the earmarks of a yuppie toy. Enough said.

Now it's possible that some applications will thrive on such a machine. I admit that any kind of software that requires you to check boxes might work with this technology. A box would appear on the screen, and you'd write an X in the box with the stylus. I assume they are doing something about the potential for scratches on this thing; it would seem that a machine like this would easily get all scratched up. The stylus gets a little burr, and suddenly there's a gouge in the screen. Maybe the screen is made of quartz.

Someone suggested that a programmable check-box computer would be handy as a pilot's checklist for a 747. Instead of printing all those costly sheets of paper (golly, they must spend ten bucks a year for checklist printing), the pilots could have this computer in the cockpit. Yeah, there's a big market there.

One thing's for sure: As with voice recognition and the computer that knows simple English commands, there will be a lot of hype when these devices are released. I just look at my own chicken-scratch handwriting and laugh.
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