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

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

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

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

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

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

Which we are. In fact, if you've got some input for us, feel free to drop us a line. Or if you'd like to find out more about Word, call us at (800) 541-1261, Department P22.

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

After all, we're only making history because we make word processors the way you like 'em.
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“Let me be subtle: Microsoft is the enemy.
Bill Gates is smart, tough, and ruthless — frankly, he’d be an ideal CEO of Apple Computer.” .................................. 29
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Guy Kawasaki, Macintosh Evangelist

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Safe Six

Your article "70 Things You Need to Know About System 7.0" (June '91, page 96) was so informative that it quenched my thirst to upgrade to the next version right away. I already have most of what System 7 offers with third-party software such as Suitcase II and ATM. And my work style is such that I don't much need other 7 features such as interapplication communication and aliasing.

But what interested me most was the statement that "1-megabyte machines such as the Classic will continue to ship with the most recent version of System 6." Does Apple intend to keep System 6 around to license to third-party vendors so they can make low-cost Mac clones, while Apple retains total control of the superior System 7 machines?

Jon B. Slobins
Damascus, MD

Continued shipments of System 6 are almost certainly just a stopgap measure until Apple can make 2-megabytes of RAM standard in every Mac. That doesn't mean that lots of people won't keep using it though — especially for the first year or so. See Jon Zilber's column "Compatibility Checkmate" (August '91, page 23) for some tips on how to stay on the cutting edge with System 6. — AA

Smarting Over System 7

This morning I began installing System 7 on my Mac. The Compatibility Checker told me that I have only one 7-compatible program: my Microsoft Works spreadsheet program. Four others (including my three-week-old TypeStyler 1.5) aren't available. And FreeHand needs an upgrade. But here's the kicker: My Radius display system isn't compatible.

I called Apple, and all I got was condolences. I don't believe I care to invest another $5,000 in hardware and software just to run a fancy $100 version of MultiFinder. Wish I'd known this before I spent the money.

Larry Hacker
Mabelvale, AR

We've heard from several early System 7 adopters — mainly complaining about incompatibilities. But the real miracle is that so many applications are compatible — even if its CompatibilityChecker has never heard of them. And in fact, most commercial Mac products —

Dear Mr. Sculley . . .

Poor Apple. First, thanks to Windows and cheap PCs, it had to abandon its maximum-profit strategy and come out with low-cost Macs. Now it has to consider an important logical consequence of the new strategy — selling those low-cost Macs through low-cost outlets: the new superstores — and perhaps even mail-order. And you can bet Apple's old-line dealers are howling.

Superstores are starting to dominate many consumer-product areas, from sporting goods to household appliances. They're usually in big warehouses in suburban areas, and "sales assistance" is most likely to be informative placards, if that. But the inventories are massive, and the prices rival mail-order prices.

We bet Apple'd love to know how you feel about all this. It's time to name your poison.

Speak Up:

Where do you buy Mac products, and why?

Send your thoughts to Dear Mr. Sculley, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

In June we asked whether you thought Apple should have Claris bring out Windows versions of its product line. Then Apple announced that Claris would do so just as the June MacUser came out. Mark Sekulich, of Providence, Rhode Island, had the most typical reaction: "If the Claris Windows products are any good, that's great news for Mac users in IBM-dominated offices — more connectivity and all that. Not so great for those of us who don't have to play pattycake with IBMs; the resources Claris is diverting into Windows projects will come out of the hide of Mac programs and upgrades."

Meanwhile our May question about a new Mac notebook computer continues to generate heated debate. Mark Sainsbury, of London, wanted five things: "less than 6 pounds, ten-hour battery life, SCSI port, good links, full-sized keyboard. Minimal size and weight mean nonstandard storage hardware and supporting software. But if this is customized for Macs, I'd certainly buy one!"

Alan Perlignieri, of Friendswood, Texas, asked for a "quality trackball. The Portable's little gum-rubber pickup rollers get jammed up against the support trunnions, making action erratic. Most people in our company have gone back to a mouse."

And K. M. Moore, of Coppell, Texas, had some design tips, "Vary the case colors, like the black speckled Mac that was discontinued before it shipped. Make two models, one with the right price; the other with the right features. Make it heavier than it looks — consumers think light things are cheap. And let Kawasaki see the prototype. He doesn't seem to like anything else you do — try to win him over on this one."
Raw Dealer

Well, System 7 is finally available, free, to millions of faithful Mac users. Wrong! Instead, it’s going to cost me at least $99. Why? Dealers whine, “Well, Apple isn’t making us give it away, so . . . .” The dealer I’ve bought two Macs from will let me copy System 7 off his computer—for $125. Doesn’t Apple want us to switch to System 7? I know the answer. Apple wants to rip us off.

Peter R. Payne
San Diego, CA

Sounds like you bought two Macs from a lousy dealer. When we called our local dealer (Computerware), it offered to let us copy the files for free, as long as we brought along our own blank disks. Alternatively, you can join any of the hundreds of bulletin boards and download System 7 for free. Of course, neither of these options will get you the documentation or the free tech support — which is really what Apple’s charging for. In the meantime, find a new dealer. — JB

Manual Transgression

In “70 Things You Need to Know About System 7.0,” June ’91, page 96), you state that with System 7, you can save custom desktop patterns by double-clicking on them. Big deal, I can do that now with System 6.0.7. One thing to note, however: You can’t save changes to two of the desktop patterns permanently (that is, the original pattern reappears every time you open the General Control panel). These two are the standard sickly greenish-blue squiggly things seen on Macs’ world over and the blue bathroom tile pattern that is the 6.0.7’s default. All other patterns can be edited and saved.

I feel compelled to note that this tip was the one and only thing I have ever learned from Max manuals. It won’t ever happen again. I’ll burn them!

Tony Dunn
San Luis Obispo, CA

Maybe you should send them to us instead. — JB

The Direct Line

If Apple really wants to be “kinder,” per Guy Kawasaki’s article “A Kinder, Gentler Apple” (June ’91, page 45), it could start by offering direct technical support instead of making us use “service providers.” The “service providers” in my area were not only unavailable when I called for help but were highly impatient when I finally made contact.

Considering what I forked over for my Mac system, Apple should offer what Fifth Generation (of Suitcase fame) does: tech support 24 hours a day, 7 days a week, via an 800 number.

Stace Aspy
Long Beach, CA

Apple is dipping a toe into the direct-tech-support waters with the release of System 7. Purchasers of the Personal Upgrade Kit get 90 days of phone support, and network types get 180 days. — AA

Fine Printing

I was surprised by the article “Personal Best: Two New Apple Printers” (May ’91, page 90). I was all set to read about hot new printing bargains and found instead a test chart showing my HP DeskWriter outperforming them all — even the LaserWriter LS.

When I was shopping for a printer, I found that the DeskWriter’s speed, print quality, and noise level all compared favorably with the competition’s. Looks like that’s still true.

It’s not a laser printer, but with the correspondence and manuscripts I do, so what? Anyway, keep up the good work. Maybe a bread comparison of all Mac printers will follow soon?

Michael Adelman
Canino, Wilton, CT

This issue’s lab reports on PostScript and QuickDraw printers should answer your questions. — HB

Pirates of Repentance

I’d like to respond to Paul Gifford’s letter to the editor (April ’91, page 16) and Mr. Dvorak’s earlier comments (January ’91, page 346) about software piracy.

We all hate getting stung by buying a high-priced, lousy product or one whose copy protection won’t let you back up the program disk. But, in spite of all our rationalizing and the fun Mr. Dvorak has with our minds, using stolen software is illegal, unethical, and immoral.

Of the programs you steal, how many do you get around to purchasing after you use them and like them? Many mail-order firms — MacConnection, for example — offer 30-day money-back guarantees on most programs they sell. This way you can legally examine both the program and its documentation before you buy it.
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And MacDraw® Pro isn't a bad try. In fact, it reminds us of another drawing program we've always had the utmost respect for: Canvas 2.1.

Unfortunately for Claris, our new Canvas 3.0 includes enough major enhancements to leave their latest effort idling somewhere back in the dust. Again.

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

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MacDraw Pro doesn't.

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MacDraw Pro doesn't.

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MacDraw Pro doesn't.

You are what you drive. Like Canvas 2.1 before it, the new Canvas 3.0 was developed in direct response to the wish lists of thousands of drawing professionals. Its heritage of performance is proven. Its price is right. And its ease of use is legendary. Which leaves just one last question. If what you draw is important to you, why settle for Claris's sedate sedan when you can get your hands on a dream machine?

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**LETTERS**

**I've Got a Little List**

Here are the top ten reasons why I almost canceled my MacUser subscription:

1. The writers of 1001 Hints & Tips for the Macintosh haven’t produced any new tips since PageMaker 2.0.
2. I have to save my money to buy expensive Apple products.
3. Dvorak just isn’t funny anymore (he must be writing his articles on a PC).
4. I’m tired of reading about System 7.
5. I generally can’t retain any information beyond 300 pages.
6. I’m sick of reading complaints that Microsoft Word is too hard.
7. There hasn’t been an equally good-looking male in a pool gracing MacUser’s cover.
8. The weight of previous MacUsers made my bookshelves sag.
9. Bill Gates doesn’t seem to know that those huge pullout Microsoft ads have no more impact than a regular-sized ad.
10. I have to protect my keyboard when I’m reading MacUser, because if I see that MacWarehouse blonde one more time, I’ll puke.

And here’s the main reason I didn’t:

Andy Ihnatko’s Help Folder answers — specifically his comment — “if you angle your three monitors just right, you can bake a potato on your desk in less than 30 seconds.”

Andy reestablishes the prerequisite that Mac users must possess a sense of humor.

Cynthia Gray
Cambridge, MA

**Palmtop Partisan**

As a VAR (value-added reseller) for the Atari Portfolio, specializing in medical applications, I was distressed by Darryl Lewis’ article “Data on the Run” (June ’91, page 110). The Portfolio has its limitations, but they don’t justify his negative review — especially when available software does an excellent job of linking Portfolios to Macs. As an avid Macuser, I wouldn’t have chosen to incorporate Atari’s Portfolio into my products if I hadn’t been able to link the two.

James Jones
Newport Beach, CA

The Portfolio delivers its advertised features and can share files with Macs. It just wasn’t as easy to use as the other three units we tested. — DL
Even before the Macintosh Classic & its new companions came along to wow the reviewers with heroic price/performance ratios, UltraPaint was keeping them plenty busy.

"As advertised, Deneba's UltraPaint...really does set new Macintosh graphics standards", wrote Ernest Mau of CompuServe.

"...many more B&W paint features than SuperPaint, almost all of PixelPaint's color tools, a superset of MacDraw II's object-oriented features, and the gray-scale prowess of Digital Darkroom. All this comes in a single program for less than half the price...", wrote David Pogue in MacWorld.

Perhaps Chris Prior of MacUser UK summed it up best when he wrote that "UltraPaint...could prove to be the ideal software package for those looking for a powerful, all-around draw and paint program."

And it's true. UltraPaint really does offer you the same sophisticated graphics processing power of several leading programs combined — all in one inexpensive, easy-to-use package.

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ClickChange, $89.95. Its Easy, Its Compatible...and very, very, very Hip.

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- In Color (where available).

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LETTERS

LC Plea

Because my new Mac LC is supposedly a "runaway success," I hope third-party developers are planning to make the extras we need such as:
1. Carry-in cases for an LC and its 12-inch monitor, such as the nifty ones for the Plus/SE/Classic.
2. Something to raise the LC’s front when you replace its crummy keyboard with the Apple Extended Keyboard, which blocks the disk slot (waddled-up socks work, but . . .)
3. Memory upgrades, genlock (for overlaying video with computer output), more products supporting the LC’s sound digitizer, and other special features.

Plus/SE/Classic users have it made—a zillion products support the shape of their Macs. Will the current LC product shortage last forever, just because there are fewer LCs than any other type of Mac?

Peter R. Payne
San Diego, CA

We at MacUser—especially those who’ve also bought LCs—share your concerns. Fortunately, we’ve seen several key items show up, including: some you didn’t mention—such as multichip sockets on LC boards, an internal fax modem, Ethernet cards, third-party video RAM, and large-screen displays using the built-in video output. —LT

Speedy CD-ROM Players?

You say CD-ROM is slow and always will be, because that’s how Sony and friends defined it (see “CD-ROM Drives: Is It Time for CD-ROM?” June ‘91, page 150). But why? After all, it’s just bumps on a disk—how fast those bumps are read can’t matter!

Some entrepreneurial hacker should be able to cannibalize ideas from other drive technologies to build a better CD-ROM drive—one that spins faster; uses lighter, more agile read heads; uses multiple read heads; and/or adds caching.

We can’t already have come up against the medium’s physical limits. Other technological (WORM,erasable optical, and so on) claim to be “approaching the speed of magnetic media.” As a read-only medium, CD-ROMs should be the fastest of the bunch.

So—when will we see a speedy CD-ROM drive?

Carl J. Manaster
Globe, AZ

CD-ROM drives share audio CD’s drive technology, disc format, and disarming plans. “Improve” any of the specs, and you’d lose the compatibility and economics of scale CD-ROMs now enjoying. In theory, you can build a much faster drive that packs four times the data onto the same-sized disc—but it would take a marketing giant to establish such a new standard (which would render today’s drives and discs obsolete). Are you listening, Sony? —RM

Cache Crunch

When the access time of a CD-ROM drive is tested as in “CD-ROM Drives: Is It Time for CD-ROM?” (June ‘91, page 150), results can vary, depending on how the benchmark program measures access time. If the benchmark program communicates through the device driver, results will be skewed for the Compaq CDA-431 because it employs a resident driver that reads 64 blocks at a time. This is why the CDA-431 benchmark results at 700 milliseconds instead of the correct 520 milliseconds.

Why do we use a cached driver if it slows down access time?

Our drive has no hardware cache, so we use a cached driver to shorten the apparent drive access time in most normal, everyday applications. When a file is read from a CD-ROM, the blocks containing that file are usually arranged in physical order on the disc medium. By reading multiple contiguous blocks simultaneously from the drive, we take a chance that the next block or two requested by the Mac will be contiguous with the current one. If they are, the block will already be in the cache and we’ll be the Mac’s memory. If we get a cache hit or two, we save lots of time, because it takes only 700 milliseconds to read 64 blocks of data but 520 milliseconds to read just one block. The cache system is designed to maximize cache hits in normal applications.

David M. Cole
Director of Product Development
Chionon America, Inc.
Torrance, CA

You’re right. Our FWB benchmark test suite averages thousands of brief random accesses and not the longer, contiguous reads that the Compaq CDA-431’s cached drive is designed for. New Compaq software—released after our report was published—lets you switch the cache on or off. When we retested the CDA-431 with the cache turned off, access times dropped to less than 500 milliseconds—better—but still not in the same class as the fast Toshiba-based drives. In any case, as we
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There's only one small business accounting system that's so innovative, so flexible, and so complete your business just can't outgrow it. It's called Accountant, Inc. -- its capabilities will truly amaze you. It's easy to learn, easy to use and surprisingly affordable. It does everything you would expect your accountant to do -- yet it's simple enough for a novice. In fact, Accountant, Inc. is the only comprehensive, fully-integrated accounting system available for the Macintosh. It's even System 7 compatible.

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STEVE JOBS, PRESIDENT, NEXT COMPUTER, INC.

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JIM YOUNG, ASSISTANT TO THE CHAIRMAN, EDS (ELECTRONIC DATA SYSTEMS CORPORATION)

How to get your copy of Selling the Dream:
Call The Mac Zone: 1-800-348-6890.
Or look in America Online: "Travel and Shopping", $19.95 suggested retail.

In our report, speed isn't everything. If it were, we wouldn't have awarded the CDA-431 four mice. — RM

ON DEC

"Mac, DOS, and VAX File Servers" (June '91, page 134) compared performance accurately but missed the main point of networking Macs with a Digital VAX: to integrate information from various sources.

For example, a VAX server can convert text and graphics files from one format to another as they shuttle between DOS, Mac, and UNIX clients — all on the server, without requiring clumsy import/export software on the Macs and PCs.

Install Digital's Pathworks for Macintosh, and you can add printer-resource sharing, network-database access, E-mail, X windows, terminal emulation, wide-area AppleTalk networking, and unattended central backup of your Macs' local disks.

Pathworks is the first result of a long-term Apple/Digital collaboration. Digital's VAX-based services for DOS clients have shown major performance gains from release to release. You should expect comparable gains on the Mac side.

Al Cini
Marlton, NJ

Word Imperfect

WordPerfect 2.0 doesn't deserve the four-mouse rating your reviewer, Eric Taub, gave it (June '91, page 56). First of all, it isn't really a WYSIWYG word processor. You can't see things such as headers, footers, or footnotes without either printing the document or switching to a clumsy, noneditable print-preview mode.

And it's slow, even on my Mac Iici with plenty of RAM. I'm a slow typist, but I can easily outrun the keyboard — especially if a defined style is active. And bombsites, hangups, installation problems, and incorrect screen updates continually plague WordPerfect.

I think Mac users would be more productive and satisfied with FrameMaker, Nisus, FullWrite Professional, or WriteNow. If you need DOS WordPerfect compatibility, use a translator package such as MacLinkPlus/Translators or Word for Word/Mac.

Daniel Brocklebank
Columbia, MD

Your points are well taken, but you're overlooking two important considerations. First, although WordPerfect 2.0 is often unhumorously, many of its new features are wellcrafted and Mac-like — for example, the style-sheet management, with its private and network-wide style libraries. Second, WordPerfect offers outstanding customer support. And the changes in 2.0 indicate that this software giant has finally made a serious commitment to the Mac market. — ET

Scanning the Typtist

Your review of the Typtist, our hand-held OCR scanner plus recognition software (March '91, page 58), compares it only with our OmniPage software used with a flatbed scanner. But obviously no hand-held scanner can deliver a quality image as consistently as do flatbed scanners. Had your reviewer compared the Typtist package with other hand-held scanners, he would have seen that its performance is exemplary.

I am also puzzled by the statement that "Typtist 1.0 took nearly three times as long as OmniPage 2.1 to get an acceptable recognition run." Both products have the same recognition-engine software, so the overall speed should be similar. Actually, the Typtist can be faster, because it delivers text directly to target applications. The reviewer also says that the Typtist "lacks automatic page decomposition" and that you have to scan around [graphics] manually or mask them before you begin. In fact, the Typtist does automatic page decomposition and graphics passing quite well, again because it has the same type of recognition engine as does OmniPage.

Finally, why did the reviewer question the efficacy of the SCSI interface's being last in the chain? Most SCSI devices in the Typtist's price range use the same port. Users needing to use a different port can always buy a $79 T cable.

Lawrence Miller
VP Marketing, Caere Corp.
Los Gatos, CA

The Typtist enjoys the advantages as well as the disadvantages of being a unique package. We compared it with other OCR products, none of which are seriously touted for use with hand scanners. As for speed, our tests confirmed that although the Typtist is fast, OmniPage is much faster. We couldn't get the Typtist to do page decomposition — the automatic elimination of graphics on the page — and this feature is neither claimed nor explained anywhere in the manual. Several testers here were unable to make the Typtist decompose pages. — SJ
Redefining the Paint Category
PixelPaint Pro defined the category of Professional Color Paint. Now, version 2.0 extends the Paint category into artistic image processing. Demanding designwork requiring image compositing, 8-bit masking, transparency and antialiasing or special effects such as embossing, patternning, tinting or controlled warping is dramatically simplified. Photographs can be turned into spectacular art with a few commands or brushstrokes. And precision controls and full color separations mean your designs come out looking the way you expect them to look.

While Better Simulating Traditional Paint
And, if you enjoy working with physical media, Pro 2.0 has the tools you've been searching for! PixelPaper™, which simulates textured surfaces such as linen, charcoal paper or even concrete, and pressure sensitive brushes, charcoals, pastels and airbrushes, combine to create outstanding, natural, painterly effects on a computer. In autoscrollable documents up to 4000 x 4000 pixels. All with the flexibility of Macintosh®-assisted design—Pro 2.0's object-oriented paint tools allow you to continue manipulating your strokes before applying them to your image.

With Second Generation Interface Breakthroughs
A second generation in Paint, Pro 2.0 is easier to use than ever before because the interface has been redesigned with the designer's needs in mind. Floating palettes and multiple documents allow you to immediately access and apply tools without climbing through a jungle gym of menus. And, with Balloon Help under System 7.0, Pro verbally tells you what each tool will do. Buy PixelPaint Professional 2.0 now and receive a CookBook tutorial ($19.95 value) free when you return your registration card. Call 1-800-334-3005 for more information about Pro 2.0.

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The 10T Hub is just another example of networking leadership from Asanté, a company that brings you a full line of Ethernet cards for all Macintosches. Like all Asanté products, our hub meets the IEEE Ethernet specifications and is compatible with all popular hardware and software. Reliability is guaranteed with our 5-year, hassle-free warranty.

Plug into the 10T Hub from Asanté. It will turn your office into one big happy family.

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Quick: Picture yourself in the checkout line of the place where you bought your latest new software or hardware. What’s under your feet?
It’s a strange question all right, but it’s one way to tell if you’re shopping at the right place. Let me explain.

Every month, MacUser Lab tells you which products are the best buys for which kinds of computer users. What we can’t tell you is how—or where—to buy them.

When you go to make a purchase, your priorities are different from everybody else’s. You value each of the following factors—low prices, product availability, how close you are to the dealer’s location, how tough it is to park there, and so on—differently than does everybody else. Your answers are completely different from how anybody else weighs these factors. And they’re probably different from what they’ll be tomorrow.

But even more importantly, the retail options available to you are also changing. The biggest change sweeping the consumer retail channel is warehouse mania. You know the places: huge megastores that sell everything from faucets to fauna, from yo-yos to Yugos.

The computer industry’s equivalent of the warehouse store is the “superstore,” vast acreage of shelves full of the latest software and hardware goodies. The floor space is vast. The inventory is vast. The lines at the cash registers are vast. The number of helpful salespeople, however, is usually less than vast. You might even say they’re half-vast—but just don’t say it too quickly.

The superstore assumption is that you know exactly what you’re looking for before you walk in the door. You read the lab reports, the ads, the product specs, so you—not the salespeople—have the expertise. The store keeps its costs low by keeping the traffic moving at a steady clip and staffing the place with low-paid workers who’ve just been retrained to ask “You want a hard disk with that?” instead of “You want fries with that?”

The Floor Show
The secret behind the success of warehouse stores and superstores is no secret. I was at a local superstore the other day and heard one customer ask his buddy if it was a good place to buy blank floppies. His buddy had a simple answer: “Check the floor.” This got a puzzled look from his friend (and me), so he continued: “If the store has carpeting, skip it. Don’t forget who’s paying for the carpeting, the fancy track lighting, and everything else. If the floor is bare concrete, you’re in the right place.”

For years savvy New Yorkers have known that the way to buy consumer electronics is to shop around and poke about in the push and pull of oneboutique atmosphere of Macy’s until you know what you want and then walk across the street and negotiate a much better price at a cramped and hectic storefront outlet such as 47th Street Photo.

Similarly, computer superstores are flourishing at the expense of traditional dealers that never got beyond the notion that people would pay exorbitant prices to get personalized, attentive service from salespeople who dressed well but who knew less than their customers about the products they were selling.

But will superstores stand the retail channel on its head? It’s doubtful—considering that the retail channel has already been standing on its head for years, thanks to the success of direct-mail companies.

Check in the Mail
Computer dealers, supposedly, had to charge higher prices to support their overhead and to pay for technically savvy salespeople, robust inventories, massive advertising, and so on. Direct-mail companies could charge less, because they had none of the above—or so went the theory. In fact, the mail-order companies often offer the best tech support, the fastest order fulfillment, and the most-innovative marketing ideas in the business. Overnight delivery and— in some cases—same-day and even same-afternoon delivery are available, at little or no charge.

Many mail-order companies provide free videos and any special tools required for hardware installation. Many mail-order companies have been progressive in using environmentally acceptable packing materials such as shredded recycled paper and real popcorn instead of Styrofoam. Most mail-order firms have fair return and restocking policies. And mail-order people seem to actually enjoy helping people make the right purchase. So with superstores on the rise and direct-mail companies offering full service at discount prices, it should come as no surprise that traditional dealers are getting harder to find than the culprit in an INIT conflict.

But are dealers only for chumps? No, but paying higher prices to a full-service computer dealer is worthwhile only if going to the dealer
true value to the sales process. Here’s a little quiz to help you separate the wheat from the chaff and the riff from the raff. For each question, award your dealer the number of points shown in parentheses at the end of the response that most closely matches how your dealer would respond.

1. Take a floppy disk with you into your dealer’s store. The disk has been formatted to 1.4 megabytes and contains a DOS file. Ask your dealer to copy it.

   a. He returns quickly, pleased with his success, and hands you a photocopy of the floppy. (0)
   b. He explains that he can’t copy it but knows that it’s because he doesn’t have a 1.4-meg floppy drive handy. (1)
   c. He successfully copies the floppy. (2)
   d. He copies the floppy and saves a copy of the file in a native Mac format too. (3)

2. Murch into the dealership, and tell the saleswoman that your machine won’t run After Dark.

   a. She says, “Well, you shouldn’t be working so late.” (0)
   b. She asks what System software you’re using. (1)
   c. She launches into a diatribe on the proper speed and volume for flying toasters. (2)
   d. She suggests that you have a System software incompatibility and offers you upgrade advice. (3)

3. Evaluate the banner in the dealer’s window. It says the following:

   a. “Free 8-track tape with every box of floppies.” (0)
   b. “Guaranteed lowest prices.” (1)
   c. “Knowledgeable, helpful sales staff who don’t work on commission.” (2)
   d. “Knowledgeable, helpful sales staff who do get commissions — but only for repeat business.” (5)

4. Walk into your dealer’s with an armful of blank floppy disks. Ask if you can get a copy of System 7. The answer is as follows:

   a. “Certainly — that will be $125.” (0)
   b. “Yes, as long as you have your own floppy.” (2)
   c. “You get a canned sales pitch, and it’s only for new dealers.” (5)

5. Call your dealer when he’s really busy; you can tell what kind of an outfit you’re dealing with by what happens when you get put on hold.

   a. You get music: Frank Sinatra or Itzhak Perlman. (0)
   b. You get music: Nancy Sinatra or Rhea Perlman. (5)
   c. You get a canned sales pitch. (4)
   d. You get a canned sales pitch, and it’s a 900 number. (10)

If your dealer scores fewer than 10 points, it’s time to go shopping — for a new dealer.
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Sleeping with the Enemy

Let me be subtle: Microsoft is the enemy. It seeks to dominate and control personal computing. Microsoft would like to ship every piece of software you use—even the operating system—and squeeze every other software company out of the market. Microsoft tolerates hardware companies such as Apple and IBM, seeing them as OEM suppliers. If there weren't such a low profit margin in hardware, Microsoft would be building computers too.

Don't get me wrong: Microsoft is a tremendous company and a great example of excellence in American business. I admire what Bill Gates and his company have accomplished. But I don't have to like it. And I don't have to stop trying to head off Microsoft at the pass before it achieves a monopolistic position. So here's my plan to save us all from being controlled by Microsoft.

Catalyze Microsoft Arrogance
First, let's help Microsoft become so arrogant that it no longer feels the need to introduce new products or enhance existing ones. Arrogance leads to the downfall of companies. As an example, Lotus springs to mind. In the late '80s, Lotus believed that its 1-2-3 spreadsheet was such a powerful standard that people would buy it "just because."

The problem is that Microsoft still believes that it must compete for business. It refuses to rest on its laurels (except with Microsoft File, which has set such a high standard for Macintosh database programs that it hasn't required revision). We must change this attitude and make Microsoft believe that we will buy its products "just because." Every time you speak to Microsoft employees, mention how wonderful all Microsoft products are, how Microsoft sets the standard in every category, and how you "would buy a Microsoft product just because of the Microsoft label." Try to do this with a straight face — especially those of you who own Microsoft Works, PowerPoint, and Microsoft Mail. (Hey, I never said that implementing my plan would be pleasant.)

Also, you can tell MBA students to go to work for Microsoft after graduation. (Sending over people who were laid off from Oracle would have the same effect.) The more MBAs at Microsoft, the better, because most MBAs are convinced they should be running companies after two years of reading case studies. As a rule of thumb, one MBA can neutralize the efforts of five good engineers.

Free Claris
On the one hand, we must ensure that Microsoft gets arrogant and begins to decay. On the other hand, we must ensure that other companies take up the slack—especially Claris. Claris was created for two reasons: to establish a kick-ass competitor to Microsoft and to end competition between Apple and its developers. Both reasons still make sense. Perhaps they make even more sense today, because of Microsoft's megalomaniacal tendencies. Unfortunately, Apple Kuwaied Claris, bringing it back into the Apple galaxy as an internal division. Why? Apple says it realized the importance of application software and wanted to control its destiny in this area.

I think Apple executives got sick of hearing Claris executives brag about their plans to go public and then do Microsoft Windows software. I can't blame the Apple executives for getting upset at this, but Kuwaied Claris was the worst thing they could do.

Why? Because as an Apple division, Claris won't be a kick-ass software company. It will be subject to Apple's quarterly-earnings paranoia. Now Claris is going to be more worried about helping the mother hardware company than about delivering great software. Claris will be a dumping site for all the projects Apple doesn't want to manage—projects that no real software company would consider. I'm sure Gates thanked his lucky stars for the day Apple Kuwaied Claris.

(Speaking of Gates and Kuwait, let me interrupt to tell you a story that illustrates how powerful Microsoft has become. At the Apple Worldwide Developers Conference last May, Apple invited Bill Gates to help introduce System 7. Unbelievable! Tell me that George Bush went to the grand opening of Saddam Hussein's new chemical-weapons plant. Or that Iraq's ambassador had a goodwill tour of Northrop's stealth-bomber facility.)

My plan calls for the liberation of Claris. It should be an independent software company with the sole mission of becoming the world's greatest Macintosh developer—the Microsoft, if you will, of Macintosh. Claris should have a software company's perspective: Do what's right for software customers—not only for Apple customers who've bought the parent company's hardware.

Should Claris do Windows software? At first glance, the answer is of course not. Apple could retain 51 percent ownership and 86 every plan to do non-Apple-platform software. On
closer inspection, the answer is not so simple. Imagine Claris providing the leading Windows applications. Then Apple (with its majority ownership) could threaten Microsoft the way Microsoft threatens Apple: “We don’t like what you’re doing, Bill. If you don’t do things our way, we may not revise WindowsWrite II and we may ship the NeXT version of Resolve sooner.”

Every time you speak to an Apple employee, express concern for what’s going to happen to Claris and request that Claris be an independent software company. It would help if you’re from a large company (such as Boeing, General Dynamics, EDS, Kodak, or ARCO), because Apple tends to listen to companies that are potential purchasers of thousands of Macs. Apple will also listen to those who can say they’re from a university such as Carnegie-Mellon, the University of Chicago, or Stanford, because Apple is afraid of the inroads NeXT is making in higher education.

**Distract Gates**

The Japanese have a saying: “Where the head goes, the body will follow.” The head of Microsoft is Bill Gates. He is smart, tough, and ruthless — frankly, he’d be an ideal CEO of Apple, and this may be the subject of a column someday. Another part of my plan is to distract Gates — and the rest of Microsoft’s upper management — so that they run the company less efficiently.

Here are a few ways to do this: First, those of you who are in graduate schools of business should invite Gates to speak at your school. While there, he may meet a business-school student, fall in love, and get married. This isn’t that farfetched — just ask Steve Jobs. You know that anyone strong enough to marry Gates is going to demand a high level of attention from him. This will reduce his ability to make business trips, work late, and work at home.

Second, those of you who can write compilers should contact Gates and tell him that you’ve created a revolutionary object-oriented BASIC and that Claris is trying to acquire it. I don’t know why, but Gates has this thing about BASIC. It would really bother him if Apple — or, Claris — were going to sell one.

Third, those of you who’ve always wanted to start a company should create one now and announce products in any category Microsoft doesn’t yet occupy. This will force Microsoft to preannounce a competitive product in order to grab that market. Any of you who already have products that compete with Microsoft’s should announce new versions so that Microsoft has to preannounce a new version in order to kill yours.

Fourth, those of you who decide to take my advice in the previous paragraph should call the Federal Trade Commission as soon as Microsoft makes its preemptive strike. Tell the FTC that Microsoft is competing unfairly with you. The FTC’s telephone number is (202) 326-2222. On second thought, don’t do this. If I had to bet on Microsoft or the FTC, I’d bet on Microsoft.

**Create and Consider Alternatives**

This brings me to the last part of my plan for overcoming Microsoft: All kidding (and the FTC) aside, the only thing that can really defeat Microsoft is superior products. This requires two things: superior products and people having an open mind about considering alternatives to Microsoft products.

The first necessitates that developers get off their self-pitying, fat derrieres and make great products. It also requires that venture capitalists take risks. (Otherwise they should just invest their funds in Microsoft stock and then go play golf and sip martinis at the Sundeck every day.) The second requires that people buy the best product for their needs — Microsoft or not.

Here are some alternatives to consider: CE Software’s QuickMail instead of Microsoft Mail, WordPerfect or Claris MacWrite Pro instead of Microsoft Word, Aldus Persuasion instead of PowerPoint. Add to this list two products you probably haven’t heard of. The first is an integrated product (code-named Terminator, which should give you an idea of its purpose) being created by Robert Ilem and Scott Holloway of Claris. Terminator will blow Microsoft Works into the weeds. And you can quote me. (It may be shipping by the time you read this column.) The second is an ingenious product that combines spreadsheet and database functionality, being created by Robert Ilem and Scott Holloway of Claris. Terminator will blow Microsoft Works into the weeds. And you can quote me. (It may be shipping by the time you read this column.)

I’m on the board of directors of the company that’s creating this product to take on Excel. However, I am not sure what the board of directors of the company that’s creating this product to take on Excel is. I am not sure what the board of directors of the company that’s creating this product to take on Excel is. I am not sure what the board of directors of the company that’s creating this product to take on Excel is.
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What Passes for Friendship

System 7 is not simple, and neither is 7-compatibility. Apple identifies three kinds: mere 7-compatibility, 7-friendliness, and 7-dependence. Compatibility buffs go beyond these categories to subcategories, identifying such deviant versions of 7-friendliness as Balloon Help the Bear and With Friends Like These. Microsoft Excel 3.0 conveniently demonstrates both.

MacUser reviewed Excel 3.0 in July (page 56) and gave it a high rating. It deserved every mouse it got for its ease of use and powerful features. Bravo. But then, because System 7 shipped after Excel 3.0 did, the reviewer couldn't write about Excel's 7-friendliness, either in a novice-user domain such as balloon help or in the developer domain of IAC (interapplication communication).

I can.

Balloon Help the Bear

"Help the Bear" is an old novelty song. In it, the singer addresses a well-meaning but inept friend, cataloging the disasters that befell him whenever the friend tries to help him and concluding by asking the friend, the next time he sees the singer in a wrestling match with a bear, to help the bear.

Balloon help may be the feature of System 7 most useful to novice Mac users. Just point at something on the screen, and a word balloon pops up explaining what the thing is, what it does, and why it happens to be grayed out at the moment. That's extremely useful; or at least it is if it is done right, and Apple did it right in implementing balloon help for System 7 itself, setting an example for all third-party developers. When it's not done right, both Apple and the user are justified in crying "Help the bear."

In Excel 3.0, Microsoft implemented balloon help twice, trying one approach with menu items and another with window objects. Both approaches exemplify Balloon Help the Bear friendliness.

In implementing balloon help for menus and menu items, Microsoft hit upon the economical strategy of reusing, verbatim, the text from its existing on-line help system. It wasn't a perfect match. Unlike System 7 balloons, which automatically size themselves to fit their text, the existing Excel help system uses a fixed-sized, one-line window, which enforces a style of writing notable for its paucity of punctuation, articles, detail, and clarity.

Here's how Apple documents a grayed-out Paste menu item: "Places the contents of the Clipboard at the location of the insertion point (or in place of the current selection). Not available because there is nothing in the Clipboard, or because the insertion point is not in a location where pasting is possible."

Here's how Microsoft does it: "Place data in selected cells."

Microsoft also tells us "Save document with a new name" to explain the Excel Save As menu item. This is clear enough as far as it goes, although it's not very helpful to anyone who'd appreciate knowing that it is through this menu item that you select a disk or folder for a document, apply 1 of 17 supported file formats to it, or make it available to other users via file sharing.

Still, reusing the old messages probably saved Microsoft a lot of time and money, a savings I'm sure it passed on to its customers. When it came to implementing balloon help for window items, though, Microsoft had to generate some fresh copy, and the results show what a billion-dollar company can do when it rolls up its sleeves. These balloons have complete sentences.

Of course, nothing is perfect. Microsoft could have given a bit more thought to the question of what people are likely to point at. Expecting novice users to be curious about what the boundary between cells does, or to imagine that it does anything at all, or even to conceive of the boundary between cells as an object is perhaps overly optimistic. True, users ought to be informed that clicking on a cell boundary does something and be told what it does, but perhaps a cell-boundary balloon is not the best tool for that job. In a way, such superfluous balloons compensate for all the balloons that Microsoft left out of the product, but only partially.

And despite my unabashed admiration for the grasp of the English sentence shown in the balloons for window items, there is room for improvement in the content of those sentences. Several balloons refer to something called the formula bar. There is a formula bar, and it's visible, but short of guessing or reading the printed documentation, I don't know how a novice would divine that this object is the famous formula bar mentioned in those balloons.

A suggestion for Microsoft for the next version: Consider having an object's balloon identify the object if other balloons are going to refer to it by name.

And here's another suggestion for the next

Excel 3.0 is one of the first major System-7-friendly applications. But with a friend like this, who needs enemies?
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MICHAEL SWAINE

Microsoft probably thinks of balloon help as merely a sign hung on the product; the sign I see on Excel reads Shoddy Workmanship.

With Friends Like These

With Friends Like These is a different sort of 7-friendliness, the logical consequence of System 7’s IAC, the Blanche DuBois of technologies, its success depending, as it does, on the cooperation of competitors.

The lowest form of IAC is copy-and-paste, which we already had in the dark ages before System 7. All it asks of competitors is that they agree on a few data formats. System 7’s publish-and-subscribe is the next step up in IAC, but it doesn’t ask much more of competing software vendors than copy-and-paste did. It is System 7’s idea of copy-and-paste. Microsoft has implemented publish-and-subscribe in Excel 3.0, and it seems to work well.

But like copy-and-paste, publish-and-subscribe is merely data sharing. IAC’s real potential is in letting applications communicate with one another on a functional level. If applications can open up their functionality to other applications, then we can access the power of the most advanced statistical programs from our mundane spreadsheets, customize the features of our word-processing environments, and use scripting languages to control applications with a deftness and degree of control unknown today.

This demands a higher level of cooperation among competitors than simply agreeing on data formats. It places serious constraints on how applications are written. It also demands not only that cooperating competitors expose details of how their applications work but also that they explain how their competitors can take advantage of these details and that, at a certain level, those details be the same for all similar applications. The idea is that your spreadsheet program, say, ought to be able to request the services of your word processor, whatever word-processing program you may be using.

None of this is news to Microsoft, which has been in the System-software business longer than almost any other personal-computer-software company. It has not escaped Microsoft, a multiplatform vendor, that whoever delivers a platform-independent implementation of this kind of IAC will clean up. Microsoft expects to be the company to do it. Toward that end, Microsoft has layered its own multiplatform approach to IAC on top of Apple’s IAC. Microsoft’s IAC uses the very technology that it attempts to supplant in the market.

And System software is a market as well as a tool for creating markets for application software. Apple, through its Claris subsidiary, is hinting about licensing its Apple-events IAC technology to run on other platforms and is known to have Windows-based applications in the works. In short, about the only Microsoft product Apple is not threatening to compete with directly or to drive out of existence through look-and-feel litigation is MS-DOS, the ten-year-old character-based operating system that hangs like an albatross around Microsoft’s neck — right next to that sign.

And so we have not only cooperative competition within the context of an agreed-upon implementation of IAC but also cooperative competition (?) among IAC implementations. Although competition can stimulate innovation, the only apparent advantage offered by Microsoft’s IAC is that it runs on Windows, a graphical user interface that looks good only when compared with MS-DOS. What’s going on here is not competition to produce good products but jockeying for position.

I suggest to Microsoft that no amount of positioning can repair the damage done by treating customers with scorn.
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You could be missing the best parts of System 7.0

Make sure you get 32-bit addressing and virtual memory

Your Mac II, IIX, IIXx or SE/30 lacks some important capabilities of the current generation of Macs. It won’t run Apple’s new standard 32-bit addressing mode which lets you use much more memory and run programs faster.

In fact, you’ll discover that 32-bit addressing does not even appear in the System 7.0 Memory control panel.

That is why Connectix created MODE32: the simple, affordable and unique software solution that lets older Macs use 32-bit addressing.

MODE32 gives you access to more memory and boosts your productivity. With additional memory, applications can work faster and more programs can run concurrently.

MODE32 breaks through the eight megabyte memory barrier to access up to one full gigabyte of virtual memory, or as much physical RAM as you can put in your Macintosh.

You can get full use of 4MB and 8MB SIMMs or push virtual memory beyond the 13 megabyte limit with MODE32.

It’s ideal for memory-intensive applications such as graphics, desktop publishing, multimedia, CAD, large spreadsheets and image processing.

If you want 32-bit addressing, which is standard on the current generation of machines, you need MODE32.

Get virtual memory on your original Mac II

If you have an original Macintosh II, virtual memory is also missing from your control panel.

Virtual memory is a standard System 7.0 feature that allows you to increase your Mac’s system memory without having to buy and install additional SIMM memory.

Put the power of virtual memory to work for you with an MC73** PMMU (Paged Memory Management Unit). It quickly drops into an existing socket designed specifically for this purpose.

Get virtual memory with the MC73 PMMU. It is the latest version of Motorola’s PMMU and is the only one that is known to be fully compatible with the Macintosh II.

Be sure to get the full power of System 7.0

Don’t miss these powerful System 7.0 features. Order MODE32 or MC73 today from your supplier, or call Connectix at (800) 950-5880 or (415) 324-0727.

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Please circle 63 on reader service card.
For what it's worth . . . Apple has a new monitor! It's the first large-screen color model it's ever made. This 21-inch display has a built-in antiglare, antistatic screen and ADB ports on the front panel. So why are we telling you about it and not showing it? Apple is going to sell it only in Europe. Just thought you'd like to know.

By Russell Ito

Bigger, faster, smaller: Hard drives used to be like American cars—make 'em bigger and faster. But now, as with cars, safety and smaller sizes have become important selling features. The Micro/Raven series, from MicroNet Technology ([714] 837-6033), is one of the fastest drive systems around. The system delivers screamingly fast sustained data-transfer rates with capacities starting at 624 megabytes and reaching 2.8 gigabytes. When it comes to data safety, it would be hard to beat the system we've heard about from Core International ([407] 997-6055). Boasting industrial-strength redundancy, Core's Intelligent Array Subsystems offer custom configurations that consist of five drives (four for data and one for error correction) plus backup power supplies and yet another spare drive. Capacities start at 1.2 gigabytes and go up to 4 gigabytes—multiple subsystems give you as many as 112 gigabytes. If a drive fails, the faulty unit can be removed and replaced with the spare drive and the data recovered — meanwhile the subsystem continues to handle host requests. And in the smaller-but-bigger category, Micropolis ([818] 709-3300) has introduced a 3.5-inch, 1-gigabyte drive mechanism, so you'll soon see gigabyte internal drives in machines such as the IIfi that can accept only 3.5-inch drives. Finally, there's the Clipper, from Jasmine Technology ([800] 347-3228), a portable hard drive with capacities of 20 and 40 megabytes ($369 and $529, respectively) that's smaller than the average paperback book—3 x 1 x 5 inches. Not only that but it doesn't need a power cable, because it draws power directly through the SCSI port. In fact, it plugs directly into the SCSI port (although it doesn't connect to an IIfi directly). Bigger and faster are still the hard-drive watchwords, but the language is growing. Still no sign of airbags for hard-disk crashes, though.

Up to Date . . .

Super 3D, Silicon Beach's 3-D-creation package, has been upgraded to version 2.5. It now boasts MacRenderMan support. (619) 695-6956. $495. QuickDEX, Casady & Greene's venerable personal-information manager, has finally been upgraded to QuickDEX II. Enhancements include 16K cards, time and date stamping, and user control of fonts and sizes. (408) 484-9228. $60. Address Book Plus, Power Up Software's personal-information manager, has been upgraded to version 2.0. Improvements include enhanced printing and field options as well as better importing and exporting. (415) 345-5900. $99.95.
24,000 Fast LCD Colors

LCD projection panels are slow, and the color models have relatively poor color rendering, right? Wrong. Proxima’s Ovation LCD panel marks a new standard in projection panels.

The Ovation unit is an active-matrix LCD panel capable of reproducing as many as 24,389 colors, from a pure white to a vivid black. Because of its active-matrix design, it’s also fast enough to project full-motion video at 30 fps (frames per second), so video can be part of any presentation. To make the incorporation of video into a presentation easier, the Ovation supports NTSC (composite or S-video) input plus the connection of powered speakers. You can control the speakers’ volume directly from the Ovation’s handheld remote control.

Ovation also supports Proxima’s Cyclops accessory (see New on the Menu, February ’91, page 46), which makes it possible to control the Mac with a special pointer that, in effect, turns the projected image into a huge touch screen.

The Ovation unit weighs only six pounds, so it’s ideal for presenters on the road or for conference rooms that don’t have built-in projection systems.

Proxima Corp., 6510 Nancy Ridge Drive, San Diego, CA 92121; (619) 457-5500. $8,495.

Project Comes to the Mac

Announcing its first new Mac application in years, Microsoft has introduced Microsoft Project for the Macintosh, a project-management package that’s already selling in a Windows version.

The first thing that most Mac users will notice about Project is how much its interface resembles Windows. Pop-down menus stay pulled down after the mouse has been released, for example. In many ways, Project is more Windows-like than any Mac application Microsoft has released so far. Microsoft’s explanation is that the principal market for Project will be mixed environments that are already using the Windows version or offices that will need to share files with Windows.

Project’s main claims to fame are its ease of customization and its flexibility. Project data can be entered into any view (Gantt, PERT, Task, and so on) directly, and multiple views of the same project can be studied at the same time. Users can create custom views that are stored separately from the data files, so once a view has been created, any project can be studied in that view.

Project offers resource leveling across multiple projects, and you can have resource calendars for an individual, group, or company.

Microsoft, One Microsoft Way, Redmond, WA 98052; (206) 882-8080. $695.

Faster Displays PDQ

Everyone wants a fast display, but not everyone has found Apple’s 8•24 GC accelerated display card to be the answer. SuperMac Technology’s new single-slot accelerated display card boosts double the GC’s speed and costs $600 less.

SuperMac’s Spectrum/8•24 PDQ card can drive 12- and 13-inch displays at 24 bits (16.7 million colors), 16-inch displays at 16 bits (65,536 colors), and 19- and 21-inch displays at 8 bits (256 colors). The card comes in NuBus and IIsi versions, and the IIsi card (Spectrum/8•24 PDQ si) comes with a PDS adapter.

Instead of the GC’s RISC-based graphics coprocessor, the PDQ uses a custom-builtin Toshibachip. The PDQ NuBus blockmode transfer supports RS170 timing for better display on NTSC monitors. As with the GC, however, you still must convert the video signal to NTSC for display.

SuperMac Technology, 485 Potrero Avenue, Sunnyvale, CA 94086; (408) 245-2202. $1,399.

Sound Investments

Articulate Systems is now offering three sound-input-device packages — the most from any manufacturer.

Voice Record is a software-only product that offers sound recording and editing in a single window that can be accessed as a DA; through any application that supports Apple’s SoundManager, which came with System 6.0.7; or with Articulate Systems’ SoundManager, which works with System 6 or 7. Voice Record supports input from a variety of microphones and digitizers, including Articulate’s mikes, Apple’s Mike, and Farallon Computing’s MacRecorder. Compression and sampling rates can be as varied as needed, and the Microsoft Project for the Macintosh is a project-management package that will be most at home in mixed Mac and PC environments.
software conveniently tells you how much memory and time you have available when you record a sound. You can cut out silences, re-record specific segments, or re-arrange the recording in the same window. Voice Impact comes bundled with SoundWave, a stand-alone application for advanced sound work, including special effects, mixing, and filtering.

Voice Impact is a tiny digitizer that comes bundled with Voice Record and SoundWave. Voice Impact includes built-in automatic gain control for better-sounding recordings.

Voice Impact Pro also comes with Voice Record and SoundWave software. This unit includes a high-quality unidirectional microphone, a built-in DSP chip, and onboard digital-audio compression (MACE [Macintosh Audio Compression Expansion]). Voice Impact Pro lets you record sounds in the background, and it compresses the sound before sending it to the Mac. Voice Impact Pro also offers line-in and microphone jacks for audio input from external sources.

**Presentation Magic**

By now, just about everyone knows that you can create wonderful-looking animated presentations in packages such as Macromedia Director, provided you’re willing to give up a substantial part of your life to learn the program. But Paracomp has recognized that a lot of people want to create animated presentations without the hassle, so it has introduced a package code-named Magic.

Magic lets users create animated presentations that don’t require any scripting. The interface involves a single small palette of tools that looks like the MacDraw tool set. Creating an object is as simple as drawing a shape and then pasting in an image — either still or motion. To move the filled object across the screen, you simply draw a path and tell Magic how long you want the move to take. Animated screens can be linked to create interactive presentations.

The package includes a collection of templates and clip art to make getting started even easier.

Paracomp, 1725 Montgomery Street, Second Floor, San Francisco, CA 94111; (415) 956-4091. $395.

Paracomp’s Magic is an authoring package for presenters who want to create animated interactive presentations without scripting. Note its simple Tool palette.

**Apple Cuts Exec Pay**

CUPERTINO, CA — As part of its latest restructuring effort, Apple Computer is expected to cut its top executives’ salaries by 10 percent. However, CEO John Sculley’s annual salary is reportedly going to be cut by 15 percent — from $2.2 million to $1.9 million.

**RasterOps, Truevision to Merge**

SANTA CLARA, CA — RasterOps and Truevision have announced an agreement in principle to merge the companies. RasterOps manufactures display systems for the Mac and the PC. The merger with Truevision, maker of the successful PC Targa desktop-video cards, gives RasterOps substantial credibility in the PC market. The merger was expected to be completed in August, pending stockholder approval.

**Claris Clean Sweep**

SANTA CLARA, CA — Following the example set by former CEO Bill Campbell, two other top executives at Claris have announced their plans to leave the company, now that it has been spun back into Apple Computer. Yogen Dalal, vice president of product development, and John Zeisler, vice president of marketing, have announced their resignations. Zeisler was expected to leave the company by July, and Dalal was expected to depart sometime in the third quarter. Richard Matthews, formerly of Aldus, was announced as Dalal’s replacement. Claris also announced that Jim Davis, formerly director of System Software Marketing at Apple, was the marketing director behind System 7, which would join Claris as vice president of business development. Only two of the original nine management-committee members who formed Claris four years ago are still with the company.

**Apple and IBM in Discussion**

ARMONK, NY — In a classic example of strange bedfellows, IBM and Apple Computer executives have met to discuss the possibility of an alliance between the two companies. IBM was reportedly interested in licensing some of Apple’s System-software technology, and Apple was said to be interested in one of IBM’s microprocessors. Part of the motivation for the two adversaries to cooperate was believed to be the challenge presented to both companies by Microsoft.
Voice Navigator II is a true voice-driven interface for the Mac. Just as the mouse offered a better solution than cursor keys for some operations, the Voice Navigator complements both the keyboard and the mouse by using voice to control selected commands. As a result, it’s easy to accomplish many tasks without ever moving the mouse or typing in keystrokes.

Recognize That Voice
The Voice Navigator II package includes Voice Control and Language Maker software, two manuals, the Navigator itself—a sleek, black SCSI box with switchable termination—and the Desktop Mike. Also bundled in the package are Voice Waves, a set of advanced languages for use with different applications, and Voice Record, software for recording, editing, and playing back sound.

For all its design elegance, the Navigator box itself is strictly a sound digitizer and doesn’t perform voice recognition. That’s done in software. As with any sound device, the output quality depends on the input quality, so the Desktop Mike is a critical element of the package.

The Voice Navigator software has several components. Voice Control is an INIT with an associated control panel. The Voice Control software performs all the voice-recognition work. The package’s other key software component is Language Maker, a DA that lets you edit and create the sets of commands (called languages) that control voice-driven applications. Language Maker is easily the most powerful part of the Navigator package as well as the most complex.

The Voice Navigator package offers two distinct file types: language files and voice files. Language files are lists of commands for use with specific voice-driven applications. The package comes with a substantial collection of ready-made language files designed for most common applications, and you can edit the files with Language Maker. Voice files, on the other hand, are digitized sound maps of the commands you’ve trained with the Voice Navigator. Every application that works with the voice-recognition system must have a language file and a voice file.

To start using the Voice Navigator, you open the Voice Options control panel and select the language and voice files you intend to use. You must also set several general preferences, such as the type of microphone you’re using.

Once you’ve selected the language file that corresponds with the currently active application, you’re ready to create a voice file. Even though you will have different language files for every application you use, you’ll want to create only one master voice file for all the commands you’ve trained. That way, you’ll have to train common commands, such as Quit and Print, once only. After that, every application that uses those commands can be activated by the voice-recognition system without additional training.

Training the System
You train your voice files by using Voice Commands, Voice Control’s training mode. There you’re presented with a hierarchical list of commands that parallels the menu structure of the current application. All File-menu commands, for example, are grouped under the File entry. Double-clicking on the menu name drops you down one level in the command hierarchy. To train commands to work with the Voice Navigator, you simply select the command and speak its name into the mike.

The key to an effective training process is to speak clearly and not waste time training the system for commands you rarely use. Because you can add trained commands at any time, it’s always best to start with a small number and add more as the need arises. You can probably train an application’s most commonly used commands in about 15 minutes.

You may want to rearrange your commands so that common operations, such as the Save command, are on the first level of the hierarchical command list. That way, to activate them, you don’t have to preface them with the name of their respective menu. For example, by moving Save up in the hierarchy, you don’t have to preface it with the menu name File every time. To make the change, open Language Maker and simply drag the command to its new position in the hierarchy.

Language Maker
Language Maker is the key to customizing the Voice Navigator. With it, you can create commands for hierarchical menus, dialog boxes, palettes (pop-down and tear-off), and tool palettes (fixed or floating). In addition, you can create macros that chain several commands and you can form groups of commands that perform custom formatting (“Tekton, 18 point, underline, red,” for example). You can even enter predefined text strings, such as your company’s name and address. Language Maker also allows you to create dummy commands, which don’t initiate any actions but which prevent spurious recognitions based on common sounds in and around your work area (coughs, sneezes, and ringing telephones, for example).

Unfortunately, depending on the action or application, setting up some commands to work with the Voice Navigator can be tricky. For example, certain actions, such
The Voice Navigator’s Language Maker lets you edit and create the languages that control voice-driven applications, including macros. Here, the Command window shows a macro for Microsoft Word. The software must know the name of the palette and the location of the tool within that palette. Even more complex, if the application developer failed to name a palette, you must provide the Voice Navigator with its screen location. In such a case, you’re forced to keep the palette in the wrong place. And if you’ve forgotten where you placed the palette when you performed the training, or if you use another monitor, you’re really in trouble.

Caught in the Loop
The Voice Navigator’s most serious flaw is its rigidly modal software. Initially, you find yourself in a seemingly endless loop, switching from an application to Language Maker, from Language Maker to Voice Commands, and then back to your application. And although you can keep Language Maker open while you’re using a language, when you switch applications, Language Maker doesn’t switch to the language for the new application. Articulate Systems is aware of these problems and promises a more integrated package in the next version.

Language Maker’s macro editing is another disappointment. As good as Language Maker is for creating macros, it’s not well designed for editing them. For example, you can’t step through your creations if there’s a problem. Furthermore, because everything is based on mouse actions and the system relies on applications for its operating information, what you see in the language file often has little to do with the actions you’re performing. For example, clicking on several check boxes in a dialog box usually produces the action “click” in the language file. Unless you remember what you clicked on and in what order, editing the sequence amounts to a hit-and-miss affair.

The Bottom Line
Although most users will initially be attracted to the Voice Navigator’s novelty, its most valuable asset is far more practical: It actually improves productivity. Far from acting as an alternative to a macro program, the Voice Navigator delivers a level of convenience that can’t be matched by any traditional software package. If you’re working with graphic arts, CAD, or DTP, you’ll find that you can switch tools and apply style sheets without ever leaving your work area. Even if you work primarily with word processors or spreadsheet programs, you’ll find that with the Voice Navigator, it’s easier to focus on your work and not on remembering key combinations.

Moreover, the quality of the system’s voice recognition is truly impressive. Even with its flawed interface, most users will be able to access 80 percent of the system’s functions in two to three hours. The Voice Navigator is a revolutionary product that successfully delivers a new technology. If you’re looking for the next step in productivity and want to experience the next generation in computer interfaces, the Voice Navigator II is it.

—Russell Ito

As we went to press, Articulate Systems was completing a System 7 version of Voice Control that will feature support for Apple events and other System 7 functions, such as balloon help. —Ed.

Get Info

Voice Navigator II

Version: 2.0.
List Price: $795.
Adobe Photoshop

Version 2.0 of Adobe’s powerful image-processing package places it on a par with high-end prepress systems.

With its sophisticated color-editing and image-enhancement controls, Adobe Photoshop 2.0 is an image-processing package that can hold its own against dedicated prepress systems. The new version features on-screen CMYK editing, a feature unavailable in any other package, either for the Mac or for the PC. Moreover, Photoshop’s beefed-up functionality, teamed with a well-designed, efficient interface, gives it a decided edge over Letraset’s ColorStudio 1.1.

No More Risky Conversions

Photoshop 2.0’s enhanced prepress capabilities make it faster and easier than ever for you to achieve professional results. For color-separation work, version 2.0 lets you work directly in CMYK display mode, so you can view and edit high-resolution CMYK color scans on-screen without the time-consuming and risky process of converting them to RGB. This new feature vastly improves screen-to-output fidelity, making Photoshop’s results far more predictable than those of ColorStudio for color separation. A separate 24-bit-color window displays changes made to any individual channel.

Vastly improved controls for screen- and output-color calibration also boost Photoshop’s appeal for prepress operations. The program has separate UCR (Undercolor Removal) and GCR (Gray Component Replacement) controls and provides full support for output devices that use Level 2 of Adobe’s PostScript language, which greatly improves print quality and minimizes moiré patterns with color separations. In addition, Knoll Software’s Gamma control panel is bundled with the new version.

The Curves dialog box lets you make extremely precise color-correction modifications, and the Levels dialog box contains new tools for automatic selection of optimal color and brightness values for an image. Version 2.0 features a new Info window that acts as a densitometer, displaying CMYK and RGB values for any pixel in an image. This window also provides feedback on such aspects as length and angle of lines as you use different tools, a feature that comes in handy if you have to repeat actions. All in all, these improvements essentially eliminate the prepress advantages of ColorStudio over Photoshop.

Photoshop 2.0 opens and rasterizes EPS images at any resolution, complete with anti-aliasing and font and color support, so you can easily incorporate Adobe Illustrator-compatible files into your continuous-tone images. The program imports images on a floating layer and places them with anti-aliased edges. The horizontal and vertical scales of incoming EPS images are also adjustable. The only drawback is that custom PostScript fill patterns can’t be rasterized. Although Photoshop 2.0’s EPS rasterization doesn’t offer the full feature set of ColorStudio’s Shapes Annex, it is integrated into the program. Shapes Annex, on the other hand, is a separate package. Furthermore, Photoshop’s rasterization handles complex EPS images that usually choke Shapes Annex.

Photoshop 2.0 now supports duotones—as well as the monotonous, tritones, and quadtones supported by previous versions of Photoshop—in a separate display mode. You can specify color and specific brightness ranges with the program’s new Pantone color picker, and Photoshop separates each ink color into its own output plate when it prints an image. The Pantone color picker, which is based on the Radius Pantone Color Toolkit, maps any color to its closest Pantone equivalent.

For improved precision, a new Bezier pen tool creates irregular selections, much as Adobe Illustrator’s pen tool does. You can select regions to be made into alpha channels or masks, and it’s easy to take any selected area (such as a region grabbed with the magic wand tool) and automatically turn it into a pen path. You can also save these paths as EPS clipping paths for use as masks in Illustrator.

Photoshop 2.0’s System 7 support is just short of superb. The program supports 32-bit addressing, which lets it take full advantage of large chunks of RAM for dramatic screen-redraw performance and minimal disk thrashing. TrueType fonts are fully anti-aliased, and Photoshop supports core Apple events and the Publish function. Missing, however, is support for balloon help.

Everything Old Is New Again

In addition to Photoshop’s completely new features, the program has several small but important enhancements of the standard Photoshop tool functions. For example, you can now set the eyedropper tool to pick up the average color of an area (either 3-x-3- or 5-x-5-pixel matrices)
rather than the exact color of individual pixels, which is extremely useful for dealing with scanned images that don’t have uniform color regions.

Another handy improvement lets you set the program to alert you with a beep when a processing function has finished. And the Fuzziness parameter in the magic-wand and paint-bucket tools has been replaced by the more powerful AntiAliased check box, which automatically determines the optimum values for anti-aliased edges. Perhaps one of the handiest Photoshop 2.0 improvements lets you specify a virtual-memory disk and make it independent of the disk on which your Photoshop Preferences folder is stored. If you run out of disk space when working with large color images, this approach makes it easy to redirect your virtual-memory drive without having to move your Preferences folder.

Mac animators will appreciate Photoshop 2.0’s ability to convert RGB images into indexed color images. You can dither images to a predefined color palette imported from other painting programs or to an exact number of colors, a key feature when working with programs such as Macromind Director or Paracom’s FilmMaker.

Photoshop’s PICT Resource module lets you open PICS animation files (or any other type of document or application), extract the PICT resources (or PICS frames), and import them into Photoshop for processing. Unfortunately, there is no module for exporting PICT resources, so you have to recompile processed PICTS into a PICS file by using an external application.

Photoshop 2.0’s filters are sorted into groups to speed up the process of location and selection, and there is a multitude of new special effects. The Pointillize filter turns any scan into a Seurat painting. The Crystallize filter creates a stained-glass effect. Wind adds three different directional streaks, and Tiles shatters an image into definable number of panes with controllable offsets. In addition, you can now apply the Spherize effect either horizontally or vertically.

Video philes will appreciate Photoshop’s NTSC Legal and De-Interface filters. These come in handy for automatic adjustment of harsh saturation and for cleaning images grabbed from video sources. You can use the Displace filter to automatically apply impressionist filters to an image as well as to create a multitude of other effects. In essence, the Displace filter shifts pixels in one image based on the brightness values of another image.

**The Bottom Line**

With version 2.0, Adobe has added more power and precision to the Mac’s most popular image-processing package. Direct CMYK editing and more-powerful color-calibration and image-enhancement controls make the package an indispensable tool for prepress work.

Moreover, Photoshop 2.0’s new functions are cleanly integrated with the standard Photoshop interface, so users already familiar with the package don’t have to make major readjustments to take advantage of the upgrade. If you already depend on Photoshop for your image-processing work, you’ll clearly benefit from upgrading to version 2.0. No professional graphic artist should be without it.

— David Biedny
The Macintosh of the future is...

Introducing the System 7
Personal Upgrade Kit.

You've read and heard a lot about System 7, the new system software for Apple® Macintosh® computers.

And if you already know what it will do for your Macintosh, perhaps the only other thing you need to know is this: Your System 7 Personal Upgrade Kit is ready.

You can order it right from the next page, or from your authorized Apple reseller. Just proceed to the phone number above the coupon. But if you'd like a reminder of what System 7 is all about, please read on.

More powerful capabilities.
More ease of use.

That's what System 7 brings to your Macintosh. As soon as you install it, you'll enjoy an array of new capabilities, and be ready for a new generation of software. And since System 7 runs virtually all current applications, you'll enjoy its benefits without giving up a thing.

What's on the Apple menu? You decide, by dragging any document or application into the Apple Menu Items folder. To open it, just click. And for a quick way to see what's inside a folder, click the triangle next to it.

With enhanced multitasking, you can keep several applications open at once, and continue to work while you print, search for, copy, or share files. Thanks to virtual memory, multitasking capability isn't limited by the amount of RAM.

Introducing Balloon Help. Point to anything—a menu item, icon, or tool—and a balloon appears, telling you what it is and what it does. Balloon Help is available in the Apple Finder™ and in a new generation of applications.

With TrueType, even the largest letters display perfectly on the screen, with no jaggy, "staircase" edges. You also get terrific printed output with almost any kind of printer. And System 7 is compatible with the fonts you already have.
We've also made Macintosh easier to use. For instance, take a look at Apple Balloon Help,* our new on-line help feature. Point to an item on the screen, and a balloon pops up next to it, telling you what it's for. So applications are quicker to learn, and easier to make the most of.

Everything gets smoother and simpler.

With System 7, there's a big improvement in big type. Thanks to Apple's TrueType® font technology, you get perfectly smooth letters on the screen, no matter what their size, along with more professional-looking output. And you don't need the Font/DA Mover. To install TrueType fonts, just drag their icons into the System Folder. (Ditto for desk accessories.)

Open an application. Work. Save. Quit. Open another application. Until now, that's how you've probably moved from, say, a word processing program to a spreadsheet. With improved multitasking, you can keep several applications open at once, and choose between them with a mouse click. So you don't have to stop what you're doing to print, search for files, duplicate files, or share data.

Using applications simultaneously can demand lots of memory, but with System 7 you aren't likely to see a not-enough-memory message. Because there's virtual memory.* When you need extra memory, just tell System 7 to use the spare room on your hard disk. Your Macintosh will work without interruption, and so will you.

See what's developing.

System 7 gives developers a far-reaching new set of tools, enabling them to offer applications that do new things for you. For example, to the fame and success of cut and paste, we've added publish and subscribe. Change something in one document, and it can change—automatically—in every document where it appears. Even if the documents are in different applications or on different computers across a network.

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*Virtual memory is supported by Macintosh computers with a 68030 microprocessor and Macintosh
Blueprint and PowerDraw

Blueprint and PowerDraw add new features for 2-D technical drawing and drafting.

The Mac 2-D-CAD market is crowded with nearly a dozen programs that offer similar features. New versions of Blueprint and PowerDraw offer noteworthy enhancements designed to set them apart from the competition. Blueprint 2.0 is an entry-level CAD package that offers unparalleled grouping and organizational features. PowerDraw 3.0, on the other hand, is a more powerful program designed for advanced CAD users.

Blueprint 2.0

Blueprint 2.0, from Graphsoft, is a less expensive, 2-D version of the company's MiniCad+ 3.0. What's missing is MiniCad's programming environment and integrated spreadsheet/database program. Like MiniCad, version 2.0 of Blueprint uses Graphsoft's SmartCursor, which helps you locate and position geometry with on-screen cues.

The SmartCursor makes it easy to place and align objects. As you move the cursor over a drawing's geometry, it highlights midpoints, endpoints, centers, intersections, and tangents. Unfortunately, you can often use this function only with the first object selected. For example, you can't use it to create a line that is tangent to two circles.

Blueprint supports most common 2-D entities such as lines, double lines, rectangles, circles, arcs, ellipses, splines, and polygons. It includes standard Mac fonts and fill patterns, and line styles are available from a pull-down menu.

Many Blueprint functions, such as Duplicate, Send to Front/Back, Reshape, Smoothing, Align, and Lock, are similar to those of MacDraw, but Graphsoft has added some innovative extras that make Blueprint unique.

One example is the Group command. Once objects are grouped in Blueprint, you can work on the group as if it were a separate drawing, which makes it easy to edit grouped objects in a congested area of a drawing. Another useful feature lets you assign abstract classes to geometric entities. For example, you can assign the class Chair to a chair symbol, place the symbol several times on the drawing, and selectively choose to hide or show all the chairs. These capabilities augment Blueprint's superb symbol libraries.

Blueprint also has an excellent layering system that lets you assign default colors to each layer's fill or pen patterns for easy differentiation. You can choose to hide layers, and each layer can have its own drawing scale. These features make Blueprint a powerful tool for organizing and arranging complex drawings.

Blueprint can perform Boolean operations, such as joins and intersections, on selected entities. This can be useful if you need to use one shape as a "cookie-cutter" to cut another shape or if you need to generate the geometry that results from the overlapping intersection of two objects.

For many 2-D-CAD users, dimensioning is an important feature. Blueprint provides only basic linear-style dimensioning commands, which may be adequate for basic architectural drafting. However, for mechanical drafting, the necessary radial, diametral, and ordinate dimensioning functions are missing. There is also no way to specify tolerances. For Blueprint (and MiniCad+, for that matter) to be genuinely competitive in the 2-D-drafting arena, Graphsoft must significantly enhance the programs' dimensioning capabilities.

The Blueprint package includes a built-in DXF import/export facility that adds to its value, but compared with DXF converters from Claris, Enhanced Software, and Generic, Blueprint's converter consistently missed entities and dimensions. Blueprint also offers an EPS export capability that worked flawlessly. This allows placement of Blueprint images directly into DTP documents without the loss of precision that occurs with PICT files.

PowerDraw 3.0

The roots of Mac CAD can be traced back to the original MacDraw, and that heritage is readily apparent in PowerDraw 3.0, from Enhanced Software. PowerDraw relies on a single tool palette with pop-outs, scroll bars, and rulers along the left and top of the drawing window.

To position geometry at a specific location, you simply hold down a predefined letter key, such as C for center or T for tangent, and PowerDraw snaps the geometry to the nearest corresponding point. It's not as automatic as Blueprint's SmartCursor, but it's easy to use and it works under all conditions. An indicator on the left side of the title bar shows you which geometric condition is currently active.

At some levels, PowerDraw has much in common with Blueprint. They both support similar geometric entities and Mac fonts and fill patterns. Both programs offer Boolean joins and intersections and many of the typical MacDraw-style commands. Blueprint may have an advantage in layering, groups, and classes, but PowerDraw provides a more complete set of 2-D-CAD tools.

PowerDraw has a full complement of dimensioning commands that will satisfy most drafting needs. It has a centerline tool that automatically creates centerlines on
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selected objects. By holding down the Option key when selecting a dimension tool, you get a dialog box that allows you to specify or change units, accuracy (number of decimals), placement, tolerances, arrowhead orientation, and other dimensioning parameters. It would be better, however, if this dialog box was modeless and available at all times.

In addition to the standard Mac fill patterns, PowerDraw also offers true vector-oriented cross-hatching, which provides more flexibility and is more easily plotted than the standard patterns. It's easy to customize the program by associating keystrokes with any command or tool palette. You do more-extensive customization in the built-in Pascal-based macro environment. If you have some programming experience, you'll be able to create custom programs easily.


Unlike Graphisoft, Engineered Software includes a built-in plotter driver that supports many plotters from companies such as Hewlett-Packard and Houston Instruments. It also supports plotting to a disk file for subsequent transfer.

The Bottom Line
For those whose 2-D-CAD needs don't involve dimensioning or plotted output, Blueprint is an affordable solution that's easy to learn. It offers acceptable performance, high-precision database programs, and unparalleled grouping and organizational features.

At an entry-level price of $295, Blueprint is likely to attract cost-conscious buyers and may be a good choice for owners of the newer, low-cost Macs. However, Blueprint's tutorial ($89) and plotter driver ($300) are sold separately, which detracts from the package's price-point advantage.

For serious 2-D-CAD users who require dimensioning and plotting, PowerDraw 3.0 is a solid tool that teams power with ease of use.

— James K. Anders

PowerDraw 3.0 features more-advanced CAD features, such as dimensioning and plotter support. However, to convert this AutoCAD DXF file, you must purchase a separate $275 translator.

Ray Dream Designer is fast. The ray-tracing speed of this new 3-D-design package, which includes both modeling and rendering tools, can't be matched by any other 3-D software. Despite the overall quality of the images you can create with Ray Dream Designer, however, the program's cumbersome interface makes the modeling process downright painful.

3-D Competition
Designer falls into the same midrange category as Paracomp's Swivel 3D Pro and Strata's StrataVision. Although its $895 price tag puts it beyond the reach of casual users, Designer still costs much less than high-end, professional-level 3-D software such as VDI's $3,000 Presenter Professional. Yet for certain design tasks, Designer competes on a par with Presenter Professional.

To run Designer, you need a Mac equipped with a Mac coprocessor (III owners can upgrade with a NuBus or 68030 DirectSlot Adapter Card), 4 megabytes of RAM, and a hard-disk drive. The 24-bit-display capability is nice for viewing your finished artistry but not required.

What sets Designer apart from all other packages is its speedy, ray-traced renderings, which it executes in the background without MultiFinder. The resulting surfaces are not only more detailed and reflective than those created with other packages but the program also does an excellent job of shadow casting and provides a wide range of transparencies. Overall, the results it produces are close to photo-realistic.

Modeling
Objects are modeled in Designer's LightForge module. Unfortunately, the program creates a separate file for each individual polygon that you build. In a
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complex model, this can quickly add up to hundreds of files you must manage by filename alone.

Before you begin drawing, you must decide whether to use lathing or extrusion to describe your 3-D objects. The program then creates a cross section and assigns either depth (for extrusion) or revolution (for lathing) to create the object in 3-D. A real plus is the program’s support for asymmetrical models.

As you model objects, they hover in virtual space, projecting profiles onto the bottom, sides, and background of the design space. You can select or modify an object only by clicking on its projections — never on the object itself, which is a far-from-intuitive process. Colors and surface effects are assigned through a Lighting dialog box that previews the effects in real time.

Designer is one of the first 3-D modelers to offer Bezier splines. However, Designer’s splines are difficult to modify once they’ve been set, because the program doesn’t provide any indicators for selected control points. Furthermore, Designer doesn’t let you select multiple points, and you can’t assemble splines in a free-form manner to define surface edges.

From existing PICT images, Designer can create polygons that you can edit from within the program using an auto-tracing function called Extract Contours. However, this is where the real weakness of the program’s single-polygon-per-file requirement becomes apparent. If you’re working with text, for example, you must create a different file for each letter of a word in an existing drawing. In addition, extracting the contours of letters with inner surfaces, such as D or Q, is particularly time-consuming.
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However, LightForge really shines in 24-bit PICT and texture mapping. The program fits an existing PICT file or texture like a decal onto an object, keeping all of the object's geometry intact and providing guidelines for exact positioning. For this task, Designer's interface earns a big plus for making the positioning and scaling of PICT images, which is a headache in most other 3-D programs, so easy. The program provides a dozen editable textures.

Rendering and Scene Description

Once you've modeled objects in Designer's LightForge module, you assemble and render them in the SceneBuilder, which provides three windows for manipulating objects. You gather objects for your scene in one window and then drag them, one by one, into the Perspective window's stage area, where you scale and position them. An extents box displays the boundaries of objects in 3-D. A third window lets you assign light sources and specify groups of objects. SceneBuilder also lets you position PICT images against the back wall of the scene for backgrounds.

When your 3-D scene is complete, Designer provides a preview that lets you check for proper positioning and scaling of objects. In Preview mode, you can also view the scene from each of its light sources. This is a big plus, because getting the lighting right is half the battle in good 3-D rendering.

Once all your objects and lights are positioned properly in the Perspective window and your viewpoint is set, the scene is ready for rendering to a 24-bit PICT file. SceneBuilder provides batch queueing, plus a valuable interrupt feature for the ray tracer. In general, it's wise to

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render a small version, or postage stamp, of your scene. That way, you can do a final check before committing the considerable computer time required for full-scale rendering. Even with a fast ray tracer such as Designer, large, complex images may take several hours to render.

The Bottom Line

Ray Dream Designer lacks advanced CAD features for drafting production and is strictly designed for still images, not for animation. One of the major drawbacks of the program is that all of its objects must exist in separate files, making it difficult to build scenes with interrelated parts that require exact positioning and scaling.

Moreover, once you’re in SceneBuilder, you can’t modify object attributes. For that, you must go back to the LightForge modeling module. Although it’s nice to have a modeler and a renderer in the same package, Designer would be a fair superior product if the two modules were more integrated and all objects were saved in a single file. However, in Designer’s favor, the quality of the finished artwork is excellent and somewhat offsets the irregularities of the interface. Another plus is Designer’s unparalleled ray-tracing speed.

The level of power offered by Designer and other modelers in its class can be alternately exhilarating and frustrating. Each package has its own unique interface designed to shield users from the complexities of mechanical drafting in 3-D. If you’re creating objects that can be described by lathing or extruding, Designer is as good as it gets. On the other hand, if your work is based on convoluted surfaces, exacting detail, or complex objects with exact surface definitions, you’re better off considering high-end abilities such as those offered by Presenter Professional coupled with MacRenderMan, or AutoCAD teamed with the ElectricImage Animation System.

— Doug Barnard

Get Info

Ray Dream Designer

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Version 2.0 of Bookends Mac has a faster Find function than its predecessor, but its Select function is still restricted to only one Boolean type (AND/OR) per search. Another retained inconvenience is that each separate data file requires starting with a new copy of the original master stack. There is no equivalent of Open or New commands. Printing out a bibliography requires navigating an irritating maze of buttons and cards.

Publish or Perish 6.0

Publish or Perish 6.0 meets the minimum criterion for a bibliographic-database program: it formats bibliographies using different styles. Nevertheless, Publish or Perish remains a program with limited capabilities. It can’t accommodate multiple reference types for a given style, it can’t create bibliographies from in-text citations, and each bibliography can have only one font and style. Fields can’t be added, deleted, or given more than one name per file. The only advantage of

Bookends Mac has six formats for the popular MLA (Modern Language Association) style. This one describes the format for journals (J). Although Bookends Mac contains several options for varying the formatting of authors’ names (see left side of the screen), it can’t vary the journal title between abbreviated and full.
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Publish or Perish is its simple design, which makes it the easiest program to use. It also has extensive on-line help that almost eliminates the need for documentation (which is skimpy in any case).

Notable improvements added to recent versions include enhanced search (Boolean searches) and sort (on-screen sorts) capabilities. Also, it can now export files in RTF.

The Bottom Line
EndNote Plus remains a top choice in this category, fine-tuning EndNote’s already superior ability to create formatted bibliographies and in-text citations. To this, it adds enhanced search and select features and improved printing options. However, these improvements do not seem sufficient to justify a separate new product with a substantial increase in price. EndNote Plus should simply have been an upgrade to EndNote.

Bookends Mac emerges as a capable, full-featured bibliographic-database product, although it still can’t match the more flexible formatting options of either EndNote or EndNote Plus. Publish or Perish, despite its attractive rock-bottom price, cannot seriously compete with the other programs.

— Ted Landau

Get Info

EndNote Plus

Published by: Niles & Associates, Inc., 2000 Hearst Street, Berkeley, CA 94709; (415) 655-6666.
Version: 1.0.
List Price: $249.

Bookends Mac

Published by: Sensible Software, Inc., 335 E. Big Beaver, Suite 207, Troy, MI 48083; (313) 520-1950.
Version: 2.0.
List Price: $129.95.

Publish or Perish

Published by: Park Row, Inc., 4640 Jewell Street, Suite 232, San Diego, CA 92109; (619) 581-6778.
Version: 6.01.
List Price: $74.95.

Graphics & Design

ColorSqueeze, ImpressIt, and PicturePress

Three compression utilities shrink the size of large still-frame images.

Small is definitely better than big when it comes to the file size of photographic-quality color and gray-scale still images. Whether scanned or painted, such files occupy large amounts of disk space and are unwieldy to send across networks or over phone lines. Three software packages: ColorSqueeze, ImpressIt, and PicturePress, specialize in shrinking large images to more manageable file sizes.

JPEG Quality

With the advent of the JPEG (Joint Photographic Experts Group) image-compression standard, it’s now possible to squeeze almost as many compressed images onto a floppy as require a 20-megabyte hard disk in uncompressed format, without significant loss of image quality. ColorSqueeze, ImpressIt, and PicturePress all offer JPEG-compatible compression.

JPEG compression goes well beyond the file-size reductions provided by data-compression programs such as StuffIt Deluxe and Disk Doubler. It examines an image in 8-x-8-pixel chunks and performs several mathematical operations on the pixel data. The result is that very small values are needed to describe any given pixel. The process discards data that’s visually irrelevant to the image and then compresses the remaining relevant data. This slightly degenerative compression is dubbed “lossy,” because some data is lost in the process.

ColorSqueeze, ImpressIt, and PicturePress all let you select degrees of compression for your files. Each degree directly affects the amount of visual data that’s discarded as the compression process reduces the file size. Consequently, there’s a trade-off between compressed file size and image quality.

Incredibly, even at compression ratios of 20:1, compressed images appear visually identical to the originals. Differences are noticeable only on close inspection.

ColorSqueeze

Eastman Kodak’s ColorSqueeze program opens 24-bit PICT and TIFF images and offers three degrees of compression: Normal, Medium, and High. The highest compression setting reduces file sizes by almost 100 percent, although it does so

ColorSqueeze is an image-compression utility that makes most of its options available in one dialog box. However, the program offers only three compression settings.
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The ColorSqueeze package includes a 422K decompression-only utility that you can distribute freely for noncommercial use.

Overall, ColorSqueeze is easy to use and offers the essentials for compressing files. With browsing, zooming, cutting, pasting, and printing included, it’s both multitasking and self-sufficient. The program’s three compression settings are limited compared with those of ImpressIt and PicturePress, however, and the package lacks a Photoshop plug-in module.

**ImpressIt**

You might expect Radius, a hardware company, to emerge with a compression board, but Impresslt is a software-only JPEG solution. Impresslt compresses 32-, 16-, and 8-bit-color and 8-bit grayscale PICT or TIFF images and provides a wide range of compression ratios.

The software’s claim to fame is raw speed: Its performance approaches that of hardware solutions. Compressing a 276K PICT image took 5.5 to 7.5 seconds, depending on the image quality, on a Mac IIx. On average, ImpressIt is two to three times faster than either ColorSqueeze or PicturePress. ImpressIt seems ideal for users of the single-slot Mac LC and IIsi, but the software runs on all Mac IIs and the SE/30 with at least 2 megabytes of RAM. For those worried about memory, ImpressIt has built-in virtual-memory capabilities that use excess disk space for manipulating large images.

ImpressIt lets you preview the effects of selected compression ratios on small image areas, so you can experiment with various settings before committing to full image processing. For quick browsing through image files, you can save thumbnail snapshots of compressed images. A plug-in module for Adobe Photoshop

PicturePress lets you set the compression ratio for selected areas of an image. The result preserves image quality for selected details without reducing the overall image-compression ratio. A drawback is PicturePress’ lack of support for TIFF images. However, a new version is in the works that will process not only TIFF files but also images compressed by ImpressIt.

### Get Info

**ColorSqueeze**

- **Published by:** Eastman Kodak Co., Printer Product Division, 343 State Street, Rochester, NY 14650; (800) 242-2424.
- **Version:** 1.0.
- **List Price:** $179.

**ImpressIt**

- **Published by:** Radius, Inc., 1710 Fortune Drive, San Jose, CA 95131; (800) 227-2795 or (408) 434-1010.
- **Version:** 1.1.
- **List Price:** $179.

**PicturePress**

- **Published by:** Storm Technology, Inc., 1101 San Antonio Road, Mountain View, CA 94043; (415) 691-1111.
- **Version:** 1.03.
- **List Price:** $179 or 2.0, $199; with PicturePress Accelerator Card, $999.
Last night, someone stole Dave's car. And the scary part is, he never even knew it was gone. The same thing can happen to you if you're leaving your Mac unlocked. Co-workers can cruise through your files, causing accidents and leaving viruses. Or thieves can take what they want—and trash the rest. All good reasons to get DiskLock.*

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As JPEG compression ratios increase (from the top image to the bottom), images tend to become mosaics of small gradients and other artifacts that are especially noticeable around hard-edged details.

works well for both compressing and decompressing files from within Photoshop. And ImpressIt can optionally create self-decompressing files, so you can distribute compressed files to users who don't have the ImpressIt application. This nifty option adds approximately 25K of decompression overhead to the size of a file.

PicturePress
Storm Technology's PicturePress package includes full-featured compression and decompression software, Picture Decompress, for distributing compressed files, and a Photoshop plug-in module for compressing and decompressing files from within Photoshop. This last feature is important, because although it lacks its own virtual-memory scheme, PicturePress can use Photoshop's implementation to allow processing of large documents.

Storm Technology also markets a companion hardware product called the PicturePress Accelerator Card. PicturePress software can optionally access this

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

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NuBus board, which reduces compression and decompression times to a few seconds or less.

PicturePress processes only PICT file formats, an unfortunate limitation, considering that TIFF is the file format of choice for most users working with color bit-mapped images. Storm Technology is working on a new version, 2.0, that will accept TIFF files as well as images compressed by ImpressIt. It should be available by the time this review appears.

PicturePress offers several special compression options. Its standard JPEG compression has four user-selectable settings that range from ratios of 2:1 to 40:1. A customizable setting can result in ratios up to 200:1.

Especially noteworthy is the PicturePress JPEG++ option, a clever twist that nicely balances high-quality image detail with small file size. You can select one or more rectangular areas of an image and compress them at a much lower ratio than the rest of the image, a scheme that lets you retain as much detail as you need in those areas while not reducing the overall image-compression ratio. A true "lossless" run-length-encoding option provides modest compression ratios that rarely exceed 2:1. For handy browsing, PicturePress also lets you save thumbnails of your images.

The Bottom Line
The JPEG standard was finalized at about the time this review went to press, and the three products evaluated here were released well before that. As a result, you may not be able to open one program's JPEG output with another program until upgrades addressing the new standard become available.

For now, however, ColorSqueeze, ImpressIt, and PicturePress all do an adequate job of reducing the file size of still images. All are easy to use and can compress and decompress most small- to medium-sized images in much less than a minute.

ImpressIt wins hands down in speed. Its interface and preview capabilities are well thought out, and the software produces self-decompressing files and comes with a Photoshop module.

Both ColorSqueeze and ImpressIt handle PICT and TIFF formats and can serve for image-file browsing and PICT/TIFF-conversion utilities. ColorSqueeze does not include a plug-in module for photo-editing programs, however.

The main limitation of the current version of PicturePress is that it can't open TIFF files. However, in addition to being System 7-compatible, Storm Technology's upcoming version 2.0 will eliminate that limitation as well as provide the ability to open ImpressIt files. Version 2.0 will also feature JPEG++ in hardware for greater speed. The current PicturePress package is an excellent value for users who want fine control over the compression process. Its Photoshop module, free decompressor, and JPEG++ feature for selective detail compression ratios, plus the ability to use a hardware accelerator, make it an excellent value.

— Salvatore Parascandolo
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Spyglass Transform

The latest version of Spyglass Transform offers more ways to view scientific data than ever before.

For scientific data analysis, a picture is worth a thousand numbers. With Spyglass Transform 2.0 and a Mac, you can transform thousands of data points into a variety of images that help you analyze your data visually.

Whether they are measuring pollution at different sites across a continent, running brain scans, or using sonar to look for archaeological treasures, scientists generate large datasets. The first version of Spyglass Transform created images of scientific data, using color raster imaging, a process that assigns a color value to each data point in much the same way that image-processing programs assign a number to each color value.

In addition, Spyglass’ quartet of data-analysis packages becomes a trio in Spyglass Transform 2.0. View, a separate module for animating raster images, is now a separate product bundled with it. View is useful for watching data evolve over time according to some other variable. Spyglass Dicer, which creates 3-D raster images, and Spyglass Format, a presentation package for images (both of which work with Transform output), round out the Spyglass product lineup.

Paint by Numbers
Spyglass Transform creates its images by using a spreadsheet-like matrix of data points. Numbers occupy the same relative position in the matrix as do corresponding pixels in the raster image (that is, a value located in the upper left corner of the matrix is represented in the same relative position on an image).

Spyglass Transform can open and save spreadsheets in a standard data format called HDF, but you can also import other formats. Version 1.0 imported only ASCII text, but version 2.0 imports data in a variety of workstation and mainframe generic formats, including byte, integer, and floating-point. You can also import image files in PICT, TIFF, and FITS formats.

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Transform's most powerful new import format is the ASCII list of triplets, which consists of two columns containing the x and y coordinates of a measurement plus a third column that contains the measurement itself. Additional columns can contain other parameters such as temperature, pressure, or wind speed. You choose which column of data to visualize while Spyglass Transform rearranges the data into a matrix. This is a significant improvement over version 1.0, which required you to organize your data into matrix format before importing files into Transform.

As you import data, you can define the width and height of the spreadsheet matrix, using the number of data points or the default aspect ratio of the image. If you change your mind, Spyglass Transform does array resampling, which places the data into new arrays of different sizes, using a logarithmic or linear scale or a scale you've created.

Transform can display spreadsheet data to a variety of decimal places as well as

Spyglass Transform 2.0 is a flexible tool for turning numerical data into pictures. Here, an interpolated color raster image, overlaid with a contour plot and a PICT map of the U.S., creates a picture based on 700 temperature-related data points.

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Spyglass Transform 2.0 uses a variety of new image types for data analysis. The surface plot (left) and the vector plot (right, overlaid with a raster image) both display the same data set recording air pressure around the U.S.

in scientific notation. Unfortunately, the display formats are in FORTRAN 77 terminology, so if you don’t know that F5.2 means “floating point, five digits, two decimal places,” you’re in for a bit of trial and error.

Once your data is set up in the spreadsheet matrix, you can select a raster image from the Image menu. The Windows menu shows you in outline form which images go with which spreadsheet matrices. Images are saved with the corresponding spreadsheet-matrix file.

To select details in an image for charting, you can assign colors to data values. There are 23 color tables to choose from, and more are available from a folder that comes with the program. Transform also lets you easily modify color tables, ranges, and contrasts.

Filling in the Blanks
A powerful new graphics feature in version 2.0 is the Interpolated Image command, which fills in missing data in a raster image. This feature is useful in dealing with data points that are nonuniformly distributed. You can either execute a linear interpolation that keeps a point’s original values, in addition to its interpolated values, or execute a smooth

Impressive any way you look at it.
data interpolation that eliminates spikes in the graph to create an entirely new data set.

In addition to raster images, several new graph types have been added to the package. The Surface Plot graphs the x- and y-position coordinates in the horizontal plane and your recorded measurements in a third dimension. There are six types of surface plots to choose from, ranging from black-and-white wire frame to high-resolution color surface. To change the viewing angle in 3-D space, simply click on the plot and drag to rotate.

A Vector Plot displays magnitude and direction by plotting a field of arrows of varying lengths pointing in different directions. You create a vector plot by selecting two data arrays that represent the x and y components of a vector.

A third graph type, the Contour Plot, gives you lines of equal value, such as the temperature lines on a newspaper weather map. The Contour window has tools for sizing and moving images and a tool for adding contour intervals. For creating an image that uses multiple variables, a simple copy-and-paste function lets you overlay any of the plot types as well as PICT or TIFF images.

You can also combine images and data sets mathematically by typing equations into the Notebook window. Notebook calculations use a FORTRAN-like language, but Spyglass has improved Transform's interface somewhat by adding a pull-down menu for selecting functions and variables. There are new functions as well, including Fast Fourier Transforms in one and two dimensions for dealing with data sets that contain imaginary numbers. Trigonometric functions, standard mathematical functions, and functions for matrix manipulation are also included.

The excellent tools in Spyglass View haven't changed since we last reviewed it (October '90, page 72), except that the program is now bundled with Transform. Spyglass View animates multiple raster images directly from memory or from the hard disk. Spyglass plans to integrate View with the Transform program in a future version.

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Protégé Displays

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<td>Protege Full-page Display With Video Card</td>
<td>$220</td>
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<tr>
<td>Protege Dual-page Display With Video Card</td>
<td>$220</td>
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</table>

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When it comes to file compression, the new Stufflt Deluxe 2.0 provides nearly every feature available in competing packages without sacrificing an interface that's unmatched in terms of simplicity and ease of use.

Most useful among Stufflt Deluxe 2.0's enhancements are self-extracting archives. As with competitors Diamond and Compacker, double-clicking on "self-unstuffing" files compressed with Stufflt decompresses them automatically, without the need for the Stufflt application. Although this self-extracting feature typically adds about 20K of overhead to an archive, it guarantees that recipients of Stufflt-compressed files will be able to decompress them.

Version 2.0 opens stuffed documents directly in their original applications when you hold down the Option key while double-clicking on a file. This feature mimics an existing DiskDoubler feature. And although Stufflt archives don't normally appear in applications' Open and Save As dialog boxes, the addition of the Stufflt product fills that gap, allowing archives to behave like normal files: Double-clicking on a stuffed file unstuffs and opens it. Furthermore, Stufflt doesn't automatically decompress previously compressed files when you quit an application. However, Stufflt provides a check box in the Save As dialog box that lets you add this function.

Stufflt has added two new compression settings to Stufflt's Options menu: Best Guess and Optimal. The company strongly recommends the new Best Guess setting for most users, and we agree. Stufflt's compression settings represent a variety of trade-offs between speed and file size. The faster the compression, the larger the file size. Best Guess intelligently chooses the best compromise for you from among the program's numerous settings. If speed is your primary concern, you'll find version 2.0's Optimal setting an improvement in speed (and file size) over the program's existing Fast setting.

With version 2.0, you can use two new DAs to stuff and unstuff files without launching the Stufflt Deluxe application. Also included are Stuff and Unstuff functions for HyperCard XCMDs, an XTND that allows MacWrite II or On Location to read and list the contents of archived files, and Stuff and Unstuff extensions for QuickKeys 2.0.

With or without Stufflt, Stufflt Deluxe 2.0 is the king of compression programs. However, at $99.95 (not including the cost of Stufflt), it's also the most expensive. If you're interested only in basic compression and archiving, your best choice is probably a shareware program such as Stufflt Classic or Compacker. For only $25, each of these programs provides equivalent compression and archiving performance without the additional functionality and convenience of Stufflt Deluxe 2.0.

— Darryl Lewis

If you're looking for a time saver that adds a ton of new features to your Open and Save As dialog boxes, Shortcut 1.5 is it. The new Shortcut adds several enhancements that make it one of the most versatile and useful utilities for managing files and folders.

Shortcut's menu pops up when you click on the disk name that appears in any standard Open and Save As dialog boxes. From there, you can execute a staggering variety of useful functions quickly and easily without leaving the dialog box to access additional software. For example, you can create a new folder (forget the QuickFolder INIT); find lost files or folders (you don't need DiskTop or FindSwell); get information on files, folders, and volumes (Shortcut works even better than the Finder's Get Info command); unstuff archives (forget UnStufflt); and erase files and disks. And if you install frequently used folders and files on Shortcut's Go To Folder or Open File submenus, you can open them with a single mouse click. In addition, version 1.5 lets you add your most recently used folders and files to those submenus so that you can return to them quickly (exit Super Boomerang).

Shortcut 1.5 also displays Stufflt archives in most applications' Open and Save As dialog boxes. As with folders, when you double-click on archives, they open to reveal all the enclosed folders and stuffed documents that are compatible with the current application. Double-clicking on a stuffed document first unstuffs it and then opens it.

Version 1.5's View command lets you open read-only copies of text and PICT files, copy any portion of a file, and paste it into another document. In addition, teams with Stufflt Deluxe, Shortcut 1.5 adds the ability to stuff files from the Shortcut menu. It also provides you with a check box at the bottom of your standard Save As dialog boxes that gives you the option of unstuffing files immediately after you save them.

From a control panel, you can change the listing order of the files and folders that are available in Shortcut's Go To Folder and Open File submenus. You can also specify the number of recent files and folders to be tracked, assign keyboard command equivalents to each menu item, and set other options.

Before Shortcut, all the additional software we required to accomplish these functions was not only inconvenient but was also the cause of a never-ending string of INIT conflicts. We much prefer Shortcut's elegant combination of function and ease of use. And although System 7 makes some of Shortcut's functions, such as finding files, less essential, the program adds an extraordinary level of convenience to Finder-related tasks.

— Darryl Lewis

Some people care passionately about the fit of their jeans, others about the feel of their computer keyboard. If you long for a keyboard that's quiet and "smooshy" to the touch, Key Tronic's MacPro Plus may be for you.

You can customize the MacPro Plus to suit your keyboard fancy in a variety of ways. First and foremost is touch. You can modify the tension of individual keys by using little rubber domes: You pull off the key caps and attach the domes to the stem of the switches on the keyboard itself. The rubber domes come in three weights — the heavier the weight of the dome, the harder it is to depress the key. So if you keep pressing your Caps Lock key...
accidentally, for example, you can make it harder to depress, thereby eliminating the annoyance.

For those used to IBM-style keyboards, the MacPro Plus lets you switch the positions of the Caps Lock and Control keys. You can also use a Period/Comma lock to eliminate the greater-than (>) and less-than (<) symbols when you’re typing successive uppercase letters with periods and commas. The extra-large L-shaped Return key is also a nice touch.

Another plus is the keyboard’s compatibility with the full range of Mac models — ADB and non-ADB Macs alike. And if you use paper templates designed for the Apple keyboard, you’ll have no problem fitting them onto the MacPro Plus’ 105-key layout (it includes 15 user-definable function keys).

For the keyboard’s $179 purchase price, you also get a free copy of Affinity Microsystems’ Tempo II macro utility software, a $149.95 retail value.

One aspect of the keyboard we didn’t like is the positioning of the two ADB cable connections. They’re located on the back side of the keyboard, facing the CPU. This makes it impossible to move the rear of the keyboard flush against a flat surface.

But overall, if you’re fanatical about the sound and feel of a keyboard, the MacPro Plus will suit your style.

Key Tronic Corp., P.O. Box 14687, Spokane, WA 99214; (509) 928-8000; $179.
— Paul Freedman

**OverView**

If you don’t have the time or money to invest in full-featured presentation software, take a look at OverView. With OverView, you can build presentations quickly and easily, using text and images created in other programs. The results aren’t as slick as a Persuasion or PowerPoint presentation, but you’ll get from idea to output much faster, because you create the entire contents of the presentation from within the familiar confines of your favorite word-processing or graphics program.

OverView’s main task is to assemble the files you import from other programs into a single presentation file and then let you play the presentation from within OverView. When you import files you’ve prepared in a word-processing or graphics program into OverView, each file becomes a screen, or “slide,” in the presentation.

Arranging the slides’ order is a snap: You use either OverView’s outline list of the slides or actual thumbnail representations. The program also makes it easy to select and rearrange chunks of your presentation and to make global and specific changes to slide details such as text and borders (OverView provides a variety of borders to choose from). You’ll want to create most of your text in your word processor, though, because the program provides only a limited text editor.

One word of caution: OverView is great for creating on-screen presentations, but the program’s support for slide makers is extremely limited, as are the transitional effects the package provides. If your presentation demands professional-looking color slides, you’re better off with a high-end package. And if you want special effects such as fancy color gradients, you’ll have to depend on a graphics program.

OverView lets you convert your on-screen presentations into stand-alone applications for distribution purposes.

Although OverView’s interface is a bit busy and it takes a while to decipher a few cryptic icons, you can probably master OverView in just a few hours. Its excellent tutorial helps.

A large-scale monitor is a boon, because the more slide thumbnails you can see at once, the easier it is to organize your presentations.

The OverView package provides both application and full-featured DA versions of the product.

If you’re addressing the board of directors, OverView won’t be your best tool. But if you need to gather your coworkers around a Mac to show them business plans and you don’t have much time to get a presentation together, OverView will not let you down.

Loop Software, P.O. Box 1249, Menlo Park, CA 94026; (415) 326-4803. Version 2.1. $159.95.
— Steven Bobker

**Music Writer**

Musicians engaged in the tedious task of transferring notes to pages share a common fantasy: playing music into a magical keyboard that then spews forth perfectly printed musical notation. In an attempt to make this dream come true, Pygraphics has introduced Music Writer.
Introducing the RAVEN Series. The First Macintosh Disk Array With 5.7 ms Average Access and 4.4 MB/sec Sustained Transfers.

You may be wondering just how fast 4.4 MBytes per second really is. Well here’s the bottom line – the RAVEN is so fast, you can now accomplish disk intensive applications such as animation and graphic design three times faster than you’ve ever been able to before! We’re not talking about small cache bursts here, but real honest to goodness sustained data transfers.

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Music Writer is available in three versions: The first and least expensive package provides up to 3 musical staves; a second package provides 6 staves; and a third, 40 staves. The differences in price and staves aside, all three packages share the same features: input via mouse or MIDI; the ability to import standard MIDI files; PostScript printing, using Adobe’s Sonata font (the printer font is not included); nonstandard note heads; chord symbols; articulations, rehearsal marks, text, titles, and more. Having these items from a series of tool palettes. Once you’ve entered them, you can select individual elements and move them to enhance their legibility.

As the saying goes, every silver lining has a cloud, and in the case of Music Writer, we found it to be more of a thunderhead. Importing a few large standard MIDI files caused a system crash. Restarting and playing some notes into the MiniSequencer had the same effect. In addition to being so capricious, Music Writer fails in other obvious ways. The program failed to recognize accidentals when we used the MIDImouse feature to place individual notes in the score via MIDI. Grace notes appear identical to regular notes, save for their tiny heads, and the Undo command is whimsical at best — it’s available for some operations but not for others.

With its current deficiencies, the usefulness of Music Writer may depend largely upon the state of your pocketbook. If your needs are simple and you can stand the frustration, $119 for the 3-stave version is tempting. Even more tempting, however, is Coda Music Software’s Music Prose 2.1, a reliable $399 package with 32 staves and a similar feature set. Music Prose makes Music Writer’s 6- and 40-stave versions look decidedly unappealing.

— Christopher Breen

MyAdvancedLabelMaker

MyAdvancedMailList

MyAdvancedMailList claims to be a free-form utility that lets you put "what you want where you want it" on a label. MyAdvancedMailList is billed as a powerful mailing-label manager and personal data organizer. According to the products’ packaging, both require less than five minutes to learn and are extremely easy to use. That may be so — but only if you’re willing to unlearn most basic assumptions about how Mac software should function.

The feature sets of both products sound comprehensive and powerful, but it’s an exasperating experience to learn to use these programs, because of poor design and inconsistency with Mac operating conventions. According to MySoftware Company, which makes both products, the company has its own interface philosophy that it has attempted to incorporate into Apple’s way of doing things. If this approach were an improvement, we’d be the first to laud a break from Apple standards, but MySoftware’s divergences trip you up instead of letting you climb to higher ground.

One fundamental paradigm of the Apple Human Interface Guidelines is that you select an object and then select the action to be performed on that object. Both LabelMaker and MailList violate this convention at every turn. For example, in LabelMaker, the standard Cut, Copy, and Paste commands are unnecessarily complicated by submenus, which require you to specify whether to perform the commands on art, text, or format.

And in MailList, it’s difficult to select a single record, because the nongressible window displays pairs of records. This approach can become confusing, because you must specify whether actions should apply to the upper or lower record in the pair. Some people may find that the dual-record display offers greater flexibility,
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but we found it awkward.

LabelMaker has a clumsy, nonvisual approach to many tasks. For example, instead of recording information by dragging text fields across the WYSIWYG label, you tell the program in a dialog box to move Line 1 to Line 3 and so on for all the lines. For selecting labels for printing, the program doesn’t display a sheet with the appropriate number of labels down and across. It presents a dialog box in which you type the specific starting row and column numbers. Furthermore, the Print command appears in its own separate menu, not on the File menu as convention dictates.

When you add a graphic to a label, the entire menu bar is replaced with a new modal Drawing menu. Unfortunately, the tools are limited and Cut and Paste don’t work properly under MultiFinder. To use the Clipboard, you must work in one application at a time.

Because it’s in its second rendition, MailList is a better product than LabelMaker, but there are still disappointments. MailList supplies 16 fields and 4 categories, but none can be repositioned or individually formatted. For bulk mailing, you can sort with 3 fields and the program automatically generates mail reports. It can’t print Postnet barcodes on envelopes, however. MailList has 25 predefined output forms for labels, envelopes, cards, and personal organizers, and you can customize specifications for unsupported stock. However, you can’t save more than one custom template for each type of stock.

When all is said and done, if you prefer programs that operate in the conventional Mac fashion (and who doesn’t?), there are better alternatives to MyAdvancedLabelMaker and MyAdvancedMailList (see “Mac to Mailbox,” April ’91, page 174). Most notable among them are StickyBusiness for labels and MacEnvelope for mailing.

In light of the problems we encountered with MySoftware’s products, we’re happy to report that updates to both packages are scheduled for this summer. We sincerely hope that the new products will address the shortcomings of the current versions.

—Owen W. Linnmayer

Last Resort

QUICK CLICKS

Working Software’s Last Resort is just that. It’s a small INIT that can recover lost files when all else has failed, because it transparently captures all your keystrokes (that’s right, all!) and stores them in text files within your System Folder.

Last Resort, which runs well under Systems 6 and 7, is managed by a control panel. You determine intervals between file saves by setting the number of key-strokes (from 1 to 512) to be recorded before the program executes a save. You can also control intervals with user-specified periods of inactivity (from 1 to 60 seconds). In our tests, the program never revealed that it was going about its file-saving business, an impressive feat that makes for truly transparent operation.

Passwords that do not appear on-screen are nonetheless visible in Last Resort’s work files. Fortunately, a Pause button prevents the program from saving keystrokes when passwords or other confidential information are entered. The Delete button provides a handy list of all Last Resort files and lets you delete any or all of them.

The program works flawlessly, but the interval controls aren’t as well designed as they could be. For example, you can’t just type in numeric values; you must use small scroll arrows, which make the settings hard to fine-tune. And an important option that’s missing altogether is an automatic delete after a user-defined period. As is, a new text file is created upon every startup and you tend to forget to delete old files, which can quickly become a storage problem.

There’s also a drawback when it comes to using the files that Last Resort creates. Everything you type is captured in the order in which you typed it. Consequently, when you edit a document, keystrokes are recorded out of context. Also, backspaces, original errors, and other artifacts of less than perfect keyboarding are all there and must be dealt with manually. Still, it’s better to have a messy file than no file at all.

Last Resort has an excellent manual and comes in the most ecologically sensible packaging we’ve seen yet.

Working Software Inc., P.O. Box 1844, Santa Cruz, CA 95061; (408) 423-5696. Version 1.0, $49.95.

—Steven Bobker
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Your Money and Your Mac

If you can balance your checkbook, electronic personal accounting may be the logical next step.

Anyone who’s ever purchased a Mac for home use knows that it’s easier to justify the acquisition as a checkbook balancer than as an entertainment center — even if the latter is what you really bought it for. But although the household-accounting rationale used to be little more than a ruse so you could play Dark Castle or Crystal Quest, there’s now an excellent field of contenders not only for balancing your checkbook but also for helping you plan for your children’s college education.

BY TOM WRONA
Checkbook programs are the simplest home-finance programs. These inexpensive, modestly endowed packages duplicate and automate your checkbook and check register. Checkwriter II and Quicken are the most popular checkbook programs. Another program, MacMoney, looks and feels like a checkbook program, but it's more sophisticated. CheckFree, an electronic-payment service that walks and talks a lot like a checkbook program, goes even further — it pays your bills with electronic checks.

Beyond the checkbook program is the financial-management program — a check register with financial-planning features. In this category, Andrew Tobias' Managing Your Money is in a class by itself. MacMoney nudges into the financial-management category, but it's much less sophisticated than Managing Your Money. (On the other hand, it's also almost half the price.) [Dollars & Sense, another well-known financial-management package, was excluded from this story at the request of its publisher. Software Toolworks, because it was in the process of making some major repairs to the program. — Ed.]

The next level of personal-finance programs — financial-planning software — is populated by exactly one program: WealthBuilder. There's a distinct difference between Managing Your Money and WealthBuilder. WealthBuilder doesn't contain a check register, so you can't use it to manage your day-to-day financial affairs. It's strictly for planning your major expenditures, such as buying a house, financing your children's college education, or structuring your retirement income. So if you use WealthBuilder as a financial planner, you'll still have to use one of the other personal-finance programs to manage your checkbook.

Electronic Checkbooks

All the checkbook programs can print checks on your printer and record the checks you write by hand. The programs also have simple budgeting capabilities and the ability to automate recurring transactions. Because checkbook programs are low-priced and easy to use, they're an excellent choice if you want to start automating your financial record keeping or if you just don't want to get involved with anything too complex.

Although the programs have their own strengths and weaknesses, they all share a common set of core features. When you want to write a check, you're presented with a reasonably accurate on-screen depiction of a blank check. Once you've written a check, you can print it out right away or write others and then print them as a batch. Every program comes with offers for LaserWriter-or ImageWriter-compatible checks from check printers such as Deluxe and NEBS (or, in the case of Quicken, from Quicken's publisher, Intuit). Each program offers a variety of compatible checks to choose from (one-part, two-part, all-purpose, payroll, voucher), and prices run in the 7-to-11-cent-per-check range when you buy quantities of a thousand. (You can buy smaller quantities at a slightly higher price.) You don't have to print all of your checks if you don't want to, however; all the programs can account for handwritten checks too.

All the programs include both a personal (or home) chart of accounts and a business chart of accounts. An account in this sense isn't necessarily a bank account but is instead a category used for classifying where your money comes from and where it goes. The four classic categories are income (what you're paid), expenses (what you pay), assets (what you own), and liabilities (what you owe). Your monthly income minus your monthly expenses is your cash flow. Your assets minus your liabilities is your net worth.

Each of the four categories is further subdivided. You have an account for each type of transaction you regularly perform. This enables you to track where your money goes. All the checkbook programs let you budget for each account, and each program can generate a report, for example, of budgeted versus actual expenses (or income, as the case may be). So if you budget $100 a month for your Entertaining account and blow $150 on nachos and cocktail weenies in March, your Budgeted Versus Actual report will show that you're 50 percent over budget on this account for March.
Like the other checkbook programs, MacMoney goes after the small-business market by including a sample business chart of accounts, but MacMoney’s publisher, Survivor Software, sells a $99.95 companion program called Invoicit, which adds invoicing capability. This may make MacMoney particularly appealing to moonlighters and others with home-office businesses.

Checkwriter II, Quicken, and MacMoney differ in the sophistication of their accounting. Quicken and Checkwriter II have only income and expense categories, so you can’t use them to figure out your net worth, for example. (Quicken’s manual describes a workaround for tracking assets and liabilities, but if doing so is important to you, you’ll probably want to move up to MacMoney or Managing Your Money.) MacMoney, on the other hand, does have asset and liability accounts and a Personal Balance Sheet report.

The three programs differ in the sophistication of their output too. At a list price of $119.95, MacMoney costs twice as much as Quicken or Checkwriter II, but it gives you more for your money. Depending on how you look at it, MacMoney is either a high-end checkbook program or a low-end financial-management program.

Output is one consideration that sets MacMoney apart from the other checkbook programs. A report that lists where your money is going is useful, but there’s nothing like a chart to vividly show you your expenditures in one category compared with the other ways you spend your money. MacMoney is the only checkbook program that can produce multicolor graphs. The program has four built in: Net Worth, Budgeted Versus Actual, Major Expenses, and Cash Flow. If these aren’t enough for you, you can create custom bar, line, and pie charts with a few mouse clicks and keystrokes. Want to see what your tax bite looks like? Create a custom pie chart comparing your total income with the taxes you pay.

MacMoney’s financial-management features are handy but quite modest. There’s an unsophisticated retirement planner, a loan calculator, and a future-value calculator (so, for instance, you can figure out how much to save monthly to have $x dollars, inflation-adjusted, in y years).

MacMoney has staked out the middle ground. If you want a more sophisticated checkbook program or if you want a simple financial planner with growth possibilities, MacMoney may be just the program you’re looking for.

Quicken lies at the low end of the spectrum. It’s cheap and easy to use, and it makes a virtue of its simplicity. Its one nod to sophistication is its payment-grouping ability. It lets you group recurring payments that fall on the same day, so you can not only quickly pay your rent at the click of a mouse but also pay all other bills that come due at the same time.
Personal Finance

It's hard to find fault with Quicken. Its documentation is comprehensive, friendly, and well written. Getting technical support requires a toll call, but help is free and unlimited. One minor nit to pick: Because Quicken can deal with only one account at a time, transferring money between, say, a checking account and a savings account is awkward.

Common Property

All the checkbook programs can provide numerous reports, including cash-flow, income-versus-expense, and budgeted-versus-actual-expenditures reports, and a check register. In general, you can customize reports by limiting the output to certain periods of time or accounts, which is useful for isolating and highlighting specific expenditures.

In making reports, MacMoney's capabilities are again the most sophisticated of the lot. The program gives you seven report categories from which to choose: Income and Expense, Personal Balance Sheet, This Month's Activity, Bill Payment Summary, Category List, Name List, and ID Code List. As with MacMoney's graphs, you can also create your own reports.

Beyond the core features, each program has its own set of bells and whistles. For instance, only Checkwriter II offers an integrated WYSIWYG check-design program complete with simple object-oriented drawing capabilities. It's also the only checkbook program that comes with a matching DA, so you can write a check while you're using another application.

Appropriately enough, Checkwriter II's most powerful feature is its check-writing capability. It can maintain a database of more than 32,000 payees and not only write checks to them but also address labels and envelopes. And because you can customize your checks, you can even use your existing checkbook for printing checks. You can actually tear them out of your checkbook and run them through your laser printer or ImageWriter (but not, unfortunately, a DeskWriter).

Checkwriter II is also the only checkbook program with two levels of password protection. They let you prohibit first-level users from voiding or deleting transactions, which is handy if you use Checkwriter II for business and want to have an employee run it. Checkwriter II also comes with an INIT that automatically reminds you, whenever
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While Paying Bills

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Make bill paying and record keeping faster and easier than ever with CheckFree from CheckFree Corporation, the nation's leader in electronic payments. CheckFree processes well over $2 billion annually for businesses and individuals.

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You can pay all of your bills and do your record keeping with just a few mouse clicks. You simply indicate who you want paid, the amount, and the date. Fixed, recurring bills (such as your mortgage) can be paid automatically. Your software records, categorizes and sends the information via modem to the CheckFree Processing Center. Then, CheckFree completes your payments.

ANY BILL, ANY BANK, ANY CHECKING ACCOUNT
With CheckFree, you don't have to switch banks and you can pay virtually any individual or company in the U.S. Your payments will be cleared through the U.S. Federal Reserve System, the same system banks use. Many payments can be sent electronically from your account to the account of the party you are paying. If not, a laser-printed draft or check is sent.

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AVAILABLE WITH...
CheckFree's electronic bill payment system is integrated in Managing Your Money®. So, you can enjoy CheckFree with this program, too!

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Hardware Requirements: Apple Macintosh® 128K or higher, 68000, or — and a Fast® compatible system. CheckFree is a registered trademark of CheckFree Corporation. All other trademarks are the property of their respective corporations.

you turn on your machine, of payments and deposits that are
due.
Quicken, in keeping with its "small is beautiful" motif,
limits its fancy features to a couple of clever time savers. If
the program's check number is wrong (because, say, you've
written or voided a handwritten check), just press the plus
or minus key to change the number on-screen. Typing the
first few characters of a category's name or clicking on it in
the category list plugs the category into a split transaction
that itemizes the payment — for example, mortgage prin-
cipal and interest.

CheckFree: Electronic Bill Paying
CheckFree is a simple checkbook program — with a
twist. Instead of printing the checks you write, it pays them
electronically! First offered in 1988 as a stand-alone DOS
program, CheckFree is also integrated into the DOS versions
of Quicken and Managing Your Money. It made its debut
on the Mac last fall.
Checkfree Corp., creator of CheckFree, figured out how
to bring electronic funds transfer (EFT), increasingly com-
mon in the corporate world, to you and me. Checkfree pays
your bills in three ways. Companies that have agreements
with Checkfree, such as American Express and MasterCard,
get their dough electronically. Other companies get laser-
printed checks or laser-printed drafts. When Checkfree
pays by check, it lumps several of its customers' payments
into one check and sends along an itemized list of whose
payments the check includes. A draft, on the other hand, is
an individual check similar to one you would write yourself.
The actual payment method for any given payment is
picked by Checkfree, based on technical requirements and
agreements with merchants. Whatever the method, the
payment shows up on your monthly bank statement like any
other. If the payment is made by draft, you receive the
canceled draft too.
The CheckFree program itself is simple and not very
impressive. It's a classic electronic check register with a
little budgeting capability thrown in. It can make recurring
payments for you, and you can record paper checks in
addition to CheckFree payments.
The manual has the distinction of being one of the worst
I've ever seen. It is ugly; poorly organized; and filled with
hostile, gratuitous legalese about how few rights you have
if you get into an argument with Checkfree. It is the only
Mac-software manual I have ever seen that doesn't have a
single screen shot.
Still, I found the program useful and worthwhile. Whether
or not it's a good deal for you depends on how much you
value your time (it really should save you some) and how
useful automation is to you. At $9 a month for up to 20
payments ($3 per additional 10 payments), it costs you a
16¢ premium over the cost of a stamp for each payment.
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This was the first time a Wacom cordless, pressure-sensitive stylus and digitizing tablet and Macintosh computer were used to create graphics for the annual Academy Awards® show. “All the designs are based on the graphic theme established by the main title,” said Mr. Piña. “The Wacom tablet opened up a whole new dimension for me. It allowed me to sketch right on the screen, which is an eye-opener the first time you do it. It’s so natural for an artist to draw with a pen, and a cordless one at that.

“One very nice thing about the pressure-sensitive pen is you’re able to create your own brushes. So that as you press down, you get more color or wider color or more transparent color or a combination of all three, depending on the software.

“The Wacom Tablet is so good,” he now states, “that it merits its own special award!”

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A coming attraction promises to be interesting. Sometime this year, Checkfree is planning to bring electronic check-paying capabilities to anyone with a Touch-Tone phone. Making payments will mean punching in numbers during a toll-free call. You’ll be able to add payees by mail or by making a voice call. Because the company anticipates that people without computers will make fewer payments, those people will likely pay a lower monthly price for a correspondingly lower number of payments.

Managing Your Money

Of all the personal-finance programs I had to choose from in doing this article, Managing Your Money was the one I chose to manage my own money.

Managing Your Money is by far the most comprehensive personal-finance package available for the Mac. It offers all the basic money-management tools, such as check writing, recurring transactions, and budgeting, as well as a wealth of financial-planning capabilities.

At the click of a button, you can display your net worth at any of five levels of detail. This can be a sobering — even alarming — experience. With a few more clicks and keystrokes, you can analyze your stock portfolio, determine if you should refinance your mortgage, forecast your cash flow for the next year — and even figure out your life expectancy!

Although the program has long been highly praised, I’ve always thought it was overrated. Despite a fair amount of power, earlier versions suffered from some glaring deficiencies, such as incompatibility with MultiFinder, “context sensitive” reports that were difficult to use, and a generally weak implementation of the Mac user interface.

But version 4.0 of Managing Your Money is a different story. The user interface has been completely revamped, and it’s greatly improved over previous versions. The program now resembles the accounting program M.Y.O.B., which is not surprising, because Teleware, the developer of M.Y.O.B., developed MYM for Meca Ventures.

In addition to the improved full-color user interface, MYM now boasts a payee pick list, more-powerful reporting, and faster and more-powerful recurring transactions.

CheckFree capability, a feature that MYM’s DOS version has had for years, is being added to version 4.0 and should be available by the time you read this. MYM’s publisher says that the CheckFree option will be available as a free upgrade.

WealthBuilder

If Managing Your Money is the Cadillac of personal-finance programs, WealthBuilder, at first glance, looks like the Mercedes. It’s bigger, prettier, and a little more expensive. Also, it’s a little less practical for the average person. That’s because WealthBuilder, as noted earlier, doesn’t manage your money on a day-to-day basis. Instead, you give the program a snapshot of your finances by entering data
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The Most Accurate OCR At Any Price.
Table 1: Features of Personal-Finance Programs

<table>
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<tr>
<th>Program</th>
<th>List Price</th>
<th>Pros</th>
<th>Cons</th>
<th>Company</th>
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<tbody>
<tr>
<td>CheckFree 1.5</td>
<td>$29.95</td>
<td>Good for users with lots of installment payments or frequent late charges. Easy-to-use service can automatically pay your bills via electronic fund transfer.</td>
<td>No canceled checks for some transactions. Terrible manual. Only simple budgeting.</td>
<td>CheckFree Corp. 720 Greencrest Dr. Westerville, OH 43081 (800) 882-5280 (614) 898-6000</td>
</tr>
<tr>
<td>Checkwriter II 3.1</td>
<td>$59</td>
<td>Good for home users with business aspirations. Two levels of password protection. Custom reports and mail features. Links with Astrix's Payroll Plus program. Includes DA version and reminder INIT.</td>
<td>Limited financial planning.</td>
<td>Astrix Software, Inc. 405 Bruce Ave. Grand Forks, ND 58201 (800) 426-0854 (701) 746-7202</td>
</tr>
<tr>
<td>MacMoney 3.5</td>
<td>$119.95</td>
<td>Excellent for home-based businesses. Integrated with Survivor's Invoicing program.</td>
<td>No password protection.</td>
<td>Survivor Software Ltd. 11222 La Cienega Blvd. Ste. 450 Inglewood, CA 90304 (213) 410-9527</td>
</tr>
</tbody>
</table>

directly or by importing it from Managing Your Money, Quicken, or MacMoney.

Once you’ve entered your data into WealthBuilder, the fun begins. It’s a video game for the Wall Street Week set. Set a financial objective — such as buying your first home or financing your kids’ education or your retirement — and WealthBuilder generates a comprehensive investment strategy complete with beautiful multicolored graphs illustrating the program’s recommended asset allocation. You can then browse through the program’s database of more than 1,400 (or 10,000, if you purchase additional entries from Reality) stocks, bonds, and mutual funds to find the ones that best suit you. The database, which you can update quarterly for a subscription fee, even includes phone numbers for the mutual funds.

Unfortunately, the financial advice the program gives is sometimes downright wacky. I told the program I was a conservative investor (2 on a scale of 1 to 5) and that I wanted to buy a house in one year. I filled out a spreadsheet that calculated how much I had to save each month to make the down payment. Even though I was going to need the money in just 12 months, the program suggested I invest 14 percent of my savings in equities (stocks) and 8 percent of my savings in precious metals!

As a former stockbroker, I can tell you to run, not walk, from anyone who tells you to invest money you’re going to need within a year in the stock market, let alone in gold-mining stocks. Volatility and transaction costs will eat you alive. The program does permit you to specify maximum percentages for investments in any of the investment types (or completely exclude them), and you can fine-tune the risk/reward ratio until you’re comfortable with it, but I don’t think that’s enough. The program should know that you don’t put short-term money into equities. Ever. In its defense, WealthBuilder is intended for long-term rather than short-term investing and it recommends mutual funds instead of individual stocks and bonds, which are far more volatile than funds. However, the program should still be smart enough to adjust to users’ requirements.

This is not to say that WealthBuilder is not a useful and powerful program. It can be very useful indeed. Just make sure that you understand all the implications of your decisions and don’t follow the program’s recommendations blindly. As always, you should consult a professional
When I heard “balance sheet,” I broke into a sweat. I know type, advertising, printing. Now I was forced to do our books. No choice.

We were on our third part-time bookkeeper in eleven months, and she was called away suddenly. Sound familiar? But I'm the boss and the buck stops with me. We had bills to pay, payroll checks to write, invoices to send, taxes to set aside.

And deadbeats to collect from—only I had no idea who owed us how much or for how long. Some suppliers may have even thought of us as deadbeats. I needed to know our cash flow, and get a handle on all this. But I didn't have a lot of time.

Step one: find an accounting program that feels as familiar as our Macs, that starts out easy, but has lots of reserve firepower for later on.

I found atOnce! The tutorial was actually fun and got me comfortable. It takes you step by step through the program, and gives you some easy-to-swallow accounting basics so you're not reading a foreign language. There's context-sensitive help, just in case.

And while you learn, you can start to set up your books. So it doesn't come in a flash and you sweat a little. But you do it and you learn.

I started off light. Double-clicked on one of the default charts of accounts and my General Ledger was practically set up for me. Then entered a few client names in Accounts Receivable, to get an idea of what was coming in. Prepared six invoices—and atOnce! calculated sales tax. Nice. Printed the invoices which I re-designed in atOnce!—realigned a field here, change a font there. The usual.

Then ran a Customer Aging Report to identify the slow-payers (I had no idea such a terrific thing was even possible).

Preparing a balance sheet! I printed out myself—no sweat. From fear and loathing to passion, now I even study the management reports atOnce! generates.

I'm still an art director, but atOnce! helped me become a better businessman!

A hidden bonus made my day

When our bookkeeper returned, I showed her atOnce! Now she even makes sure my plants are green. Putting the books on the Mac lets me take control.

Here's some free advice: Take control of your own business. Buy atOnce!

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Norcross GA 30093
404 564-5800

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### Table 1: Features of Personal-Finance Programs, continued

<table>
<thead>
<tr>
<th>Program</th>
<th>List price</th>
<th>Pros</th>
<th>Cons</th>
<th>Company</th>
</tr>
</thead>
</table>
| Managing Your Money 4.0 | $219.98    | Ideal for sophisticated investors. Comprehensive and well designed. Can handle investment transactions and advanced planning. | May be overkill for people with simple money-management requirements. No password protection. | Meca Ventures, Inc.  
327 Riverside Ave.  
Westport, CT 06880  
(203) 226-2400 |
| Quicken 1.5 | $59.95     | Excellent for beginners in computerized personal accounting. Inexpensive and very easy to use. | Can't open more than one account at a time. No graphs. No password protection. | Intuit  
P.O. Box 3014  
Menlo Park, CA 94026  
(800) 624-8742  
(415) 322-0573 |
| WealthBuilder 1.0 | $249.95    | Good tool for knowledgeable investors. Easy-to-use financial planner. Comprehensive securities database. | Recommendations may be inappropriate for unsophisticated investors. No day-to-day money-management functions. No password protection. | Reality Technologies  
3624 Market St.  
Philadelphia, PA 19104  
(800) 346-2024  
(215) 387-6055 |

Financial advisor before making any decisions about your money, but WealthBuilder can help you do your homework, which will make you a more informed investor. And for novice investors, WealthBuilder’s extensive help system can take some of the mystery out of making money and get you started asking the right questions.

**The Bottom Line**

If you’re looking for the best all-around personal-finance program, buy Managing Your Money. Version 4.0 is a breakthrough improvement.

If you want something simpler, any of the checkbook programs will do. Quicken’s manual is the best of the lot, and Quicken has the most attractive user interface. If you need security, though, you’ll want to go with Checkwriter II. MacMoney is also respectable. It is more expensive, but you do get some simple financial-planning capabilities and, by adding its companion Invoic program, you can expand it into a small-business package complete with accounts-payable capabilities. Your decision may come down to which set of features you like the best.

If your needs are more sophisticated (and you yourself are more financially sophisticated), you will appreciate WealthBuilder’s powerful planning features — but take its recommendations with a grain of salt. Combining WealthBuilder and one of the checkbook programs gives you roughly the same capabilities you’d have with Managing Your Money alone.

If you balance your checkbook religiously each month, you’re a good candidate for a personal-finance program. But if you infrequently or never balance your checkbook, if you occasionally bounce checks because you don’t know exactly what’s in your account, or if your wallet or purse is littered with ATM slips, handling your money electronically may not be the financial panacea you thought it would be. If you’re somewhere between these two extremes, going electronic is worth a try.

[As we went to press, we got our first look at Intuit’s latest revision of Quicken. Version 3.0 is a major upgrade that significantly increases the program’s power and features. We’ll have a full review in an upcoming issue. — Ed.]

Tom Wrona is a New York-based technical writer and consultant who writes frequently on technology and finance.
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A Tale of Two Cities
By Charles Dickens

It was the best of times, it was the worst of times...
Writing well doesn't necessarily require a personal copy editor. A grammar checker may be all you need to produce perfect prose.

BY TED LANDAU

Writing isn't what it used to be. Using a word processor, you can swiftly edit your work with just a few clicks. Using a spelling checker, you can eliminate your misspellings. Using a grammar checker, you can eradicate grammatical mistakes and ensure that your writing maintains a smooth, consistent style. Almost. Grammar checkers can't really do all that. None of the current grammar-checking programs can turn dross into gold. Bad writing is bad writing. Still, these programs can help make your writing better.

Right now, five products are competing for a share of the Mac grammar-checking market: Correct Grammar, Grammatik Mac, RightWriter, Sensible Grammar, and MacProof. Although each has distinctive characteristics, they all share some basic similarities.
Grammar Checkers

All employ a set of algorithms for analyzing sentence structure and identifying possible errors. For example, they can detect a lack of agreement between a subject and a verb (they is) or a split infinitive (to hastily decide). They can also spot many contextual spelling errors that most spelling checkers miss — such as homophone errors (there instead of their) and compound-word errors (every one instead of everyone). They even check for improper phrase usage, such as wordy phrases (later instead of at some later point) or inappropriate use of the passive voice (Jill wrote the book instead of The book was written by Jill).

The majority of these programs incorporate an “ordinary” spelling checker, eliminating the need to use two types of checkers to proofread a document. Also, they let you adjust the checking procedures to match the overall style appropriate for intended readers. When they’ve finished checking a document, all the programs offer analyses that list statistics such as word count and an assessment of the text’s level of difficulty.

But these programs cannot work miracles. They don’t always suggest a correction. Sometimes they do. Other times the best they can manage is to describe the nature of the error and the general means of correcting it; you then have to decide on your own what the specific correction should be. Sometimes these programs flag a correct or deliberate usage as a possible error (for example, you may really want to use the passive voice). It’s up to you to decide whether a correction is actually necessary. None of these programs successfully detects all errors — they often miss even obviously obvious ones. There also seems to be little consistency across the programs in terms of which types of errors they detect and which they don’t.

All the programs provide an option for turning off selected rules. This is essential to prevent repeated flagging of a type of “error” you do not wish to change. Most of the programs include separate style settings that, when you select them, automatically turn on and off the rules that are appropriate for a given style, such as technical, fiction, or business. The only drawback of turning off a selected rule is that the program will then skip those few instances when you might want that error indicated.

All the programs can check documents created in MacWrite, MacWrite II, and Word, and all but MacProof can also check WordPerfect and WriteNow documents. Text formatting is retained in all corrected files. All the programs can also check ASCII text files. Be sure to read how your program saves corrected documents, though; you

Figure 1: Correct Grammar was the best performer in our tests. When the program flags an error, it highlights it within the document text. Clicking on the Correct button makes the suggested correction; otherwise you can edit the text directly. Selecting Quiet prevents flagging of future violations of a specific rule.

Figure 2: You can turn Correct Grammar’s classes of rules on and off in this window. Classes that are off (for example, Informal) are indicated by the absence of a bullet. Classes that have individual rules turned off are indicated by a diamond (for example, Noun group consistency).
might discover that you have unintentionally replaced your original with the corrected copy. This can be especially critical if something corrupts your altered file.

When your system is running under MultiFinder, you should have at least 2 megabytes of RAM to use these programs effectively with your word processor. Although they can all run on any Mac, they can be frustratingly slow on 68000-based machines such as the SE and the Classic.

**Correct Grammar**

Correct Grammar is a model of interactive grammar checking. The program scans a document and pauses at each suspected error, highlighting the relevant word(s) within the several visible lines of text. Additionally, it displays an explanation of the error together with a suggested correction. If you click on the Correct button when Correct Grammar suggests a specific replacement, it makes the replacement (see Figure 1). You can also edit your text directly. If you decide not to make a suggested change, you click on the Ignore button and proceed to the next possible error. Clicking on the Quiet button turns off the rule pertaining to the current error; you can choose whether to do this permanently or just for the rest of the session.

Correct Grammar includes 11 preset styles (the most of any of the programs reviewed here), ranging from Informal to Technical. Selecting one determines which rule classes are turned on or off. Most users won’t be completely satisfied with any of the preset styles. Using the Style Guide, you can turn any individual rule class on or off (see Figure 2), but each class represents a collection of many rules. You cannot list rules within a class, and you can turn rules on and off only when you see the program use them during a document check. Correct Grammar also provides no means for you to edit rules or add new ones.

Ease of use is especially important in evaluating these programs, because a grammar checker is simply an adjunct to your word processor — you shouldn’t need to take a course to learn how to use it properly. Still, you don’t want to sacrifice the ability to detect and correct errors for the sake of convenience, so a balance must be struck. Correct Grammar does an excellent job of striking this balance. Its functions are easy to access and easy to understand. The combination of the Correct, Ignore, and Quiet buttons smoothly carries you through the entire document-checking process. Its checking features are relatively easy to customize, and in our tests, it detected the most errors of any of the programs (see the “Mistake Proof?” sidebar).

**Grammatik Mac**

Grammatik Mac offers you a choice of methods for checking a document. As an interactive checker, it functions similarly to Correct Grammar. Once again, you either click on a button to make a suggested replacement or, after reading some general advice, edit the text directly (see Figure 3). Separate buttons let you instruct Grammatik Mac to ignore either a specific phrase (for example, can be checked) or the general rule (for example, passive voice) for the rest of a session. Six writing-style templates are available, and you can turn individual rule sets on and off. Overall, Grammatik Mac compares favorably with
Correct Grammar in terms of ease of use.

Additionally, Grammatik Mac offers the option of creating a "marked" version of a document. With this method, it creates a separate copy of the document in which each suspected error is enclosed by brackets, together with a brief description of the type of error. You can review the marked copy and make changes, using the word processor that created the original document. When you've finished making changes, you can reopen the marked copy in Grammatik Mac, which then automatically removes all the error markings and leaves you with a corrected final copy.

Grammatik Mac 2.0's rule-modification abilities are the most complete of any of the grammar checkers. The program comes with a separate application, called Rule Editor, that lets you modify any existing rule and create entirely new rules (see Figure 4). For example, if you often make a particular error that isn't included in Grammatik Mac's set of rules, you can add a new rule that detects it. Except in the simplest cases, however, Rule Editor is a rather difficult application to learn to use; most users will probably never bother with it. To make matters worse, the Rule Editor manual is poorly written. In particular, it often presumes knowledge of procedures that weren't defined earlier in the manual.

A second editor application lets you modify Grammatik Mac's help screens. Reference Software suggests that you can use it to customize help screens for specific purposes such as classroom use.

Version 2.0 of Grammatik Mac offers some significant improvements over previous versions. The most obvious one is that it now automatically recognizes the wordprocessor format of the selected document instead of requiring you to specify it in advance. Most other improvements were intended to make the interface more interactive and more Mac-like. Reference Software has released several bug-fixed versions of 2.0 without assigning a new version number. If you're having any problems with the program, call Reference Software to make sure you have the latest version.

**RightWriter**

Unlike the two previous programs, RightWriter has no interactive mode. You can only use it to create a marked copy of the document, which you must then review with a word processor. Various document analyses (such as readability level) appear on-screen as well as at the end of the marked copy. As can Grammatik Mac, RightWriter can remove the marks after corrections have been made. Rather than accompany the marks with explanation or advice, however, RightWriter refers you to explanations in its manual.

The marked-copy approach does have some advantages. For example, it simplifies the process of working with the grammar checker itself: Simply click on Analyze Document, and you've finished. Still, the interactive method is more convenient overall. Both Grammatik Mac and Sensible Grammar let you choose the approach you prefer; RightWriter does not.

RightWriter does include five style templates together with the option of turning its various rule classes on and off. You can add single words to the program's usage dictionary, but this is a cumbersome procedure that the manual does a poor job of explaining. RightWriter does not include a spelling checker.

**Sensible Grammar**

Sensible Grammar is primarily an interactive checker. It performs adequately but not as well as its competitors. Its major asset is that it has the simplest procedure for editing, deleting, and creating new phrase rules. Adding a new rule
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Betsy Mill put it all in perspective when she wrote to us, “I love [Microsoft] Excel as much as my microwave oven but no love is perfect.”

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By the way, Bryan Larson: we said hi to Bill for you. He sends his regards.

Microsoft
Making it all make sense
Grammar Checkers

is as simple as typing in the correct and incorrect phrases on separate lines in the relevant list.

The program does not include style templates, nor does it have a spelling checker. It has no button for turning off a flagged rule while you're interactively checking a document, although it does let you add flagged phrases to an exceptions list. This requires clicking on the correct one of several poorly labeled icons (see Figure 5). Saving changes to the exceptions list is also awkward, requiring you to answer such cryptic questions as “Discard the (memory) changes also?”

Sensible Grammar also offers the alternative of marked-copy checking, but the usefulness of this function is limited in that it can't automatically delete the marks after you've made corrections. Also, the marked copy does not include any explanations of the marked errors.

Sensible Grammar has more than its share of irritations. For example, free text editing requires that you first click on the Edit icon, which in turn opens up a separate editable display. Checking for homophones requires as many as four operations: selecting Check Homophones from the Check menu, selecting Confusing Homophones in the window you obtain after selecting Change Phrase Usage Group Index from the Options menu, and possibly examining the Confusing Homophones phrase list and the Homophones parts list (it's not clear why Sensible Grammar needs two lists). No wonder it's called "confusing!" For another example of unnecessary ambiguity, try reading the manual’s description of the Open Phrase Usage Group Index command.

MacProof

MacProof is the only program reviewed here that is a DA, which means that you can use it directly within your word processor as you would use a spelling checker. Although this appears to be an advantage, it's a relatively minor one, especially if you use MultiFinder.

MacProof has many of the same features as the other programs. You can correct errors with the Change button, skip a particular instance with the Next button, or use the Ignore button to skip all instances of an error for the rest of a session (see Figure 6). You can edit words and phrases in its spelling and usage dictionaries and add new ones, using a well-designed dialog box that guides you through the procedure. MacProof has a menu option for turning specific usage rule classes on and off. You cannot do this while checking is in progress, however, because you cannot access any other window or menu—including MacProof's own menu—until MacProof has completely finished its checking.

Overall, MacProof does not compare favorably with its competitors. Its rule set is the smallest of any of the programs, which is probably why it detected the fewest grammatical errors in our tests (see the "Mistake Proof?" sidebar). It requires you to select the text and copy it to the Clipboard before it checks it. Although this approach has the advantage of permitting checking of selected portions of a document, it is mostly an inconvenience. Another inconvenience is that the analyses of document structure (for example, word count) require recopying the selection to the Clipboard. MacProof is also the only grammar checker that does not include difficulty-level indexes.

Probably its biggest limitation is that you cannot directly edit the text during checking, except via the small Replace With box. Thus, if a sentence requires an extended rewrite, you can't do it until MacProof has completely finished its checking and you've returned to your word processor.

MacProof is the only grammar checker we tested that is
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  • Exceptionally quiet (less than 35db)
  • 40-120MB
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  • Exclusive active Termination
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Grammar Checkers

not compatible with any version of WriteNow or WordPerfect. In the case of MacWrite II, it is compatible only with version 1.0, even though version 1.1 has been out for more than a year. You can check the text of noncompatible versions, but you lose all special formatting (for example, italics) when you paste any changes back into the document.

[As we went to press, we were unable to contact Lexpertise by telephone. All our attempts to reach the company resulted in a "number is disconnected" message. We don't know what this means about the company's or MacProof's future. — Ed.]

The Bottom Line

The top two choices are clear: Correct Grammar and Grammatik Mac. Correct Grammar has the edge in the critical measure of error detection and in convenience and ease of use. Grammatik Mac has the advantage of providing a choice between the interactive and marking methods for checking a document. Also, it has more-extensive (although more difficult to use) procedures for customizing its checking procedures.

There is little reason to consider buying RightWriter or Sensible Grammar. Although RightWriter's marked-copy approach works as promised, RightWriter offers no advantages over Grammatik Mac's similar capabilities and it can't check a document interactively. Sensible Grammar, although respectable, is burdened with too many inconveniences. It also lacks several useful features, including a spelling checker and style templates. Finally, its manual needs work.

MacProof was a loser in almost every category. It was the least effective in detecting errors. It's the only program that requires a document to be copied to the Clipboard prior to checking, it prohibits editing of a document while it's being checked, and it's compatible with the fewest popular word processors. Incredibly, MacProof is also twice as expensive as any of the other programs.

At their best, grammar checkers helpfully point out specific mistakes that you might otherwise overlook and offer advice on how to correct them. Certainly, many people can benefit from using a grammar checker, but the technology is still evolving. In a few years, these programs (and others like them) are likely to be vastly improved, and faster CPUs and cheaper storage for larger rule sets will also play major roles. At that point, grammar checkers may join spelling checkers as indispensable writing tools and become as essential as a good word processor.

Ted Landau is a professor at Oakland University, Michigan, and is a frequent contributor to MacUser.

<table>
<thead>
<tr>
<th>Table 1: Features of Grammar Checkers</th>
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<tr>
<td><strong>Correct Grammar 2.0</strong></td>
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<tr>
<td>List price</td>
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<tr>
<td>Pros</td>
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<td>Cons</td>
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GETTING DOWN TO BUSINESS:

Workgroup Printers

Need a printer that can handle the demands of a busy office? MacUser Labs tests 13 fast, reliable, high-capacity printers.
ot all printers are created equal, especially when you hook them up to your network. Sure, all of them can make the connection — every Mac PostScript or PostScript-clone printer comes with at least a LocalTalk connection — but only a few have the speed and stamina necessary to hold up under heavy business use.

This month we test 13 contenders for the title of workgroup-printer champ. All 13 — 12 PostScript printers and 1 upgrade board for the popular Apple LaserWriter series — combine the powerful microprocessors, fast printing engines, generous paper-handling options, and sturdy construction that are essential in a business printing environment.
Below workgroup printers on the PostScript evolutionary scale are personal printers with slow engine speeds — 4 or 6 ppm (pages per minute) — and meager 50-sheet paper trays. On another branch of the family tree are printers targeted for personal typesetting, which have resolutions higher than the normal 300dpi (dots per inch). There’s a performance penalty for all the extra dots these high-resolution printers create, however. Both classes of printers are valuable in their niches, but neither can satisfy the needs of a busy office (see the “Right Printer for the Right Job” sidebar).

A workgroup printer is designed for office use. Its speedy microprocessor and engine prevent it from becoming the modern equivalent of the water cooler — a hangout spot where workers kill time. A busy office that devours reams of paper quickly also needs a printer with large-capacity paper trays for input and output. A workgroup printer should also have a heavy duty cycle — the number of pages the printer can print in a month should exceed the number of pages that are actually printed in an average month. And last

### Figure 1: Workgroup-Printer Performance

<table>
<thead>
<tr>
<th>Printer</th>
<th>Overall Speed</th>
<th>Text Engine</th>
<th>Time in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qume CrystalPrint Express</td>
<td>Better</td>
<td>22 ppm</td>
<td>1</td>
</tr>
<tr>
<td>Xiante Accel-a-Writer II</td>
<td>Better</td>
<td>Not even a speedy RISC processor can compensate for an 8-ppm engine.</td>
<td></td>
</tr>
<tr>
<td>Dataproducts LZR1260ess</td>
<td>Worse</td>
<td>A fast printing engine — 22 ppm — makes this printer the text-file winner.</td>
<td></td>
</tr>
<tr>
<td>QMS QMS-PS 2210</td>
<td>Worse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QMS QMS-PS 810 turbo</td>
<td>Better</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QMS QMS-PS 820 turbo</td>
<td>Worse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dataproducts LZR1260i</td>
<td>Worse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple LaserWriter IIINTX</td>
<td>Better</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Kyocera Q-8010</td>
<td>Worse</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>GCC BLP IIS</td>
<td>Worse</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Texas Instruments microLaser XL P335</td>
<td>25%</td>
<td>Required additional 1MB of memory — 1.5MB is standard — to print the text files.</td>
<td></td>
</tr>
<tr>
<td>Panasonic KX-P4455</td>
<td>Worse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple LaserWriter IIINTX</td>
<td>Better</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Overall Speed:**
When we compared each printer’s performance on all three test files with that of the Apple LaserWriter IIINTX, we discovered that the fastest printer overall was the Qume CrystalPrint Express. Its 12-ppm engine and fast RISC processor make it a good choice if you're going to print a variety of documents. Otherwise, refer to the results of the individual tests for more-specific recommendations.

**Text:**
The ten-page Microsoft Word file tested raw engine speed, because little processing is needed to prepare a text page for printing.
The AMD 29000 RISC processor produces the fastest PostScript graphic processing.

An old version of the PostScript page-description language in addition to a slow microprocessor result in poor performance.

As expected, the 22-ppm QMS-PS 2210 came in first, followed by the 16-ppm Texas Instruments microLaser XL PS35.

PostScript Graphic:
The speed of printing the test PostScript-graphic page mostly depends on microprocessor speed. The two RISC-based products came out on top, with the Xante Accel-a-Writer II board edging out the Qume CrystalPrint Express. The loser was the Apple LaserWriter IINT — it took five times as long as the Xante Accel-a-Writer II.

Page Layout:
The page-layout document tested a combination of processor horsepower, communications efficiency, and how well each printer handled the diverse elements contained on the page. Although the RISC-based Xante Accel-a-Writer II board finished first, a few of the 68020-based printers were faster than the RISC-based CrystalPrint Express. The Apple LaserWriter IINT and Panasonic KX-P4455 had difficulty dealing with the complexities of the test document.

The two other 68000-based printers use fast engines to compensate for their lack of processing power: The Texas Instruments microLaser XL PS35 uses a 16-ppm engine, and the Panasonic KX-P4455 sports an 11-ppm engine. The microLaser XL PS35 achieved respectable performance for a printer with a slow processor, but the Panasonic failed to impress.

MacUser Labs defines a workgroup printer as having an engine speed of at least 8 ppm and a processor at least as fast as a 12-megahertz Motorola 68000. We set a price ceiling of $10,000. Four of the printers in our test group use the 68000 processor. The Apple LaserWriter IINT couples it with an 8-ppm engine and is about the minimal printer suitable for a network. The IINT placed near the bottom in almost every speed test. The GCC BLP IIS also uses an 8-ppm engine, but its processor runs at 16.67 megahertz. Not only does it have a low price but it's also faster than the IINT.

but not least, a workgroup printer should be affordable — after all, your business exists to make money, not to spend it.

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The other workgroup printers use more-powerful processors, either a Motorola 68020 or a RISC (reduced-instruction-set computer) chip — the latter is a microprocessor technology that favors performance over complexity. The LaserWriter IINTX and the QMS-PS 810 turbo use the same 8-ppm Canon engine as does the LaserWriter IINT, but they use a 68020 processor instead of a 68000. The QMS-PS 820 turbo is identical to the QMS-PS 810 turbo except for its heavier-duty Canon engine and two paper trays. The Kyocera Q-8010 has a 10-ppm engine and is unique among the printers we tested in that all three of its ports — LocalTalk, serial, and parallel — are active simultaneously, enabling you to hook it up to IBM PCs as well as Macs. A few soon-to-be-released printers will offer this feature along with automatic emulation switching — switching among Adobe’s PostScript page-description language and other printer languages such as PCL.(see the “On the Horizon” sidebar).

The Dataproducts LZR 1260i returns after being a top pick in our October ‘90 PostScript Printers Buyer’s Guide (page 89). Now it’s joined by the LZR 1260ess, the same printer but with an external processor box and a 20-megabyte hard drive. Both couple a 68020 processor with a 12-ppm engine. The QMS-PS 2210, with its 22-ppm speed, benefits from the fastest engine and is the only printer we tested that can print on 11-x-17-inch, ledger-sized, paper (at 11 ppm).

The Qume CrystalPrint Express uses a 12-ppm engine and a Weitek XL-8200 RISC chip. The CrystalPrint Express is a PostScript-clone printer: It uses Qume’s proprietary page-description language, which mimics Adobe’s PostScript. In addition to high speed, the CrystalPrint Express offers a choice of resolutions: either the standard 300 x 300 dpi or the non-standard 600 x 300 dpi, easily switchable by controls on the front panel.

Xante provides an unusual RISC-based product for users who find that their Apple LaserWriter II is showing its age: The Accel-a-Writer II board turns any LaserWriter II into a graphics speed demon and provides variable resolutions of up to 1,200 x 300 dpi — although to change the resolution, you must fiddle with DIP switches on the back of the board. The Xante board uses an AMD 29000 RISC chip and replaces the controller board for any Apple LaserWriter II-series printer (boards are also available for the LaserWriter and LaserWriter Plus printers). Like the Qume CrystalPrint Express, the Accel-a-Writer uses a PostScript-clone language, in this case the PhoenixPage language from Phoenix Technologies.

We ran the 12 printers — and the Xante board installed in a LaserWriter IISC — through MacUser Labs’ printer benchmark tests to determine printing-speed, paper-handling, ease-of-use, and image-quality ratings. Instead of finding a clear overall winner, we discovered that most of the printers had good and bad points. We did find, however, that it may be time to retire an old favorite: the Apple LaserWriter IINT.

Network Needs

When considering a workgroup printer, first compare the number of pages you need the printer to handle with the manufacturer’s recommended
duty cycle. We tested three categories of printers: heavy-, medium-, and light-duty.

The Dataproducts' LZR1260i and LZR1260css, Panasonic KX-P4455, QMS-PS 2210, and Texas Instruments microLaser XL PS35 are heavy-duty printers, with monthly duty cycles of 20,000 pages or more — about 1,000 pages a day. Although the Panasonic KX-P4455 has a heavy-duty engine, its sluggish performance when printing complex page-layout documents would be a serious drawback in a graphics shop that needed to print in large volume.

The Kyocera Q-8010, the QMS-PS 820 turbo, and the Qume CrystalPrint Express are medium-duty printers, with a 10,000-page recommended monthly maximum duty cycle. The remaining workgroup printers are light-duty printers, with a recommended monthly maximum page count of 5,000 or less. Although Apple declines to state recommended duty cycles for its printers, other vendors that use the same Canon engine generally recommend a 5,000-page-per-month maximum.

The GCC BLP IIS has the lowest recommended page count per month, at 3,000. Although a BLP IIS isn't hefty enough to serve the needs of a large network, its low cost may make it worthwhile to buy several and distribute them throughout your network.

Besides having a recommended duty cycle, printers are also rated for a certain engine life — Canon, for example, rates the 8-ppm engine used in the Apple LaserWriter II-series printers at 300,000 pages — but this is a less useful specification than the duty cycle. Most printers don't suddenly stop working when they reach the magic number: We know of at least one original Apple LaserWriter that has printed more than 1.5 million pages, but printers become less reliable once the engine-life limit has been reached. This dip in reliability usually manifests itself in the form of paper-handling difficulties and frequent jams. LaserWriter II owners who are considering the Xânte Accel-a-Writer II board should decide whether there's enough useful life left in their LaserWriter's engine to make such a purchase worthwhile.

**Paper Chase**

A heavy duty cycle and a long engine life are moot points if a printer is slow. Speed is probably the most important buying factor for any printer buyer, especially a buyer for a workgroup. Printer speed is a composite of two factors: first, how fast the printer's processor can prepare the page — that is, get it ready to be printed — and second, how quickly the engine can print it after the page has been processed. The MacUser Labs' PostScript-printer benchmark tests focused on both speed factors in the printing of three real-world types of output: text, PostScript graphics, and a composite page. A ten-page Word document using only two fonts — Times and Helvetica — tested primarily engine speed. A PostScript graphic created in Adobe Illustrator tested processor speed. A page layout containing a gray-scale scan, blends, and text — also created in Adobe Illustrator — tested a combination of microprocessor power, LocalTalk-communication efficiency, and how quickly a printer could interpret the composite elements.

The overall-speed winner was the RISC-based Qume CrystalPrint Express, with its 12-ppm engine (see Figure 1). The CrystalPrint was followed closely by the Xânte Accel-a-Writer II — also RISC-based — which was installed in an 8-ppm Apple LaserWriter IISC. The Motorola 68020-based printers — the Dataproducts LZR1260css, QMS-PS 2210, QMS-PS 810 turbo and QMS-PS 820 turbo, Dataproducts LZR1260i, and Apple LaserWriter IINTX — followed. The GCC BLP IIS was not among the fastest printers, but its low price makes it an attractive buy. We considered the Apple LaserWriter IINT to be too slow for all but the least demanding workgroup situations.

Individual test results show that printer performance relates directly to the kind of pages being printed. If your typical documents contain text and simple graphics, engine speed is of primary importance, but a graphics department gets much better results from a printer with a fast processor. You should also consider whether you will be better served by a single printer with all-round good performance or by two or more less expensive but more specialized printers.

In the engine-intensive text test, the QMS-PS 2210 took first place easily, by virtue of its 22-ppm engine, followed closely by the 16-ppm Texas Instruments microLaser XL PS35 — a slightly larger version of the popular...
The New Color Pivot Shown In Landscape And Full-Page Mode

The comparison you see above is really no comparison at all. • If you live in a world where things are all middle with no top or bottom, or where the year has only six months, you might choose the Apple. But if you would like to see a full page of color graphics, and see twelve months of spreadsheet instead of merely six, and be able to go from portrait to landscape with swift and deft ease, and own the only color full-page display on the
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Workgroup Printers

The Right Printer for the Right Job

1. Dot-matrix: less than 1-ppm engine; no intelligence. Too noisy and slow but the only solution for impact-printing multipart forms and checks.


3. Personal PostScript: 4- to 6-ppm engine; 68000, 68020, or RISC processor. Inexpensive but have slow, light-duty engines; some have processors fast enough to make them attractive to graphics users.

4. Light-duty workgroup PostScript: 8-ppm engine; 68000 processor. Inexpensive enough for several to be distributed on one network.

5. Medium-duty workgroup PostScript: 8- to 12-ppm engine, 68020 or RISC processor. Fast engines and microprocessors can handle text and graphics printing from five to ten Macs.
Three medium-duty workgroup PostScript printers handle the bulk of the printing needs. A heavy-duty workgroup printer is used for long reports.

Marketing

A color inkjet printer is used to create color transparencies and presentations. Two light-duty workgroup PostScript printers handle the needs of most of the staff, and one medium-duty workgroup PostScript printer prints the more intensive, lengthy documents. Executives may want a personal inkjet or laser printer in their office for security and convenience.

Word Processing

6. Heavy-duty workgroup PostScript: 12- to 22-ppm engine; 68020 or RISC processor. Fast and heavy-duty engines can handle large printing volumes; many include large paper trays and output bins.

7. High-resolution PostScript: 8- to 12-ppm engine with 600-to-1,200-dpi resolution; 68020 or RISC processor. Increased resolution for greater text clarity and gray-scale rendition; designed for personal typesetting.


9. Color thermal-wax PostScript: 1- to 2-ppm engine; 68020 or RISC processor. Have 300-dpi resolution and PostScript language; print high-quality color comps.

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On the Horizon

It's hard to imagine how printer manufacturers can sleep at night—in this fast-moving industry, what's hot today can be obsolete tomorrow. It seems that hardly a day goes by without a new printer, a new technology, or a new feature being introduced. Out of this avalanche of new technology, two trends are emerging: Printers are getting faster—using speedier engines and RISC processors—and they're gearing up for network use with better paper handling and automatic port- and emulation-switching features.

Consider the Hewlett-Packard LaserJet IISi, for example: This 17-ppm heavy-duty network workhorse has a 50,000-page-per-month duty cycle, a powerful AMD 29000 RISC processor, two whopping 500-sheet paper trays, an optional Ethernet interface, and the ability to do duplex printing: printing on both sides of each sheet. The IISi uses microfine toner and features a new Canon engine that HP improves on with its proprietary resolution-enhancement technology to produce print quality that's comparable to that of higher-resolution printers. Speed tests with a preproduction model showed faster times than those of any of the workgroup printers we tested for this report. The IISi will be produced for the Mac and the PC, the IISi for the Macintosh, which includes 35 fonts, 5 megabytes of RAM, and a LocalTalk interface, will list for $1,190.

Hewlett-Packard, 19310 Pruneridge Avenue, Cupertino, CA 95014; (800) 752-0900.

OMS' networkhorse is the 20-ppm OMS-PS 2000 ($15,995). Sporting a MIPS R3000 RISC chip, the OMS-PS 2000 has automatic port and emulation switching, a 70,000-page-per-month duty cycle, and the ability to print ledger-sized (11 x 17 inch) documents. It comes with two 250-sheet paper trays, and there's an optional 1,000-sheet paper tray.

OMS is also introducing the OMS-PS 815 ($4,995) and the OMS-PS 825 ($5,995). These printers are upgrades of the current 8-ppm models, the OMS-PS 810 turbo and OMS-PS 820 turbo, respectively, that add automatic port and emulation switching. OMS, Inc., One Magnum Pass, Mobile, AL 36618; (800) 523-2696.

LaserMaster has introduced the 400XL ($9,995), a high-resolution workgroup printer with a 20-ppm engine. The 400XL prints at 400 dpi; uses Microsoft's TrueImage, a PostScript-clone language; and is well suited for complex PostScript pages. The real slowpoke was the venerable Apple LaserWriter IINTX, which took almost twice as long as the next-slower printer.

Texas Instruments microLaser PS35 (see "Personal PostScript Printers," March '91, page 116)—and the Qume CrystalPrint Express. The Dataproducts LZR1260i and LZR1260ess also boast a 12-ppm engine but couldn't quite keep up with the Qume CrystalPrint Express' fast processor. The Kyocera Q-8010, with a 10-ppm engine, is slightly faster than the 8-ppm machines. The Xante Accel-a-Writer II's fast RISC processor was limited by the 8-ppm engine of the Apple LaserWriter IIRC in which the board was installed.

In the complex PostScript-graphic test, the results proved once more that engine speed is only a small part of the story in rating printer performance. The Xante board—which uses the PhoenixPage PostScript-clone language and an AMD 29000 RISC chip—was the clear winner in this test. Even when set to 600 x 300 dpi, it still beat the second-place finisher—the Qume CrystalPrint Express—which also runs a PostScript-clone language on its RISC processor. Set at its maximum resolution, 1,200 x 300 dpi, it finished only slightly behind the CrystalPrint Express. It seems that PostScript-clone printers are shedding the incompatibility problems that plagued them when they were first released.

The fastest true Adobe PostScript printers in this test were the QMS-PS 810 turbo and the QMS-PS 820 turbo, closely followed by the QMS-PS 2210. The Apple LaserWriter IINTX finished next, narrowly beating the Dataproducts LZR1260i and LZR1260ess and the Kyocera Q-8010. The Texas Instruments microLaser XL PS35's performance on this test was disappointing—its 12-megahertz Motorola 68000 processor just isn't fast enough for complex PostScript pages. The real slowpoke was the venerable Apple LaserWriter IINTX, which took almost twice as long as the next-slower printer.

There was less variation between the printers' performance in the page-layout test, with the exception of the Panasonic KX-P4455, which proved significantly slower than any other printers. Again, the Xante board turned in the fastest time, followed closely by the Dataproducts LZR1260ess, QMS-PS 810 turbo and QMS-PS 820 turbo, Apple LaserWriter IINTX, and Qume CrystalPrint Express.

The Texas Instruments microLaser XL PS35 in its standard configuration of 1.5 megabytes of RAM failed to print this page. The other printers had no problem with their standard memory configurations of 2 to 6 megabytes (see Table 1). When we added RAM, bringing the total to 2.5 megabytes,
the microLaser XL PS35 turned in a respectable performance. With RAM increased to 4.5 megabytes, it was slightly faster, taking a bit longer than the Apple LaserWriter IIINTX and the GCC BLP IIS.

After our speed tests were completed, we also ran a page-layout test to rate image quality. Our jurors found image quality from all the printers to be generally good (see Figure 2). They did prefer the optional higher-resolution output from the Xante board and the Qume CrystalPrint Express to the standard 300-dpi output produced by all the other printers, but that was to be expected. Higher resolutions may produce crisper images, but they increase printing time by about 30 percent on the CrystalPrint and around 10 to 15 percent with the Accel-a-Writer board at the maximum resolution. In the 300-dpi range, the differences among the printers were very small, but the Texas Instruments microLaser XL PS35 produced slightly better-looking output than the rest of the pack and the output of the Panasonic, the Dataproducts, and the Kyocera printers was slightly below average.

We also printed a test page that included a downloadable TrueType font. Networks will undoubtedly be upgrading to System 7, and the last thing you want is a printer that’s incompatible with Apple’s new font technology. Only the Kyocera Q-8010 had trouble printing this page. Although the printing process proceeded without an error message, a page never emerged from the printer. Kyocera is aware of the TrueType incompatibility, which should be fixed by the time you read this. The Texas Instruments microLaser also failed to print the TrueType page when configured with 1.5 megabytes of RAM — increasing the RAM to 4.5 megabytes took care of the problem, however. The conclusion here is that whatever your workgroup printer is, it won’t be a stumbling block when your network converts to System 7.

Ease of Setup and Use

Setting up a workgroup printer is as straightforward as setting up any other laser printer, and printers with Canon engines are the easiest kind. The single Canon cartridge contains all the replaceable elements and simply slides into place. The other printers have separate developer, toner, and drum units that are only slightly more difficult to install.

The Kyocera Q-8010, for example, requires that you install the drum within five minutes of removing the packaging, because the drum is light-sensitive.
Workgroup Printers

and a longer exposure to light will ruin it. This process takes only about 30 seconds, so the time constraint shouldn’t be a problem. The only printers that gave us trouble when we installed the consumables were the Qume CrystalPrint Express and the Panasonic KX-P4455. The drum for the CrystalPrint has no protective covering, so it’s easy to scratch, and the developer unit spills a small amount of toner when you install it. With the KX-P4455, you have to pour toner out of a plastic bottle into the toner hopper—a messy operation no matter how careful you are.

In addition to installing the consumables, you have to set the printer for use as a Macintosh PostScript printer. Luckily, PostScript is the default emulation mode for most of the printers and LocalTalk is the default communication mode. You can change these settings on the printers’ front panel. The Apple printers, however, use DIP switches for this purpose, which is a nuisance. The Dataproducts LZR1260i and LZR1260ess come configured with the RS-232 port as the default communications mode and must be changed to LocalTalk. This isn’t difficult but requires you to read the manual.

The trickiest setup is that of the Xante Accel-a-Writer II, because it requires hardware installation. Luckily, the board installs easily in a LaserWriter II, replacing the existing controller board. We used a LaserWriter IISC, but the procedure is the same for any LaserWriter II-series printer. A series of DIP switches controls the emulation, communication, and resolution parameters. We’d rather have these controls on the front panel, but the LaserWriter II lacks one, so Xante had little choice in the matter.

Paper Handling

The last critical aspect of a workgroup printer is how well it handles paper. If a printer is supporting 20 Macs, there’s going to be a lot of pages coming out of the printer, so it’s necessary to have a large-capacity paper tray as well as a tray that can accommodate the output.

We first ran a 50-page print job to check that the output tray could hold 50 sheets. Only the Qume CrystalPrint Express had a problem: The paper started to splay after the printer had produced 40 sheets, because of the output tray’s unusual curved shape. We also had more than our share of paper jams with this printer, and the

The Bottom Line

Not every PostScript printer is built for a demanding business environment. To meet the needs of a busy workgroup, a PostScript printer should have at least the speed and power of an Apple LaserWriter II: an 8 ppm engine and a Motorola 68000 processor. Just as there are different types of workgroups — accounting departments, design studios, secretarial pools — different workgroup printers satisfy different needs. Which one you choose depends on whether your workgroup prints mostly text and simple graphics or prints reams of complex layouts and illustrations.

The volume of printing on your network is another important factor, so we divide our printer recommendations into three categories: heavy-, medium-, and light-duty. For heavy-duty printing, we recommend the Qume CrystalPrint Express for its 22 ppm, 30 ppm, 60 ppm engine, or its 68020 processor for the Apple LaserWriter II. The Xante Accel-a-Writer II is impressed with the performance of its 1.5 megabyte RAM.

Print 1,000 or more pages a day? Pick one of these heavy-duty champs (clockwise from bottom left): the Qume CrystalPrint Express or the LZR1260i, Texas Instruments microlaser XL PS35, Dataproducts LZR1260i, and Dataproducts LZR1260ess.
design of the engine makes it quite difficult to remove jammed paper. Worse, when the jam occurred near the toner unit, the next 20 or so pages came out dirty.

The Dataproducts LZR1260i and LZR1260ess have a paper sensor in their output tray. When the page count in the output tray reaches 250 pages, the printer goes off-line and sends an error message over the network asking you to empty the tray — a useful feature in a heavy-duty workgroup printer.

Several printers feature multiple paper trays. The Dataproducts LZR260i and LZR1260ess and the Qume CrystalPrint Express come with software that lets you choose, on a per-page basis, which tray you want to use. You can, for example, keep letterhead in one tray and plain paper in another or alternate between two sizes of paper. The QMS multityray printers (the QMS-PS 820 turbo and the QMS-PS 2210) come with a DA that lets you select the default paper tray and switch automatically to the second tray when the first is empty, but it doesn’t let you choose which tray to use on a per-page or per-job basis. QMS is working on more-sophisticated software — which should be shipping by the time you read this — that will give you greater control and flexibility in switching between paper trays.

**A Group Decision**

As we’ve found in the past, finding the perfect printer depends on your printing needs. What separates workgroup winners from losers is speed and paper-handling ability (see the “Bottom Line” sidebar), because all the printers we tested showed good-to-excellent print quality. Some printers shine when printing text, some when printing more-complex images: Your ideal network may consist of one printer with a fast engine, or it may contain several printers — some having fast engines and others fast processors.

Although new printers are constantly being introduced with new features, new technology, and lower prices, there’s never been a better time to buy a workgroup printer. You could always wait for the incremental improvements of the next generation of printers, but today’s business needs must be met today. Luckily, these workgroup printers are ready for the challenge.

Bruce Fraser is an author, consultant, and frequent contributor to *MacUser.*
# Table 1: Features of Workgroup Printers

<table>
<thead>
<tr>
<th></th>
<th>Apple LaserWriter INT</th>
<th>Apple LaserWriter IIXT</th>
<th>Dataproducts LZR1260</th>
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<td>$2,799</td>
<td>$3,399</td>
<td>$3,200</td>
<td>$4,000</td>
<td>$2,590</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>Slowest printer.</td>
<td>No SCSI port.</td>
<td>Bulky, Slow processor.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Specifications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Printer language</td>
<td>PostScript</td>
<td>PostScript</td>
<td>PostScript</td>
<td>PostScript</td>
<td>PostScript</td>
</tr>
<tr>
<td>Engine, type</td>
<td>Canon, laser</td>
<td>Canon, laser</td>
<td>Toshiba, laser</td>
<td>Toshiba, laser</td>
<td>Giana, LED</td>
</tr>
<tr>
<td>Engine life (pages)</td>
<td>300,000</td>
<td>300,000</td>
<td>unavailable</td>
<td>unavailable</td>
<td>300,000</td>
</tr>
<tr>
<td>Monthly duty cycle (pages)</td>
<td>5,000</td>
<td>5,000</td>
<td>25,000</td>
<td>25,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Pages per minute</td>
<td>8 ppm</td>
<td>8 ppm</td>
<td>12 ppm</td>
<td>12 ppm</td>
<td>8 ppm</td>
</tr>
<tr>
<td>Microprocessor, clock speed</td>
<td>Motorola 68000, 12 MHz</td>
<td>Motorola 68020, 16.67 MHz</td>
<td>Motorola 68020, 16.67 MHz</td>
<td>Motorola 68000, 16.67 MHz</td>
<td>300 dpi</td>
</tr>
<tr>
<td>Resolution (standard, enhanced)</td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
</tr>
<tr>
<td>RAM (standard, max.; upgrades)</td>
<td>2 MB</td>
<td>2 MB, 12 MB, 1 MB, 299; 4 MB, 999</td>
<td>4 MB</td>
<td>4 MB</td>
<td>2 MB, 4 MB; 2 MB, 299</td>
</tr>
<tr>
<td>Hard drive</td>
<td>none</td>
<td>third party</td>
<td>none</td>
<td>20 MB (bundled)</td>
<td>third party</td>
</tr>
<tr>
<td>Network interfaces</td>
<td>serial, LocalTalk</td>
<td>serial, LocalTalk</td>
<td>serial, parallel, LocalTalk</td>
<td>serial, parallel, LocalTalk</td>
<td>LocalTalk*</td>
</tr>
<tr>
<td>Printer emulations</td>
<td>Diablo 630, PCL3</td>
<td>Diablo 630, PCL3</td>
<td>PCL3</td>
<td>PCL3</td>
<td>Diablo 630; PCL4, $149*</td>
</tr>
<tr>
<td>No. of trays, page capacity</td>
<td>1, 200</td>
<td>1, 200</td>
<td>1, 250</td>
<td>1, 200</td>
<td>1, 200</td>
</tr>
<tr>
<td>Optional envelope tray (capacity, price)</td>
<td>15, $89</td>
<td>15, $89</td>
<td>100, $1,095</td>
<td>100, $1,095</td>
<td>50, $89</td>
</tr>
<tr>
<td>Other features/options</td>
<td>INTX upgrade, $1,000</td>
<td>NA</td>
<td>multicassette feeder, $845; universal paper case, $99</td>
<td>multicassette feeder, $845; universal paper case, $99</td>
<td>optional paper trays — A4, B5, legal, $89 each</td>
</tr>
<tr>
<td><strong>Replacement supplies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPC (drum)/copies</td>
<td>NA</td>
<td>NA</td>
<td>$326/25,000</td>
<td>$326/25,000</td>
<td>$289/15,000</td>
</tr>
<tr>
<td>Toner/copies</td>
<td>$129/4,000</td>
<td>$129/4,000</td>
<td>$315/5,000</td>
<td>$315/5,000</td>
<td>$332/2,500</td>
</tr>
<tr>
<td>Developer/copies</td>
<td>NA</td>
<td>NA</td>
<td>$238/40,000</td>
<td>$238/40,000</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H in.)</td>
<td>20 x 19 x 9</td>
<td>20 x 19 x 9</td>
<td>19 x 19 x 13</td>
<td>20 x 20 x 19</td>
<td>18 x 18 x 5</td>
</tr>
<tr>
<td>Weight</td>
<td>45 lb</td>
<td>45 lb</td>
<td>85 lb</td>
<td>printer, 85 lb; processor unit, 22 lb</td>
<td>24 lb</td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td></td>
<td>20325 Mariam Ave.</td>
<td>20325 Mariam Ave.</td>
<td>6219 De Soto Ave.</td>
<td>6219 De Soto Ave.</td>
<td>580 Winter St.</td>
</tr>
<tr>
<td></td>
<td>Cupertino, CA 95014</td>
<td>Cupertino, CA 95014</td>
<td>Woodland Hills, CA 91365</td>
<td>Woodland Hills, CA 91365</td>
<td>Waltham, MA 02154</td>
</tr>
<tr>
<td></td>
<td>(800) 976-2333</td>
<td>(800) 976-2333</td>
<td>(818) 887-8000</td>
<td>(818) 887-8000</td>
<td>(800) 422-7777</td>
</tr>
</tbody>
</table>

*The $149 PC Emulation Kit comes with serial and parallel ports and PCL4 emulation.*

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*The $149 PC Emulation Kit comes with serial and parallel ports and PCL4 emulation.*

142 September 1991 MacUser
$50 mail-in rebate on Kodak Diconix 150 plus and M150 plus printers--another good reason why you shouldn't have a laptop or notebook computer without a printer.

There are all kinds of reasons to travel with a Kodak Diconix printer: including sudden revisions, quick letters, instant overheads. And the sheer convenience of being able to see what you've written. And now there are 50 more: for a limited time, Diconix printers come with a $50 mail-in rebate from Kodak! Both the 150 plus printer for DOS computers, and the M150 plus, with Adobe Type Manager™ software, for Macintosh computers. They're easy to carry—no printer is smaller or lighter—produce quality output on plain paper, and work as well on the desktop as on the road. But the rebate offer ends September 30, 1991, so get 'em up, Scout! For more information, or the name of a participating dealer near you in the U.S. or Canada, call 1 800 344-0006.

$50 REBATE

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<table>
<thead>
<tr>
<th>Feature</th>
<th>Kyocera Q-8010</th>
<th>Panasonic KX-P4455</th>
<th>QMS QMS-PS 810 turbo</th>
<th>QMS QMS-PS 820 turbo</th>
<th>QMS QMS-PS 2210</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$6,995</td>
<td>$3,495</td>
<td>$5,495</td>
<td>$6,995</td>
<td>$9,995</td>
</tr>
<tr>
<td><strong>Street price</strong></td>
<td>$4,500</td>
<td>$2,000</td>
<td>$3,945</td>
<td>$4,695</td>
<td>$7,300</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>Slow.</td>
<td>Expensive.</td>
<td>Expensive.</td>
<td>Expensive.</td>
<td></td>
</tr>
<tr>
<td><strong>Specifications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Printer language</td>
<td>PostScript clone</td>
<td>PostScript</td>
<td>PostScript</td>
<td>PostScript</td>
<td>PostScript</td>
</tr>
<tr>
<td>Engine, type</td>
<td>Kyocera, laser</td>
<td>Panasonic, laser</td>
<td>Canon, laser</td>
<td>Canon, laser</td>
<td>Canon, laser</td>
</tr>
<tr>
<td>Engine life (pages)</td>
<td>unavailable</td>
<td>300,000</td>
<td>300,000</td>
<td>600,000</td>
<td>1,200,000</td>
</tr>
<tr>
<td>Monthly duty cycle (pages)</td>
<td>10,000</td>
<td>20,000</td>
<td>5,000</td>
<td>10,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Pages per minute</td>
<td>10 ppm</td>
<td>11 ppm</td>
<td>8 ppm</td>
<td>8 ppm</td>
<td>22 ppm (letter), 11 ppm (ledger)</td>
</tr>
<tr>
<td>Resolution</td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
</tr>
<tr>
<td>RAM (standard, enhanced; upgrades)</td>
<td>5 MB, 6 MB, 2 MB, 4 MB, 2 MB, $699</td>
<td>2 MB, 8 MB, 1 MB, $595, 2 MB, $995, 4 MB, $1,495</td>
<td>2 MB, 8 MB, 1 MB, $595, 2 MB, $995, 4 MB, $1,495</td>
<td>4 MB</td>
<td></td>
</tr>
<tr>
<td>Hard drive</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>Network interfaces</td>
<td>serial, parallel, LocalTalk</td>
<td>serial, parallel, LocalTalk</td>
<td>serial, parallel, LocalTalk</td>
<td>serial, parallel, LocalTalk</td>
<td>serial, parallel, LocalTalk</td>
</tr>
<tr>
<td>Printer emulations</td>
<td>Diablo 630, PCL4</td>
<td>Diablo 630, PCL4</td>
<td>HP-GL, PCL4</td>
<td>HP-GL, PCL4</td>
<td>HP-GL, PCL4</td>
</tr>
<tr>
<td>No. of fonts in ROM, type</td>
<td>35, Bitstream Type B</td>
<td>39, Adobe</td>
<td>39, Adobe</td>
<td>39, Adobe</td>
<td>39, Adobe</td>
</tr>
<tr>
<td>No. of trays, page capacity</td>
<td>1, 250</td>
<td>2, 250 each</td>
<td>1, 200</td>
<td>2, 200 each</td>
<td>1, 250, 1, 100</td>
</tr>
<tr>
<td>Optional envelope tray (capacity, price)</td>
<td>none, $85</td>
<td>none, $75</td>
<td>none, $75</td>
<td>none, $75</td>
<td>none</td>
</tr>
<tr>
<td>Other features/options</td>
<td>1,000-sheet input bin, $85, font cards, $325</td>
<td>1,000-sheet input bin, $75, optional paper tray, $75</td>
<td>1,000-sheet input bin, $75, optional paper tray, $75</td>
<td>1,000-sheet input bin, $75, optional paper tray, $75</td>
<td>Optional paper tray, $115</td>
</tr>
<tr>
<td>Replacement supplies</td>
<td>OPC (drum/copies)</td>
<td>$180/10,000 sheets</td>
<td>$190/13,000</td>
<td>NA</td>
<td>$182/12,000</td>
</tr>
<tr>
<td></td>
<td>Toner/copies</td>
<td>$27/3,000 sheets</td>
<td>$45/5,000</td>
<td>$130/4,000</td>
<td>$75/6,000</td>
</tr>
<tr>
<td></td>
<td>Developer/copies</td>
<td>$170/50,000</td>
<td>$120/20,000</td>
<td>NA</td>
<td>$161/30,000</td>
</tr>
<tr>
<td>Other</td>
<td>Dimensions (WxDxH, in)</td>
<td>17 x 18 x 13</td>
<td>28 x 17 x 15</td>
<td>18 x 25 x 9</td>
<td>18 x 19 x 12</td>
</tr>
<tr>
<td></td>
<td>Weight</td>
<td>64 lb</td>
<td>60 lb</td>
<td>44 lb</td>
<td>55 lb</td>
</tr>
<tr>
<td></td>
<td>Warranty</td>
<td>90 days</td>
<td>1 year</td>
<td>1 year</td>
<td>90 days</td>
</tr>
<tr>
<td>Company</td>
<td>Kyocera Electronics, Inc.</td>
<td>Panasonic</td>
<td>QMS, Inc.</td>
<td>QMS, Inc.</td>
<td>QMS, Inc.</td>
</tr>
<tr>
<td></td>
<td>100 Randolph Rd.</td>
<td>Two Panasonic Way</td>
<td>One Magnum Pass</td>
<td>One Magnum Pass</td>
<td>One Magnum Pass</td>
</tr>
<tr>
<td></td>
<td>Somerset, NJ 08875</td>
<td>Secaucus, NJ 07094</td>
<td>Mobile, AL 36618</td>
<td>Mobile, AL 36618</td>
<td>Mobile, AL 36618</td>
</tr>
<tr>
<td></td>
<td>(800) 333-0470</td>
<td>(800) 742-8086</td>
<td>(800) 523-2696</td>
<td>(800) 523-2696</td>
<td>(800) 523-2696</td>
</tr>
</tbody>
</table>

*Port switching is handled automatically.*
INTRODUCING RASTEROPS’
TEAM OF 21” GRAPHICS SYSTEMS.
GAME. SET. MATCH.

RasterOps’ new two-page 21” graphics systems offer the precision, speed, and high performance you’ve come to expect from the leader in color technology. From photorealistic imagery to video capture and graphics acceleration, our five new systems offer everything you need for winning graphic design.

The RasterOps® 8XLi and 24XLi bring graphic design to new heights. Both offer two full pages of text and graphics with on-board acceleration. What’s more, the 8XLi can quickly and easily be upgraded to 24-bit color with the VRAM expansion kit. It’s designed to protect your hardware investment by providing the ultimate in flexibility.

The RasterOps 24XLTV offers the same 24-bit True Color brilliance and on-board acceleration of the 24XLi, plus video capture so you can get all the best shots. The 8XL brings you 256 glorious colors with unequalled clarity, and is priced within reach. The ClearVue/GSXL gives you 256 shades of gray; perfect for business productivity. And when it comes to low cost, high resolution monochrome, the ClearVue/XL is a clear winner.

With these advancements in the art and science of color, it’s no wonder RasterOps aces the competition. For a dynamic 21” system that’s a perfect match for you, just see your local RasterOps dealer or call 1.800.SAY.COLOR.

RasterOps®
THE ART & SCIENCE OF COLOR™
### Table 1: Features of Workgroup Printers, continued

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Qume CrystalPrint Express</th>
<th>Texas Instruments microLaser XL F535</th>
<th>Xante Accel-a-Writer II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$5,595</td>
<td>$4,6445</td>
<td>$2,495</td>
</tr>
<tr>
<td><strong>Street price</strong></td>
<td>$3,500</td>
<td>$2,975</td>
<td>$2,495</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>300 dpi, 600 x 300 dpi</td>
<td>600 dpi, 12 dpi</td>
<td>300 dpi; 600 x 300 dpi</td>
</tr>
<tr>
<td><strong>RAM (standard, max.; upgrades)</strong></td>
<td>3 MB, 8 MB, 1 MB, $70</td>
<td>1.5 MB, 4.5 MB, 1 MB, $350</td>
<td>6 MB, 16 MB; 2 MB, $300; 4 MB, $800</td>
</tr>
<tr>
<td><strong>Microprocessor, clock speed</strong></td>
<td>Weitek XL-820D, 6 MHz</td>
<td>AMD 29000, 16 MHz</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Hard drive</strong></td>
<td>none</td>
<td>none</td>
<td>third party</td>
</tr>
<tr>
<td><strong>Network interfaces</strong></td>
<td>serial, parallel, LocalTalk</td>
<td>serial ($49), parallel, LocalTalk4</td>
<td>serial, LocalTalk</td>
</tr>
<tr>
<td><strong>Printer emulations</strong></td>
<td>PCL 4</td>
<td>Diablo 630, Epsom 850/1050, IBM Proprinter, PCL 4</td>
<td>PCL4</td>
</tr>
<tr>
<td><strong>No. of fonts in ROM, type</strong></td>
<td>39, Bitstream</td>
<td>35, Adobe</td>
<td>35, Bitstream</td>
</tr>
<tr>
<td><strong>No. of trays, page capacity</strong></td>
<td>2, 250 each</td>
<td>1, 250</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Paper sizes</strong></td>
<td>letter, legal, A4</td>
<td>letter, legal, A4, A5, envelope</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Optional envelope tray (capacity, price)</strong></td>
<td>none</td>
<td>70, $495</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Optional envelope tray (capacity, price)</strong></td>
<td>none</td>
<td>70, $495</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Other features/options</strong></td>
<td>legal, A4 paper tray, $69 each</td>
<td>optional paper tray, $495</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Replacement supplies</strong></td>
<td>OPC (drum)/copies</td>
<td>$327/15,000</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Toner/copies</strong></td>
<td>$108/14,000</td>
<td>$95/6,000</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Developer/copies</strong></td>
<td>NA</td>
<td>$280/30,000</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Dimensions (W x D x H, in.)</strong></td>
<td>17 x 18 x 13</td>
<td>16 x 17 x 11</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>60 lb</td>
<td>55 lb</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Warranty</strong></td>
<td>1 year</td>
<td>1 year</td>
<td>2 years</td>
</tr>
<tr>
<td><strong>Company</strong></td>
<td>Qume Corp. S00 Yosemite Dr., Milpitas, CA 95035 (800) 223-247</td>
<td>Texas Instruments P.O. Box 202230 Austin, TX 78720 (800) 527-3500</td>
<td>Xante Corp. P.O. Box 518 Montrose, AL 36559 (800) 926-8859</td>
</tr>
</tbody>
</table>

5List price includes $145 LocalTalk option.

### Table 1 Criteria

- **List price** — The manufacturer's suggested retail price.
- **Street price** — An average price charged by U.S. dealers in May 1991 or the price charged by vendors that sell direct.
- **Printer language** — The PDL (page-description language) used in the printer.
- **Engine, type** — The manufacturer of the engine used in the printer and the type of marking technology (laser or LED).
- **Engine life (pages)** — The manufacturer's rating of the engine life in total number of pages the unit is expected to produce.
- **Monthly duty cycle (pages)** — The number of pages the printer can print in a month, significant for high-volume printing.
- **Pages per minute** — The manufacturer's rating for how many pages the printer can output after the RIP has prepared the pages for printing.
- **Microprocessor, clock speed** — The processor that powers the printer and the clock speed, in megahertz.
- **Resolution (standard, enhanced)** — The number of dots per inch the printer can produce.
- **RAM (standard, max.; upgrades)** — The amount of on-board memory the printer ships with and the most memory the printer can accommodate.
- **Hard drive** — If a printer has a SCSI port, the manufacturer provides its own hard drive or allows you to use a third-party drive.
- **Network interfaces** — Interfaces other than LocalTalk for connecting with IBM PCs.
- **Printer emulations** — Popular PC printer languages for PC users.
- **No. of fonts in ROM, type** — The number and the type of font outlines in the printer's ROM.
- **No. of trays, page capacity** — The number of paper trays and how many sheets of paper they can hold.
- **Paper sizes** — The sizes of paper the printer can handle.
- **Optional envelope tray (capacity, price)** — The number of envelopes the optional envelope tray can handle and the price of the tray. "None" indicates no envelope tray; manual feed is required.
- **Other features/options** — Any other feature or option and its price.
- **Replacement supplies** — The price of the supply and the number of copies it can produce.
88MB REMOVABLE CARTRIDGE DRIVE

STEP UP TO THE INFINITY 88 TURBO

One of the most exciting advances in data storage technology of the eighties meets the capacity and performance challenges of the nineties.

Why do more than 600,000 people worldwide use this storage technology? Because it's the simplest, most effective system for security, back-up, archiving, and data sharing available today. Remove a cartridge and lock it away, store it, or take it with you.

Easy to Use
There's nothing to learn. If you know how to use diskettes, you already know how to use the Infinity 88 Turbo. Backups are fast and reliable. You don't have to restore data to use it.

Unlimited Storage
When you run out of space, just put in a new cartridge. Imagine how you can streamline your work with a different cartridge for each client or project, or for transporting huge graphics files.

Fastest Possible Performance
You don't have to sacrifice performance to get portability. This is the fastest removable-media technology available. The access time is just 20 ms. PLI alone includes TurboCache, a disk drive accelerator program that can speed up your other drives, too. TurboCache uses system memory to create a cache, boosting data access time by up to 50% with many applications.

A Solid Price-Performance Value
It's affordable — both the drive and the cartridges are much less expensive than optical drives and cartridges. Additional 88MB cartridges cost less than $2 a megabyte.

PLI is one of the oldest manufacturers of hard disk systems for the Macintosh. We have been making innovative, highly-rated storage solutions since 1985. When SyQuest was ready with a removable-cartridge drive, PLI was ready to deliver it to you — right from the start. Through our experience, we have learned to make the most reliable SyQuest-mechanism drive you can buy. You can extend the 2-year warranty to five years.

PLI offers a full family of SCSI storage devices for the Macintosh, including the Infinity 40 Turbo drive, DAT drives, optical drives and jukeboxes, floppy drives, and fixed hard drives in capacities ranging from 40MB to 1.2GB.

Don't miss this chance to get started with the best. Call PLI today.

The most trusted name in removable hard drive technology.

Peripheral Land Incorporated
47421 Bayside Parkway, Fremont CA 94538
800-285-8754 or FAX 415-583-9713

PLI
Everyone agrees that the Typist™ is the best thing that ever happened to hand scanners. The ability to read words and numbers easily and accurately really makes a difference when you’re pressed for time. Or like most people you simply hate to type.

With the Typist you can scan almost any document just like you were typing it yourself: into just about any PC compatible or Macintosh® word processor, spreadsheet or database.

It’s not surprising then that the Typist has so quickly become the hand scanner of choice when it comes to OCR. The clear standard.

So you might say that the writing was already on the wall, and it was only a matter of time before the Typist allowed you to scan and edit graphics as well.

That’s why Caere® Corporation created the Typist Plus Graphics ™, the hand scanner that adds yet another dimension by allowing you to scan and enhance photos, artwork and illustrations with incredible ease and accuracy.

The Typist Plus Graphics lets you put your best image forward because of a major innovation called the Graphic Editor™, which creates full tone images – 256 shades of gray – in software. You can display grayscale images up to the full capacity of your screen; modify and edit in either grayscale mode for photographs, or black and white mode for line drawings; and later output in picture perfect form.

In fact, when it comes to printed output, the Typist Plus includes LaserGray™, yet another proprietary technology from Caere. So you can print half-tones that look just like grayscale images. The photos that
you modify on-screen have a crisp, sharper look and feel. A professional touch.

Just think of what the addition of picture perfect graphics can mean for your business or profession.

Use the Typist Plus Graphics to capture photos that you can incorporate into your most critical business presentations or reports. Scan company logos and place directly onto your stationary, invoices or slide presentations. You can add graphics to all of your Macintosh desktop published documents, including training manuals, newsletters – even invitations to company events.

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HIGH-QUALITY LOW-COST
Personal Printers

Now you can have LaserWriter output on an ImageWriter budget. If you don’t need Adobe’s PostScript page-description language, one of these seven personal printers will sharpen your text—and your image.

Looks like it’s time to retire your ImageWriter. Sure, it’s been a valued—if noisy—friend, but time has passed it by. Personal printing—one Mac, one printer—has undergone a renaissance in quality, availability, and pricing. Fueled by the introduction of
the affordable Macs, seven personal printers have appeared, offering high-quality printing for less than the cost of a Mac Classic.

MacUser Labs took its first peek at Apple’s two new personal printers — the StyleWriter, a modernistic, compact inkjet printer; and the Personal LaserWriter LS, Apple’s least expensive laser printer — in May ’91 (see “Personal Best: Two New Apple Printers,” page 90). This month we compare them with five other personal printers. Three — the Hewlett-Packard DeskWriter and two portables, the GCC WriteMove and the Kodak Diconix M150 Plus — are inkjet printers. Rounding out the pack are two laser printers from
The three laser printers can produce 300 dpi (dots per inch). That output is as good as that of laser printers costing ten times as much as the GCC PLP II. Of course, more-expensive printers are much faster — and almost all have the graphic-image-quality advantages of Adobe’s PostScript page-description language — but only the best-trained eye can tell the difference between simple text printed by a personal laser printer and that printed by a high-end PostScript printer.

Among the inkjets, the Apple StyleWriter prints at 360 dpi — a higher resolution than most laser printers produce. The Hewlett-Packard DeskWriter prints at 300 dpi, and the portable GCC WriteMove and Kodak Diconix M150 Plus print at 192 dpi. The GCC WriteMove is nearly identical in appearance to the Kodak Diconix, but it has better driver software and built-in hardware compression to improve printing speed. GCC has reduced the WriteMove’s price to $399, whereas Kodak asks a steep $549 for the Diconix.

Absent from the new wave of high-quality low-cost personal printers are printers that use dot-matrix technology. Dot-matrix printers — such as the venerable ImageWriter II — leave a lot to be desired in print quality, speed, and noise level. Also, Apple’s $399 StyleWriter costs only $4 more than the aging ImageWriter II. All seven printers in our review produce high-quality output; are faster; and are much quieter to live with than any dot-matrix printer, with its construction-grade noise. However, don’t relegiate the dot-matrix dinosaur to total extinction — using its impact-printing technology is still the only way you can print multicopy forms such as invoices and sales receipts.

In addition to speed, image quality, and ease of use, we tested each of these printers for compatibility with System 7’s font technology, TrueType. TrueType renders smooth fonts at any size and resolution, both on-screen and on the printed page. The two Apple printers ship with TrueType software and fonts, and the other printer manufacturers have updated their software to be fully compatible with TrueType. Because System 7 — and TrueType — wasn’t shipping when we started our testing, we tested printing speed with ATM (Adobe Type Manager), Adobe’s font-scaling technology, which is similar in function to TrueType.

QuickDraw Versus PostScript

There are two types of Mac printers: PostScript printers — and PostScript-compatibles — and all the rest. PostScript printers are smart in that they contain a microprocessor and a hardware/software combination called an interpreter, which processes images for printing. Printers without this interpreter — or without an interpreter based on one of the PostScript clones — are dumb. Most of them have no microprocessor, and all of them must rely on the Mac’s microprocessor and...
Quick Drawbacks, Slow Solutions

One argument against buying a QuickDraw printer is lack of speed — printing with QuickDraw printers can take many times as long as with PostScript printers. Another knock is that the text and image quality of PostScript is lacking. There are, however, workarounds and solutions to both of these complaints.

A QuickDraw printer relies on the Mac to which it's connected to prepare a document for printing. If you have a low-end Mac such as a Classic, it can take a long time to print simple things and an amazingly long time to print a complex document. But the amount of time spent printing may not be as important to you as the amount of time your Mac is tied up figuring out how to print the page and is unavailable to do any other work. Third-party print-spooler software lets you use your Mac while it's processing a page in the background.

This lets you regain control of your Mac for other work. Because the spooler interleaves these tasks, the total print time actually increases. You may also experience jerky reactions of the mouse or keyboard.

Some of the printers we tested came with spoolers: Apple's Personal LaserWriter LS works with the Apple PrintMonitor to do background printing, and the GCC WriteMove comes with QuickSpool II. None of the other printer packages include spoolers, but all except the GCC PLP printers supposedly work with third-party spoolers. The PLP II and the PLP IIIS use a SCSI interface, which prevents spooling.

The other reason that some people balk at using QuickDraw printers is that they don't have PostScript built in, which can be a real drawback. You can't print from Adobe Illustrator to a QuickDraw printer, for example, and the rich graphics power of PostScript can't be used. You also can't print rotated text or text on a path — routine PostScript effects. But thanks to ATM and TrueType, text can look as good as they're printed by any PostScript printer. The GCC PLP printers have optional PostScript hardware upgrades, but they're expensive.

Fortunately, PostScript functionality can be emulated in a software program, such as CAI's Freedom of Press ($498; Freedom of Press Light, $99), OMS' UltraScript ($195; UltraScript Plus, $495), or TeleTypesetting's T-Script ($145). CAI, 900 Technology Park Drive, Building 8, Billerica, MA 01821; (508) 667-6895. OMS, P.O. Box 58101, Santa Clara, CA 95052; (800) 635-3997. TeleTypesetting, 474 Commonwealth Avenue, Boston, MA 02215; (617) 734-9700.

If you buy a PostScript-emulator program, it will reside on your hard disk. When you print, the emulator takes PostScript instructions from the printer and translates them into instructions the printer can understand. The emulator performs the same functions as do the microprocessor and code in any PostScript printer. This adds some processing time to the print job, so you'll find that your documents print more slowly than they would without an emulator. For the price, however, PostScript-emulation software is an ideal way to get PostScript abilities for a fraction of the PostScript-hardware cost.

its internal QuickDraw graphics language to perform the image processing. Because of this reliance on the Mac's graphics language, non-PostScript printers are often referred to as QuickDraw printers — a misleading term, because there's no QuickDraw in these printers. Although QuickDraw printer may be a misnomer, it's a convenient and widespread one: All the personal printers we tested for this report are often referred to as QuickDraw printers.

Every Mac PostScript printer has a LocalTalk connection. Conversely, most QuickDraw printers don't have this expensive connection — because the host Mac does all the work, it doesn't make sense to put QuickDraw printers on a network. These printers don't let you regain control of your Mac quickly, and their performance is so slow that they're impractical to share. Only the Hewlett-Packard DeskWriter can be networked, because it can use LocalTalk or serial connections. The other printers connect to your Mac through the serial port or via SCSI.

A QuickDraw printer costs much less than a PostScript printer. Most PostScript printers are priced around $5,000, but $10,000 workhorses are not uncommon. GCC recently announced a 300-dpi bargain PostScript printer — the BLP Elite — for $1,599 and other companies such as Abaton and Software and Hardware That Fits are also offering PostScript printers for less than $2,000, but these units are expensive compared with the $500 street price of a 300-dpi HP DeskWriter.

The two GCC laser printers — the PLP II and the PLP IIIS — can be upgraded to PostScript models. The PLP II can be upgraded with a board swap for the difference in cost to the BLP Elite or, for a little more money, to the BLP II. The PLP IIIS can also be upgraded to the PostScript BLP IIIS. This is an option if your personal Mac is pressed into duty in a network of two or more Macs or if you need PostScript graphics capabilities. The other QuickDraw printers can use inexpensive third-party PostScript-emulation software packages that run on the Mac (see the "Quick Drawbacks, Slow Solutions" sidebar).

Setting Up

Besides being easy on your wallet, personal QuickDraw printers are also easy to set up: Should you stumble, the manuals can help you. The Kodak Diconix, for example, comes with an especially useful instruction sheet — called Quick Card — in the front of the manual. It has detailed illustrations for each step, so you probably won't need to read further. The GCC WriteMove's manual isn't as thorough as the Diconix's, but setup is equally easy. The HP DeskWriter is also very easy to set up.

The StyleWriter, on the other hand, has several latches and foldout parts that make setup confusing (see Figure 1). Although the flipping, sliding, and folding can be fun — it's kind of like playing with a "transformer" toy — you can't be quite sure if everything is in place. It's possible to install the ink cartridge improperly, for example, which results in a paper jam or a dialog box telling you that the printer is out of paper while you're printing. Simply removing and reinstalling the ink cartridge fixes this problem.

For the laser printers, the toughest
How It Works: Inkjet and Laser Engines

The QuickDraw printers in this report use two types of printing technologies: inkjet or laser. Laser output is generally of higher quality than inkjet output, even in cases where an inkjet has higher resolution. Ink tends to spread on paper, and if a page contains large areas of solid black, the paper can get wet during printing. Laser printers use small particles of toner that produce finer text and rich black graphics.

1. An electric heating element behind the nozzle opening is activated, and it heats up.
2. The ink in front of the heating element begins to vaporize and expand.
3. The ink vaporization increases the pressure in the nozzle, forcing the ink to shoot onto the paper.

The four inkjet printers in this report — the Apple StyleWriter, GCC WriteMove, Hewlett-Packard DeskWriter, and Kodak Diconix M150 Plus — use heat to vaporize ink onto a page. The ink and print head are integrated into a disposable cartridge that has many inkjet nozzles.
The three laser printers — the Apple Personal LaserWriter LS, GCC PLP II, and GCC PLP IIIS — use tiny black-plastic toner particles to create images on a page. There are four essential elements in a laser engine: a photosensitive drum, a light beam from either a single laser or an array of LEDs, toner, and a fuser.
Personal Printers

setup is installing the consumables — the toner, the drum, and the fuser. It’s easy to change the Personal LaserWriter LS’ single toner/drum unit, but the same can’t be said for the GCC PLPs, whose two-part toner-and-drum set requires more installation steps. All the inkjets have fairly simple setup. The WriteMove and the Diconix cartridges, however, require priming, which can leave ink all over your hands if you’re too vigorous.

Ink and toner refills or replacements start at $8, depending on the printer type and how much ink or toner coverage your average page requires. Don’t let these numbers fool you, however — the cost per page (see Figure 2 and Tables 1 and 2) is what you really need to check.

Although initially it may seem that consumables for laser printers are more expensive than those for inkjet printers — the GCC PLP toner refills cost $33, and the drum replacements are $289, for example — using a laser printer actually costs less per page, because each toner cartridge lasts for thousands of pages. Inkjet-cartridge replacements have less intimidating prices, but they don’t last as long, so you’ll change cartridges more often and pay more per page.

You may also be concerned about the amount of plastic these cartridges are adding to your local landfill. Inkjet cartridges, although small and unobtrusive, have to be replaced more frequently than do the larger laser-printer cartridges. Inkjet cartridges are not reusable, unlike the Apple Personal LaserWriter LS cartridge, which can be refilled. The GCC PLP cartridge isn’t environmentally sound: It can’t be refilled. Laser or inkjet, both will eventually make you throw away roughly the same amount of plastic (unless you refill your LaserWriter LS cartridge repeatedly).

Figure 3: The clever design of the GCC WriteMove and the Kodak Diconix M150 Plus printers makes them truly portable: Their rechargeable batteries are in the platen, so no space is wasted.

After you unpack your new personal printer and fill it with ink or toner, the next consideration is where to put it on your desk. The Diconix and WriteMove are truly portables: Each is about the size of an average hardback dictionary, weighs about three pounds, and can operate on batteries that fit inside the platen — the drum around which the paper rolls (see Figure 3). The batteries can even be left in the platen to recharge as you work.

The size of the StyleWriter makes it almost portable, but it requires an AC outlet. Its footprint is actually smaller than that of the Diconix or the WriteMove, because it stands upright, but its upright orientation also makes it somewhat awkward to transport. The rest of the printers have larger footprints and are meant to occupy significant desk space.

All the printers, except the GCC PLP II and PLP IIIS, use serial connections and connect to the Mac’s printer port or modem port. The GCC printers are SCSI devices, so you must pay attention to the standard caveats about SCSI ID and termination when you connect them. Neither GCC printer comes with a SCSI cable, so you have
Introducing the AddressWriter. The amazing new printer that takes the aggravation out of printing envelopes, postcards and labels.

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For more information or the dealer nearest you, call 800-4-COSTAR. For additional information by fax, 24 hours a day, call 800-388-4888.
Personal Printers

Figure 4: Personal-Printer Performance

<table>
<thead>
<tr>
<th>Personal LaserWriter LS</th>
<th>Hewlett-Packard DeskWriter</th>
<th>Apple StyleWriter</th>
<th>GCC WriteMove</th>
<th>Kodak Diconix M150 Plus</th>
</tr>
</thead>
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<td>200%</td>
<td>300%</td>
<td>400%</td>
<td>500%</td>
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</table>

Mac Iici: Overall Speed

<table>
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<tr>
<th>GCC PLP II</th>
<th>GCC PLP IIS</th>
<th>Apple Personal LaserWriter LS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better</td>
<td>Better</td>
<td>Better</td>
</tr>
</tbody>
</table>

Mac Iici: Text

<table>
<thead>
<tr>
<th>Apple Personal LaserWriter LS</th>
<th>Hewlett-Packard DeskWriter</th>
<th>Apple StyleWriter</th>
<th>GCC WriteMove</th>
<th>Kodak Diconix M150 Plus</th>
</tr>
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<tbody>
<tr>
<td>30%</td>
<td>20%</td>
<td>0%</td>
<td>10%</td>
<td>50%</td>
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</table>

The three inkjet printers offer a Draft mode that saves time and ink but produces less-than-ideal output. To obtain the highest-quality printed images, we tested all the inkjet printers in their Best mode.

Mac Iici: Overall Speed:

The three laser printers produced output faster than did any of the inkjet printers. The GCC PLP II’s 9-ppm engine helped it finish on top. The Hewlett-Packard DeskWriter has impressive speed for an inkjet printer—it nearly kept pace with the 4-ppm Apple Personal LaserWriter LS. Because of its slow performance on the page-layout test, the Apple StyleWriter tied its predecessor, the Apple ImageWriter II.

Figure 4: The speed of a personal printer—one without built-in PostScript intelligence—is determined by the speed of the Mac that’s driving it. To help these printers show their best performance, we connected each one to a Mac Iici. We printed a ten-page Word document, a complex MacDraw graphic, and a one-page PageMaker layout with text and graphic elements. We compared each unit’s printing times with that of the Apple ImageWriter II.

Because a low-cost printer is the perfect complement to a low-cost Mac, we also ran the ten-page Word-document test with each printer connected to a Mac Classic.

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Engine speed is the determining factor in how quickly a personal printer can produce a text document. The Apple Personal LaserWriter LS and the GCC PLP II have the same 4-ppm engine, but the LaserWriter LS uses compression to edge out the PLP II. The GCC WriteMove also uses data compression, which let it outpace the otherwise identical Kodak Diconix M150 Plus.

Although the two GCC laser printers continued to lead the pack, the Hewlett-Packard DeskWriter took less than a minute — slightly faster than the Apple Personal LaserWriter LS. Again, the Apple StyleWriter easily beat its venerable ancestor, the dot-matrix ImageWriter II.

This was the most processor-intensive test. The 360-dpi Apple StyleWriter was the clear loser because the Mac has to generate more dots — thus processing more data — than the 300-dpi laser printers, the 300-dpi Hewlett-Packard DeskWriter, or the 192-dpi inkjet printers.

Surprisingly, the Hewlett-Packard DeskWriter beat the other personal printers in this test — edging out the 8-ppm GCC PLP IIS.

Speed may not be as important as price or quality to a personal-printer shopper. Remember that the Mac model and the amount of RAM you're using influence a QuickDraw printer's performance — the more powerful the Mac or the larger the RAM, the faster the printing job. When you use a low-end Mac, processing time is a more limiting factor than it is on a faster Mac. The same is true for printing complex documents, because the Mac has to do more processing.

We used a ten-page Word document, a single-page QuickDraw graphic, and a single-page PageMaker file on a Mac IIci. The PageMaker test was the most processing-intensive — it consisted of gradient bars, fine lines, a gray-scale graphic, and text in various sizes. This was the document we used for judging text and image quality.

We also printed the ten-page Word file from a Mac Classic to gauge performance on a low-end Mac. From the Classic, the ten-page Word document took around 30 minutes to print on the
**Personal Printers**

**Figure 5: Image Quality**

<table>
<thead>
<tr>
<th>Printers</th>
<th>Quality relative to LaserWriter IINTX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple StyleWriter</td>
<td>Better</td>
</tr>
<tr>
<td>GCC PLP II</td>
<td>Better</td>
</tr>
<tr>
<td>Kodak Diconix M150 Plus</td>
<td>Better</td>
</tr>
<tr>
<td>LaserWriter IINTX</td>
<td>Worse</td>
</tr>
</tbody>
</table>

**Figure 5: Low-cost personal printers differ widely in the quality of the images they produce.** We assembled a panel of judges to evaluate the print quality of a complex PageMaker layout, using a test page printed by an Apple LaserWriter IINTX as the benchmark. The QuickDraw laser printers’ output matched the quality of the IINTX’s. The closest inkjet was the Apple StyleWriter — thanks to its 360-dpi resolution — with the Hewlett-Packard DeskWriter close behind. The output of the two 192-dpi portable inkjet printers was far from laser-quality, although it is superior to dot-matrix-quality output.

StyleWriter and on the WriteMove. It took close to 47 minutes on the Diconix (see Figure 4) — agonizingly slow performance. The HP DeskWriter, on the other hand, beat the other inkjet printers by at least a factor of 3 when printing from the Classic. Amazingly, it also outpaced all the laser printers, but only by a small margin.

When printing the Word document from the IICi, the StyleWriter’s speed improved, but the WriteMove and the Diconix remained intolerably slow.

The overall fastest printer with the Mac IICi was the GCC PLP II, which was roughly eight times faster than the Diconix. The PLP II came in second, and Apple’s Personal LaserWriter LS was a close overall third, although it edged past the PLP II in the test test. The DeskWriter threatened the laser printers’ overall dominance, beating the Personal LaserWriter LS in two out of the three tests.

On average, printing with the Apple StyleWriter took more than twice as long as with the DeskWriter. The PageMaker document showed the StyleWriter’s speed to molasses — it came in a dead last in that test. Its 360-dpi resolution is one reason why the StyleWriter is slow — your Mac must process a lot of dots per square inch.

The WriteMove and Diconix printers were slowest overall, but the WriteMove’s superior firmware — a special compression chip — and driver software gave it a clear advantage over the Diconix.

**Quick and Clean**

Our final test evaluated the image quality produced by each printer. A panel of judges scrutinized output in three areas: text quality, line resolution, and gray-scale clarity. We compared each printer’s version of the complex PageMaker document against that of an Apple LaserWriter IINTX, a fast network PostScript printer that has a Canon 8-ppm laser engine. For purposes of comparison, the LaserWriter IINTX output received a perfect score.

As expected, the three laser printers produced the highest overall image quality — they tied for first place (see Figure 5). The StyleWriter’s output quality was close behind that of the laser printers. At 360 dpi, its resolution is better than that of any of the laser printers, and only the slight spreading of its ink kept the images from being perfect. StyleWriter output can easily be mistaken for laser output. The DeskWriter’s 300-dpi output was
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significantly more grainy. Although the DeskWriter had impressive speed, the StyleWriter was the clear image-quality winner among the inkjet printers. At 192 dpi, the WriteMove and the Diconix were last in overall quality. However, they both produce much sharper, blacker output than does an Apple ImageWriter II or, for that matter, any other dot-matrix printer.

Keep in mind that the kind of paper you use can affect output quality, especially with inkjet printers. Textured paper lets the ink bleed into its fibers, causing blurry edges on text and images. Pages with heavy ink coverage can also curl slightly because of moisture. Special inkjet paper or high-quality bond paper can minimize such effects (see Figure 6).

A Personal Decision
If you’re thinking about buying a personal printer, now there’s a wide selection from which to choose.

The personal-printing renaissance is led by some outstanding QuickDraw printers. Although we emphasized output quality and speed in our tests, you should also consider price—or portability, if you need a printer that can travel well. Use our picks as guidelines, and fit them to your needs. The GCC PLP II ($999 list, $999 street) and the GCC PLP IIS ($1,499 list, $1,350 street) are our overall favorites. They ranked first and second in the speed tests: The PLP IIIS has an 8 ppm engine, and the PLP II has a 4 ppm engine. If you print a lot, pick the PLP IIIS, but if you’re like most personal users, you’ll do fine if you settle for the less costly PLP II. Output from either one of the PLPs is as good as that from a LaserWriter INTX, and the PLP prices are much less intimidating. If you think you’ll eventually want a PostScript printer, both PLP printers have optional PostScript hardware upgrades. The SCSI interface is the only drawback to these printers. Unless you have an extra-long SCSI cable (no longer than 6 feet), either printer must sit right next to your Mac.

If you own a low-end Mac—a Plus, SE, or Classic—and you have a low-end budget to match, the Hewlett-Packard DeskWriter ($729 list, $500 street) is your best buy. The DeskWriter gives you the most speed for your dollar and good-quality output as well. The DeskWriter beats the rest of the inkjet printers in all the speed tests by at least a factor of 2 and surpassed the laser printers’ speed when printing from a Mac Classic. You can’t print graphics that have many dark areas, however, or the paper may get some wet, but that drawback applies to all inkjet printers.

The Apple Personal LaserWriter LS ($1,299 list, $949 street) is a nice printer, but it was beaten solidly by both the PLPs in the speed tests. The Apple StyleWriter ($999 list, $425 street) was too slow to get a solid recommendation, although it produces the closest thing to laser-quality output without costing you the extra money for a laser printer.

The GCC WriteMove ($399 list, $359 street) is the printer for anyone who needs portability, but we can’t recommend it otherwise. Its output is fine for drafts but is barely acceptable for final output. It’s also extremely slow. The WriteMove’s superior driver software and included print spooler give it a significant edge over its twin, the Kodak Diconix ($549 list, $369 street).

Figure 6: Paper Concerns

Apple StyleWriter
Apple Personal LaserWriter LS

smooth paper
porous paper
smooth paper
porous paper

Figure 6: The quality of your output depends heavily on the quality and type of paper you use. Laser printers require smooth paper, but inkjet printers need more-porous paper. Overly porous paper lets the ink spread, though. Don’t use special laser-printer paper in an inkjet printer, or the ink will run.

Whether you thirst for speed, crave quality, demand portability, or just want a quiet, inexpensive output device, there’s a printer for you. Dot-matrix printers still have a place for printing low-cost color and multipart forms, but for everyday use, personal inkjet and laser printers are the wave of the present.

Jackie Taylor is a San Francisco Bay Area author who tries to output her own personal renaissance.

Our three top low-cost personal-printer picks: the Hewlett-Packard DeskWriter (top), the GCC PLP II (center), and the GCC PLP IIS (bottom).
THE PRIVATE LIFE OF FRED B. DULL.

Laura Lovely, up and coming starlet, is seen on the arm of Fred B. Dull at the Peacock Hilton in Las Vegas. Dull, the entrepreneurial paper clip king, flew in on his private Concorde with a 45-carat diamond ring for his birthday girl.

Winner at Le Mans, Fred B. Dull, known as a man who loves to live on the edge, receives yet another trophy to add to his collection. Purportedly bored by constant victory, Dull plans to take a year off by circumnavigating the globe in his 116-foot yacht, "The Dinghy."

Fred B. Dull scores again. Finding life too serene on his 150,000-acre Texas ranch last week, Dull imported the entire Argentine polo team for an afternoon of play. Dull reportedly found the day to be fairly amusing.

Fred B. Dull flips his cigarette butt, "Le Cool," into a double corncob somersault on Lake Washington and comes up smiling, going on to win his heat and the grand trophy: "This baby is really built," says Dull, as he quaffs Dom Perignon in the winner’s circle.

How to improve your personal image.

Introducing the new TurboPS Personal Series laser printers.

Take it from Fred B. Dull. With NewGen™ TurboPS Personal Series printers, your documents will look amazingly crisp, clean and professional.

With our new line of personal PostScript®-compatible printers, you can greatly enhance images beyond your wildest imagination. The TurboPS400p™ (400 dpi) and the TurboPS300p™ (300 dpi), both offer the convenience and compactness of a personal printer. And proprietary features the competition can't touch.

Like Image Enhancement Technology (IET), standard on the TurboPS400p, to smooth characters, lines and curves. And Automatic Recognition Technology (ART)™ that smartly selects interfaces and emulations without operator intervention.

A second paper tray, memory cards, SCSI interface and other I/O expansions are among the options when you're ready to upgrade.

All this at a surprisingly low price.

To learn more, or for your nearest Authorized Dealer, contact NewGen today. The NewGen TurboPS Personal Series laser printers. If they can do this much for Fred B. Dull, just think what they can do for you.

Come see us at MacWorld Boston Booth #200, Bayside Expo

Dealer inquiries welcome.

End users please circle 56 on reader service card.

NewGen Systems Corporation

California Sales Office:
17580 Newhope Street, Fountain Valley, CA 92708
Telephone (714) 436-5100 FAX (714) 641-2800

Minnesota Sales Office:
Telephone (612) 942-5665 FAX (612) 942-5923
Toll Free 1-(800)-879-4639

Dealers please circle 54 on reader service card.


End users please circle 56 on reader service card.
## Personal Printers

**Table 1: Features of Low-Cost Inkjet Printers**

<table>
<thead>
<tr>
<th></th>
<th>Apple StyleWriter</th>
<th>GCC WriteMove</th>
<th>Hewlett-Packard DeskWriter</th>
<th>Kodak Diconix M150 Plus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$599</td>
<td>$399</td>
<td>$720</td>
<td>$849</td>
</tr>
<tr>
<td><strong>Street price</strong></td>
<td>$425</td>
<td>$359</td>
<td>$500</td>
<td>$369</td>
</tr>
<tr>
<td></td>
<td>Inexpensive.</td>
<td></td>
<td>Networkable. Low street price.</td>
<td>Powered by batteries or AC.</td>
</tr>
<tr>
<td></td>
<td>Compact design.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limited printable area.</td>
<td></td>
<td>Limited printable area.</td>
</tr>
<tr>
<td><strong>Specifications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine type</td>
<td>Canon BJ 10E, Inkjet</td>
<td>Diconix 150S, Inkjet</td>
<td>Hewlett-Packard, Inkjet</td>
<td>Diconix 150S, Inkjet</td>
</tr>
<tr>
<td>Engine speed (pages per min.)</td>
<td>.5 ppm; 1 ppm Draft mode</td>
<td>less than .5 ppm</td>
<td>.5 ppm; 2 ppm Draft mode</td>
<td>less than .5 ppm</td>
</tr>
<tr>
<td>Memory (RAM)</td>
<td>64K</td>
<td>none</td>
<td>16K</td>
<td>none</td>
</tr>
<tr>
<td>Monthly duty cycle (pages)</td>
<td>600</td>
<td>not available</td>
<td>600</td>
<td>not available</td>
</tr>
<tr>
<td>Engine life (pages)</td>
<td>not available</td>
<td>not available</td>
<td>60,000</td>
<td>not available</td>
</tr>
<tr>
<td>Resolution</td>
<td>360 dpi</td>
<td>192 dpi</td>
<td>300 dpi</td>
<td>192 dpi</td>
</tr>
<tr>
<td>Network support</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>PostScript upgrade</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outline fonts</td>
<td>13, TrueType</td>
<td>5, Bitstream</td>
<td>13, Agfa Compugraphic</td>
<td>13, Adobe</td>
</tr>
<tr>
<td>Additional software</td>
<td>TrueType</td>
<td>QuickEnvelope</td>
<td>none</td>
<td>ATM</td>
</tr>
<tr>
<td>Print spooler</td>
<td>third-party</td>
<td>QuickSpool II</td>
<td>third-party</td>
<td>third-party</td>
</tr>
<tr>
<td><strong>Paper handling</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper output (image up, down)</td>
<td>up, down</td>
<td>up</td>
<td>up</td>
<td>up, down</td>
</tr>
<tr>
<td>Paper stock min./max.</td>
<td>16/28 lb</td>
<td>16/34 lb</td>
<td>16/24 lb</td>
<td>16/34 lb</td>
</tr>
<tr>
<td>No. of trays, page capacity</td>
<td>1, 50</td>
<td>NA*</td>
<td>1, 100</td>
<td>NA*</td>
</tr>
<tr>
<td>Envelope tray (capacity, price)</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Other options</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td><strong>Supplies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inkjet cartridge</td>
<td>$22.95/500</td>
<td>$8/100*</td>
<td>$19.95/400</td>
<td>$13.95/100*</td>
</tr>
<tr>
<td>Cost per page</td>
<td>4¢</td>
<td>8¢</td>
<td>5¢</td>
<td>14¢</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H, in.)</td>
<td>13 x 6 x 9</td>
<td>11 x 7 x 2</td>
<td>17 x 15 x 8</td>
<td>11 x 7 x 2</td>
</tr>
<tr>
<td>Weight</td>
<td>6 lb</td>
<td>3 lb</td>
<td>14.3 lb</td>
<td>3 lb</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><strong>Company</strong></td>
<td>Apple Computer, Inc.</td>
<td>GCC Technologies, Inc.</td>
<td>Hewlett-Packard</td>
<td>Eastman Kodak Co.</td>
</tr>
<tr>
<td></td>
<td>20525 Mariani Ave.</td>
<td>580 Winter St.</td>
<td>19310 Pruneridge Ave.</td>
<td>901 Elmgrove Rd.</td>
</tr>
<tr>
<td></td>
<td>Cupertino, CA 95014</td>
<td>Waltham, MA 02154</td>
<td>Cupertino, CA 95014</td>
<td>Rochester, NY 14653</td>
</tr>
<tr>
<td></td>
<td>(800) 976-2333</td>
<td>(800) 422-7777</td>
<td>(800) 752-0600</td>
<td>(800) 255-3434</td>
</tr>
</tbody>
</table>

*Paper is fed either manually (single sheets) or in continuous, tractor-fed form.

*The inkjet cartridge lasts for 500 prints in Draft mode.*
When you're waiting to print, you and your Mac can put in some heavy downtime. Especially if you share a printer. But here's a wait loss program that really works.

SuperLaserSpool™ gives you your Mac back in seconds and handles all the printing in the background.

Along with processing documents, sending them to the printer and downloading fonts, SuperLaserSpool gives you extra control with the exclusive LaserQueue™ desk accessory. You can preview documents. Change the order they print in. Reroute them to other printers. Or delete them altogether. It even tells you when documents are finished printing.

SuperLaserSpool works with virtually all Macintosh applications and stand-alone or networked ImageWriter™, LaserWriter™, HP DeskWriter™ and PostScript-compatible printers using standard Apple drivers. All you do is load it and forget it.

Order SuperLaserSpool now, and—for a limited time—get a free copy of File Director™, the ultimate file management program valued at $129. Just call the toll-free number below. And prepare to lose some wait.

1-800-873-4384 EXT. 145

Fifth Generation Systems, Inc. 10049 N. Reiger Road Baton Rouge LA 70809 Technical Support: (504) 291-7283

Please circle 102 on reader service card.
### Table 2: Features of Low-Cost Laser Printers

<table>
<thead>
<tr>
<th></th>
<th>Apple Personal LaserWriter LS</th>
<th>GCC PLP II</th>
<th>GCC PLP IIS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$1,299</td>
<td>$999</td>
<td>$1,499</td>
</tr>
<tr>
<td><strong>Street price</strong></td>
<td>$949</td>
<td>$699</td>
<td>$1,350</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>Expensive. Slow.</td>
<td>Expensive.</td>
<td>Expensive.</td>
</tr>
<tr>
<td><strong>Specifications</strong></td>
<td>Canon LBP-LX, laser</td>
<td>Oki OL-400, LED</td>
<td>Oki OL-800, LED</td>
</tr>
<tr>
<td><strong>Engine speed</strong></td>
<td>4 ppm</td>
<td>4 ppm</td>
<td>8 ppm</td>
</tr>
<tr>
<td><strong>Memory (RAM)</strong></td>
<td>512K</td>
<td>none; optional 1 MB, $139</td>
<td>1 MB</td>
</tr>
<tr>
<td><strong>Monthly duty cycle</strong></td>
<td>2,500</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td><strong>Engine life</strong></td>
<td>150,000</td>
<td>180,000</td>
<td>300,000</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td>serial</td>
<td>SCSI</td>
<td>SCSI</td>
</tr>
<tr>
<td><strong>Network support</strong></td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td><strong>PostScript upgrade</strong></td>
<td>no</td>
<td>upgrade to BLP Elite, $799; upgrade to BLP II, $1,399</td>
<td>upgrade to BLP IIS, $1,399</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>13, TrueType</td>
<td>5, Bitstream</td>
<td>11, Bitstream</td>
</tr>
<tr>
<td><strong>Outline fonts</strong></td>
<td>TrueType</td>
<td>QuickEnvelope, GCC Print Manager</td>
<td>QuickEnvelope, GCC Print Manager</td>
</tr>
<tr>
<td><strong>Print spooler</strong></td>
<td>Apple PrintMonitor</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td><strong>Paper handling</strong></td>
<td>up, down</td>
<td>up, down</td>
<td>up, down</td>
</tr>
<tr>
<td><strong>Paper stock min/max</strong></td>
<td>16/28 lb</td>
<td>16/34 lb</td>
<td>16/34 lb</td>
</tr>
<tr>
<td><strong>Paper sizes</strong></td>
<td>letter, legal, A4, B5</td>
<td>letter, legal, A4, B5, memo</td>
<td>letter, legal, A4, B5, memo</td>
</tr>
<tr>
<td><strong>No. of trays, page capacity</strong></td>
<td>1, 60</td>
<td>1, 200</td>
<td>1, 200</td>
</tr>
<tr>
<td><strong>Envelope tray (capacity, price)</strong></td>
<td>15, $79*</td>
<td>50, $69</td>
<td>50, $69</td>
</tr>
<tr>
<td><strong>Other options</strong></td>
<td>250-sheet lower tray, $199†</td>
<td>legal, A4, B5 trays, $59</td>
<td>legal, A4, B5 trays, $59</td>
</tr>
<tr>
<td><strong>Supplies</strong></td>
<td>OPC (drum)/copies: NA</td>
<td>$289/15,000</td>
<td>$289/15,000</td>
</tr>
<tr>
<td></td>
<td>Toner/copies: $99/5,500</td>
<td>$332/500</td>
<td>$332/500</td>
</tr>
<tr>
<td></td>
<td>Cost per page: 3¢</td>
<td>3¢</td>
<td>3¢</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>15 x 18 x 8</td>
<td>18 x 24 x 5</td>
<td>18 x 24 x 5</td>
</tr>
<tr>
<td></td>
<td>31 lb</td>
<td>24 lb</td>
<td>24 lb</td>
</tr>
<tr>
<td></td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td><strong>Company</strong></td>
<td>Apple Computer, Inc.</td>
<td>GCC Technologies, Inc.</td>
<td>GCC Technologies, Inc.</td>
</tr>
<tr>
<td></td>
<td>20525 Mariani Ave.</td>
<td>580 Winter St.</td>
<td>580 Winter St.</td>
</tr>
<tr>
<td></td>
<td>Cupertino, CA 95014</td>
<td>Waltham, MA 02154</td>
<td>Waltham, MA 02154</td>
</tr>
<tr>
<td></td>
<td>(650) 976-2333</td>
<td>(617) 890-0880</td>
<td>(617) 890-0880</td>
</tr>
</tbody>
</table>

*Sheet feeder ($120) required for envelope-tray operation.

Price includes required sheet feeder ($120) and letter-sized paper tray ($79).

### Table 1 and 2 Criteria

- **List/Street price** — The list price is the manufacturer's suggested retail price. The street price is the average price charged by dealers around the U.S. in May 1991.
- **Engine, type** — The name and type of the mechanism.
- **Memory (RAM)** — The amount of on-board memory.
- **Monthly duty cycle (pages)** — The manufacturer's recommended maximum number of pages per month.
- **Engine life (pages)** — The rated life of the printer engine in pages.
- **Resolution** — The resolution in dots per inch of the printer engine.
- **Interface (standard/optional)** — The type of connection between the printer and the Mac.
- **Network support** — Is the printer networkable?
- **PostScript upgrade** — Can the printer be upgraded to PostScript?
- **Outline fonts** — The number and type of outline fonts shipped with the printer.
- **Additional software** — A list of bundled software.
- **Print spooler** — Software that puts printing into the background, freeing the Mac for other uses.
- **Paper output (image up, down)** — The orientation of the paper output.
- **Paper stock min./max.** — The range of paper stock (measured in pounds) that the printer can handle.
- **Paper sizes** — A list of paper sizes the printer can print.
- **No. of trays, page capacity** — The number of paper trays and how many sheets of paper they can hold.
- **Envelope tray (capacity, price)** — How many envelopes the tray, if there is one, can hold and its cost.
- **OPC (drum)/copies** — The cost and life of replacement OPCs for inkjet-based engines.
- **Inkjet cartridge** — The cost and life of replacement inkjet cartridges for inkjet engines.
- **Toner/copies** — The cost and life of replacement toner cartridges for toner-based engines.
- **Cost per page** — Average cost of a single letter-sized print, factoring the cost of consumables.
If you're in search of a laser printer that's fast, flexible & compatible in all environments – you've just found it.

TrueLaser has superior Power.

The TrueLaser printer is powered by the powerful AMD 29000 32-bit RISC processor. This allows TrueLaser to process information faster than any other printer on the market, substantially reducing the waiting time for printout. The processor is five times faster than the 6820 found in most PostScript® printers and ten times faster than the 68000 found in PCL or other PDL printers.

TrueLaser = TrueType.

The TrueLaser printer is the first printer to come bundled with 35 resident TrueType fonts, Apple's new font standard. TrueLaser will work with every member of your Adobe font library and beautifully publishes PostScript Type 1 and Type 3 fonts. It is also ready and waiting for both Windows 3.1 and Macintosh System 7.0.

TrueLaser is versatile.

The TrueLaser printer prints documents from Macintosh, IBM PC, and PS/2 machines via AppleTalk, Centronics, and RS-232C interfaces. And because of TrueLaser's unique built-in automatic switching capability, the entire process is transparent and invisible. Obviously it's perfect as a stand-alone printer or as part of a shared network resource.

TrueLaser is also the first printer to incorporate PostScript, Microsoft's TrueImage, and HP PCL compatibility. Simply put, TrueLaser will meet all of your needs for today - and for years to come. Today's investment will pay tomorrow's dividend.

TrueLaser is reliable and only $2695.

Every TrueLaser printer comes with a 1 year warranty including a six month on-site service program.

Call 1-800-654-4160 or 213-321-2121 in California for the name of the Microtek dealer nearest you. Then go buy the only printer that lets you join the future without leaving the past.
"I've been in this business for six years, and I've NEVER been this excited about printers!

PostScript Level 2 is the next generation of Adobe's page description language. The new release contains a number of significant performance, function, and print quality enhancements. It's compatible with all current applications which support the PostScript language.

Best of all, the time-saving features of PostScript Level 2 are available RIGHT NOW in our RealTech Laser and RealTech Laser 400:

- IMPROVED MEMORY MANAGEMENT. One pool of memory (RAM and hard drive) is available for all resource needs. Dynamically allocated and automatically reclaimed; no arbitrary memory restrictions exist. Disk space management is improved to eliminate fragmentation and improve transfers of information from the hard disk to RAM.
- ATM FONT RENDERING TECHNOLOGY. Raw characters are built 4 to 5 times faster.

Features available through software applications:

- COMPRESSION. Reduce transmission time and save disk space by sending compressed files directly to your printer.
- FORMS SUPPORT. You can define a base form whose representation stays cached in the printer. Then only the information that changes between forms needs to be interpreted.
- COMPOSITE FONTS. Provides the capability to handle very large character sets and non-horizontal writing modes.

• RISC processor
• 9 pages/minute
• 500% faster*

Versatile, with PC compatibility; its 3 interface ports can be used at the same time. Includes AppleTalk® RS-422, IBM PC parallel, and RS-232-C serial interface ports (can be assigned either PostScript® or LaserJet II commands). Auto switches between interfaces, and spools files on a real-time basis. A Hewlett-Packard LaserJet Series II emulation allows use with non-PostScript® applications software.

2 Mb RAM, upgradable to 10 Mb! The only printer of its kind with this much RAM and hard disk expansion capability. Includes a SCSI port for a hard disk. The RealTech Laser includes 35 resident PostScript® typefaces. Compact design (only 33.5 lbs.; measures 13.4"W x 14.2"D x 10.9"H).

Adobe® and PostScript® are registered trademarks of Adobe Systems Incorporated.
At last...a 400 dpi 11x17 laser printer.

- RISC processor*
- 8 ppm (11x17)
- 16 ppm (letter)
- Choice of 300 or 400 dpi

4 Mb RAM, upgradable to 16 Mb!
Includes a SCSI port for a hard disk. The RT Laser 400 includes 35 resident PostScript® typefaces. Compact design (measures 20.25"W x 16"D x 11.75"H; weighs 80.5 lbs). Comes with two trays and manual feed as standard features (optional bypass feeder available). PLUS, you can specify 300 or 400 dpi printing! Call for other technical specifications.

* The RealTech Laser 400 and RealTech Laser use a RISC-based controller (Reduced Instruction Set Computing). RISC is the new generation of processors for speed and performance.

TRADE-INS ACCEPTED!

YES, we take trade-ins on all Apple LaserWriters:
- LaserWriter...
- $400 trade-in value
- LaserWriter Plus...
- $600 trade-in value
- LaserWriter SC...
- $400 trade-in value
- LaserWriter IINT...
- $1000 trade-in value
- LaserWriter IINTX...
- $1350 trade-in value

Trade-in value depends on the number of pages on the engine and on any problems found with the unit. Unit must be able to run a self-test. Call for more information.

“I PERSONALLY GUARANTEE the RealTech Laser (or any RealTech product). Try it for 30 days. If you’re not absolutely satisfied, give me a call. I’ll gladly refund the purchase price (minus the cost of consumables)...and I’ll even pay the return shipping costs.”

6 REASONS TO ORDER FROM US (besides saving money!)
1. 30-day money back guarantee on all hardware (except for special-order items). No ifs, ands or buts!
2. Toll-free tech support when you need advice or want to order.
3. Pay when shipped... We charge your credit card only when your order is shipped - not when you place the order.
4. Overnight delivery when you need it.
5. Business leasing available.
6. Installation & training anywhere in the U.S.

1-800-972-3018
PREMIUM BRAND-NAME PRODUCTS AND THE AFFORDABLE OPTION:

We only sell names you can trust: RasterOps, Microtek, Texas Instruments, Seiko, Sharp, Ikegami, and others. And now there's RealTech" (our "house brand")... premium quality hardware at affordable prices.

WE GUARANTEE you'll be pleased with the power, performance, and competitive price of our RealTech products, which are:
- Priced 40-60% LESS than the comparable Apple product.
- Backed by a ONE-YEAR WARRANTY with an optional two-year add-on.
- Backed by our famous money-back guarantee and return shipping policy. If you're not satisfied with any RealTech product, call us. We'll refund your purchase price (minus consumables)...and we'll even pay the return shipping costs.

Guaranteed: If you don't like it...
$995
21" Display

RealTech Dual Page 21" Display
No more squinting and scrolling! Seeing two pages at once will save you hours of time. The latest in flicker-free monochrome technology provides true WYSIWYG! 21" landscape display with 1152 x 870 resolution, 74 dpi. Vertical refresh rate of 75 Hz, full grayscale capability, and flat CRT (P4 phosphorus, polished screen). One year warranty.

<table>
<thead>
<tr>
<th>CPU</th>
<th>Monitor</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac SE, SE30</td>
<td>Mono</td>
<td>$995</td>
</tr>
<tr>
<td>Mac II, IIc, IIC, IIt, IIx</td>
<td>Mono</td>
<td>$995</td>
</tr>
<tr>
<td>Mac II, IIc, IIC, IIt, IIx</td>
<td>GS 256</td>
<td>$1479</td>
</tr>
<tr>
<td>Mac IIsi</td>
<td>Mono</td>
<td>$1039</td>
</tr>
<tr>
<td>Mac Portable</td>
<td>Mono</td>
<td>$1249</td>
</tr>
</tbody>
</table>

RasterOps 24XLI
Color System
The latest in 24-bit technology. Includes full on-board acceleration, 16.8 million colors, 72 dpi, 75 Hz refresh rate.

OTHER MONITORS AVAILABLE!
Please call for prices.

WE’LL BUY IT BACK!
"WE'RE NOT HAPPY (unless you are!)
We want you to become a repeat customer. So we give you discount mail-order prices...superior service & selection...our unbeatable hassle-free warranty...toll-free tech support...and an unsurpassed return policy. What's more, we do it all with a smile...because that's what you deserve."

Introducing 3 new performance enhancements for Macintosh.

RealTech Cache Cards

"...cache cards are simple, efficient, cost-effective enhancements for an already speedy Mac."
— MacUser, June 1991

RealTech Iicl Cache Card

$169
Full 64K of static RAM cache, and SANE control via the control panel.

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Thanks for your orders. We appreciate your business!
Your dream Ethernet network may already be installed.

MacUser Labs tests 29 ways to turn your existing phone wiring into a data superhighway.

BY STEPHANIE N. GLEASON, KELLI WISETH, AND THE MACUSER LABS STAFF

You're tired of LocalTalk's sluggishness. The high-speed alternative, Ethernet, is attractive, but you've heard that it requires special cabling—and you recognize "special" as a common euphemism for "complex, expensive, and difficult to manage." Despite what you've heard, don't just settle back into the slow lane. A simple, powerful, and surprisingly inexpensive alternative has finally arrived.

Last September the IEEE (Institute of Electrical and Electronic Engineers) approved a new Ethernet specification called 10BASE-T—a network revolution with a name only an engineer could love. Ethernet networks that follow the 10BASE-T rules and use 10BASE-T-compliant hardware use the type of cabling that's often already installed for telephone service in modern office buildings—unshielded twisted-pair wiring—thus saving you the trouble and expense of installing special coaxial cable. And as we anticipated in last year's network report (see
"Are You Ready for Ethernet?" June '90, Buyer's Guide page 20), network-card vendors have followed quickly on the heels of the final IEEE specification with a barrage of Ethernet hardware for every Mac from the Classic to the llfx.

MacUser Labs gathered 29 10BASE-T Ethernet controllers — 16 NuBus cards, 3 LC PDS (processor-direct slot) cards, 7 SE/30 PDS cards, and 3 external SCSI-adapter boxes — from 17 different manufacturers. We hauled them all into our NetWorkShop and clocked their performance on Mac IIci's, SE/30s, LCs, and Classics. In addition to timing each card's speed in real-world file-transfer tests, we also looked at ease of installation, quality of documentation, diagnostics, and any additional features such as external setting switches or LEDs.

If last year's controller prices — hovering well above the $500 mark — prevented you from plunging headlong into an Ethernet network, you'll be pleasantly surprised: This year's 10BASE-T Ethernet cards start at a modest $199. And there's more good news: Unlike the wide-ranging results we found in our tests of last year's crop of Ethernet cards (which all required thin coaxial cable, or thinnet), we found that all of today's 10BASE-T cards perform admirably.

But good performance, falling prices, lower cable costs (see Figure 1), and potential setup savings aren't the only reasons to make the move to Ethernet — 10BASE-T or otherwise. System 7, with its file-sharing and publish-and-subscribe features, is no doubt transforming even more Mac users from passive network residents into active network participants — and LocalTalk can't keep up with the strain.

The inevitability of bogged-down LocalTalk networks no doubt hastened the development of the Apple Ethernet Cabling System, announced this past January (see the "Well-Connected Mac" sidebar). This modular connection scheme should bring plug-and-play Ethernet to the Mac in a big way. Also, it's expected that printers will soon sport an Ethernet interface in addition to standard LocalTalk, serial, and parallel connections. In the meantime, you can connect your LocalTalk-equipped printers to your new Ethernet network with a router, a device that lets LocalTalk and Ethernet talk with each other. You can choose from a software router — running on the same Mac as your print-spooling...
software, for example — or one of many hardware routers (see “Building a Better Network with EtherTalk-to-LocalTalk Routers,” April ’91, page 156). Alternatively, you can use Dayna’s EtherPrint ($495) to connect your LocalTalk printer directly to Ethernet (see “Painless Ethernet Printing,” April ’91, page 217).

What’s Wrong with LocalTalk?

LocalTalk’s chief advantage is that you don’t pay extra for it — a LocalTalk port has been built in to every Mac since the first 128K Macintoshs rolled off the assembly line in 1984. But LocalTalk transmits data at only 230.4 kilobits (thousands of bits) per second — hardly enough oomph to transport 24-bit-color graphics files or keep up with lots of file sharing, for example. To the rescue comes Ethernet, an established network-transmission scheme and cabling standard with a speed rating of 10 megabits (millions of bits) per second — theoretically about 40 times faster than LocalTalk but about 5 times as fast in real-world use.

For more than 20 years, Ethernet has been the network of choice for business, government, and universities. With an Ethernet network-interface card installed in your Mac and EtherTalk software — driver software that enables the Mac’s networking smarts, AppleTalk, to work over Ethernet cables and transceivers — you can link your Mac to an Ethernet network and gain greater connectivity with minicomputer, PC, and other business environments.

Ethernet has been steadily evolving during its 20-year career. Before 10BASE-T, the two main flavors of Ethernet were 10BASE-5 (thick coaxial cable, or thicknet) and 10BASE-2 (thin coaxial cable — thinnet, or cheapernet) (see the “10BASE-What?” sidebar). Differences among the three Ethernet schemes include the physical properties of the cable and the specifications for transmitting signals; each type has inherent advantages and limitations. For example, because of its excellent shielding and signal integrity, thick Ethernet can run distances of up to 500 meters between devices and thus is often used as the backbone to connect different areas of a building — artists in the penthouse design studio can send files to the Linotronic-500 in the basement — but it’s the most expensive by far to install. Thinnet, on the other hand, is less expensive, but it has a run limit of about 200 meters. Cheap-and-easy 10BASE-T is limited to runs of about 100 meters.

You may hear it said that 10BASE-T Ethernet uses “regular telephone
No other laser printer can outrun the

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The physical arrangement, or topology, of a 10BASE-T Ethernet network is called a star — each Mac is connected to a central hub, or multiport repeater. An advantage of the star topology is that the hub provides a convenient location for troubleshooting and network control. If there are problems between one Mac and the hub, only that link is affected, not the rest of the network. Not so with a bus topology — a daisy chain of connected Macs on a single cable; a problem with one section of the network may affect the whole network.

**CPU**
When you copy a file from Mac to Mac, the file is broken up into chunks of data, or network packets, which get converted into signals that are sent out over the network cable.

**Network-interface card**
The network-interface card (NIC) provides a link between the Mac and the network. The two key components of a NIC are an Ethernet controller chip and a transceiver chip.

**Ethernet controller chip**
The signal travels from the Mac’s bus to the Ethernet controller, which makes the signal conform to Ethernet specifications.

**Transceiver chip**
The transceiver transmits the signal through the unshielded twisted-pair wiring.

**Unshielded twisted-pair wiring**
10BASE-T Ethernet requires two pairs of unshielded twisted-pair wiring, similar to telephone wire. One pair is used to send the signal to the hub from the Mac; the second pair receives signals from the hub.

**Hub**
The hub, or multiport repeater, usually has connections for about a dozen Macs. It receives a signal and rebroadcasts it to all the network ports. In addition, it checks for various low-level errors, including excessive collisions and link problems. When there are excessive errors on a port, the hub can shut the port down.
wire,” but that’s not exactly true—it depends on what you mean by “regular.” If your building is cabled with unshielded twisted-pair wiring that meets the specifications of AT&T PDS (premises distribution system) or DIW (D-type, inside wiring) twisted-pair telephone cable—and most buildings built in the past few years are—you’re in business. (Just ask your phone-system installer to take a gander at your wiring closet.) You’ll need two unused pairs of 22- or 24-gauge solid—not stranded—copper wire; one pair sends signals, and the second receives them (see the “How It Works: 10BASE-T Ethernet” sidebar).

**Make Your Network a Star**

Another key difference among the three Ethernet schemes is that both thinnet and thicknet usually implement a bus network layout, or topology, wherein Macs are daisy-chained (see Figure 2). If you’ve ever had trouble with a bunch of hard-disk drives and other peripherals on your SCSI daisy chain, you’re aware of the major failing of bus topology: It’s hard to isolate a problem device in a chain. If one device has a problem or if the chain isn’t properly terminated, the chain won’t work at all.

Because of the physical characteristics of twisted-pair wiring, 10BASE-T must be configured in a star topology, at the center of which is a hardware hub, or multiport repeater, to which all Macs are directly connected. Because each Mac’s connection is independent of the other Macs, problems are much easier to isolate. You also don’t have to worry about termination. A star topology is vastly more reliable and manageable and promises a significant reduction in downtime, because only the ailing parts of the network are shut down when there are problems, not the entire network, as with a bus topology.

Another advantage of 10BASE-T over other types of Ethernet is that it can include many built-in self-tests that provide a greater level of reliability and troubleshooting ease. For example, some cards feature a link-integrity self-test, which constantly monitors the connection between the Mac and the 10BASE-T hub; status lights at the hub enable a network administrator to see at a glance if there’s trouble on a particular port. Many vendors have included a link-integrity LED on their cards as a convenience—users can look at the back of their Macintosh to determine if they have a failed link, making troubleshooting a lot quicker.

All the cards we tested feature link-integrity LEDs, except for the David Systems Ether-T Mac; MacProducts Magic Ethernet II/10T; National Semiconductor EtherNODE•16 NB-T and EtherNODE•32 SE/30-T; Sonic

**Figure 2: Star Topology Versus Bus Topology**

In a star topology, each Mac is directly connected to a hub, or multiport repeater.

A break in any one link will disrupt only that link.

In a bus topology, Macs are connected with BNC T-connectors. The bus must be terminated at each end.

An unterminated break in the daisy chain will bring down the entire network.
Figure 3: Network Installation

Click the items you want to select:
Shift-click to select multiple items.

Install
Remove
Other
Figure 3a: Running the installation software is usually just a matter of launching it from the floppy disk provided by the vendor, double-clicking on the installer icon, and clicking on OK once or twice. Clicking on Easy Install saves you the trouble of making any decisions.

Inside Ethernet

<table>
<thead>
<tr>
<th>Loopback</th>
<th>Cumulative Statistics</th>
</tr>
</thead>
<tbody>
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<td>Bandwidth Utilization (%)</td>
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<tr>
<td>On-Board RAM check</td>
<td>Sample Period (sec)</td>
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<td>Cable Connection</td>
<td>- 0.00000</td>
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<tr>
<td>Loopback Controller</td>
<td>- 0.00000</td>
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<td>Loopback Encoder/Decoder</td>
<td>Network Traffic:</td>
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<td>Loopback Transceiver</td>
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<td>Driver Version</td>
<td>Multicast Frames Received: 0</td>
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<td>Card Type</td>
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<tr>
<td>- 16KB</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>CRC Errors: 0</td>
</tr>
<tr>
<td></td>
<td>Frame Alignment Errors: 0</td>
</tr>
</tbody>
</table>

Figure 3b: After you've installed your 10BASE-T card and the EtherTalk network software, you can confirm that the hardware is functional by running a diagnostic program, if the vendor provides one.

Figure 3c: You may need to switch between network drivers to use resources on different networks. To select the EtherTalk network, for example, simply pull down the Apple menu, select Control Panel, and then select Network. The Built-In Icon represents your LocalTalk network; the first EtherTalk Icon represents Phase 1 EtherTalk; and the second, Phase 2. You can select only one network at a time.

Figure 3: Installing your 10BASE-T Ethernet card isn't just a matter of slotting the card into a slot and plugging in the cable. The card needs software from the AppleTalk protocol stack that enables your Mac to connect to and use an EtherTalk network.

Systems Ether TwP/II, SE, and LC; and Technology Works NuBus 10T/Thin/AUI Ethernet.

In addition to standard 10BASE-T connectors (called RJ-45 connectors), most cards have an additional Ethernet connection port, typically an AUI (attachment-unit interface) that can be connected to an external transceiver for thick or thin Ethernet cabling. An additional port gives you greater flexibility as your network evolves. For example, you may decide to move your mail server off your departmental star hub and onto your corporate thicknet backbone.

All the cards we tested provide at least one additional port, except for the David Systems Ether-T Mac, Dayna DaynaPORT E/LC-T, LRU Systems NodeM, NRC Mac 1000TP, Racal Interlan MacConnect NIA310-10BT, and Sonic Systems Ether TwP/SE and Ether TwP/LC — these cards allow RJ-45 connection only to unshielded twisted-pair wiring. The Asante MacCon+ LC card has a BNC connector instead of an AUI, with a transceiver on-board for thinnet.

At the high end of the connectivity scale is the Technology Works NuBus 10T/Thin/AUI Ethernet, which gives you the most options in a single card—a BNC connector for thinnet and an AUI (Apple attachment-unit interface) as well as the RJ-45 for twisted pair. You can connect to any type of Ethernet cable with this card.

Changing cable types can be as involved as opening your Mac and changing jumpers on the card or as simple as letting the card configure itself. The Asante MacCon+ LC, EMAC SpeedLink/II TP and SpeedLink/SE30 TP, Farallon PhoneNET Cards (NuBus and SE/30), and Tri-Data Systems LanWay E-10T cards (NuBus and SE/30) are all auto-configuring — when you change connections, the card switches itself internally to the appropriate settings. Of the SCSI adapters, the Compatibles Systems Ether+ and the Nuvotech NuVoLink SC-T both have additional AUI ports, but you must open their...
cases to get at the jumper switches inside. As shipped, all 29 products are configured to use the twisted-pair-connection port, and all those that provide additional ports have adequate instructions for setting jumpers to reconfigure the card for other types of cable.

In general, the documentation for all the cards is straightforward, but National Semiconductor deserves extra credit for providing a complete tutorial about networking, including how best to set up your wiring closet. Asante, Cabletron, Dayna, Farallon, and Shiva also get high marks for their manuals. Racial Interlan’s single manual for its entire product line— including PCs—may be environmentally kind, but it’s exceptionally confusing and finding the simple Mac-installation instructions is hard.

Quick Installation

Ethernet interfaces for the Mac are of two types: cards that plug in to a slot inside the Mac and external adapters that plug in to the Mac’s SCSI port. Installing a NuBus card into any member of the Mac II family is a snap: Simply open your Mac, and pop the card into any available NuBus slot. The SE/30 has an internal PDS connector that accepts the card and a bracket for mounting the smaller access card that contains the 10BASE-T port (for the RJ-45). Installing the two cards in an SE/30 yourself is a hassle, however. You must carefully open the Mac with a special tool before the PDS and mounting bracket are accessible. Unless you’re comfortable with the legal and electrical dangers associated with opening your SE/30— voided warranty, threat of electrocution, fear of frying internal components— we suggest that you have an authorized dealer install the card.

Cards designed for the Mac LC also install into a PDS connector on the motherboard, but—unlike with the SE/30—the slot is easily accessible when you open the LC’s case.

If your Macs’ NuBus slots or PDSs are all filled, you can still connect to Ethernet by using a SCSI adapter—an external box that plugs in to the Mac’s SCSI port with a standard SCSI cable. (A SCSI adapter must share the SCSI bus with other devices, such as hard-disk drives.) The Classic is bereft of slots—processor-direct, NuBus, or otherwise—so using a SCSI adapter is the only way to connect it to an Ethernet network. Because the Mac’s SCSI bus is slower than either the NuBus or the PDS, SCSI Ethernet

On the Horizon

As we were testing 10BASE-T cards, Apple announced its own unique approach to Ethernet connection: the Apple Ethernet Cabling System, with a nickname, FriendlyNet, that was quickly trademarked by Asante. The new system—used not only by Apple but also by Asante and Technology Works, with other vendors sure to join in—sports a new 14-pin AAUI (Apple attachment-unit interface) port. With the proper adapters, it can connect to a variety of cable types: thick coaxial, thin coaxial, and twisted-pair. And in the future, look for media adapters for fiber-optic cable.

Unfortunately, Apple didn’t start shipping its cards until after we finished our testing. By the time you read this, the Apple Ethernet NB Card ($424) should be available for NuBus Macs. This powerful card will include a Motorola 68000 processor and 512K of RAM (expandable to 2.5 megabytes) and will run A/ROSE, a real-time multitasking operating system that allows network applications or multiple protocols—including AppleTalk, TCP/IP, and DECnet—to run concurrently on the card, thus freeing the main processor to perform other tasks. The new Ethernet LC Card ($199) will fit in the Mac LC. Both cards are outfitted with only an AAUI connector—it’s up to you to purchase the appropriate adapter, available from Apple for $175. Expect other vendors to soon offer adapters for less. Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014; (800) 538-9965.

Cayman Systems, a leading vendor in the AppleTalk/Ethernet-gateway market, announced a complete line of Mac Ethernet cards in June, including the AAUI-equipped GatorCard E/LC-A for the Mac LC ($449). Cayman’s other offerings include NuBus, Ilsi, SE, and SE/30 Ethernet cards with connectors for thick and thin Ethernet or with connectors for 10BASE-T and thick Ethernet. Because of size constraints, the Mac LC cards are limited to a single port; the GatorCard E/LC-T has a 10BASE-T port, and the GatorCard E/LC has a thinner port. Cards for the LC have an FPU socket; when it’s occupied, the card is priced at $599. All other Cayman Ethernet cards are priced at $449 and come with a lifetime warranty, free telephone support, and overnight replacement. Cayman Systems, 26 Landsdowne Street, Cambridge, MA 02139; (617) 494-1999.

In early May, CNet Technology began shipping the CN450MACI/ET ($399), a two-in-one adapter that supports thick coaxial and unshielded twisted-pair 10BASE-T Ethernet cables. The CN450MACI/ET—which wins our tongue-twisting-product-name-of-the-month award—is equipped with an on-board terminator, supports Novell NetWare 3.11 and 386 network operating systems, and is backed by a five-year warranty. CNet Technology, Inc., 2199 Zanker Road, San Jose, CA 95131; (408) 954-8000.

Because the Mac Ilsi, SE/30, and LC each have only one PDS connector, multifunction Ethernet cards are beginning to appear for these popular CPUs. For example, Ilsi users who want Ethernet connection as well as high-end color display would be out of luck if it weren’t for solutions such as the Asante MacCon+ 30i/Radius ($379), which when connected to the Radius Color Pivot Ilsi Interface card ($795) and an Asante daughterboard, provides an Ethernet port as well as a video port. Asante Technologies, 404 Tasman Drive, Sunnyvale, CA 94089; (408) 752-8388.

Two additional multifunction newcomers—the Sonic Systems MagicBUS Ilsi and MagicBUS SE/30 (both $299)—are PDS adapters with thinner or twisted-pair Ethernet ports that also let you connect a second PDS board such as a color-video board, fax/modem board, or cache card. Sonic Systems, Inc., 21211 Rainbow Drive, Cupertino, CA 95014; (408) 725-1400.

As competition heats up, expect to see more vendors dropping prices. In August, Farallon lowered the price on its PhoneNET Cards for Ethernet to $395; a ten-user pack now goes for $3,495. Timbuktu is no longer part of the package. Farallon also started shipping a card for the Mac Ilsi, also $395. Farallon Computing, 2000 Powell Street, Suite 600, Emeryville, CA 94608; (415) 566-9000.
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**Figure 4: File-Transfer Speed**

To test each card's speed, we set up a two-Macintosh network, using a Farallon StarController EN, and put one of each vendor's cards in both the client and the AppleShare file server. We then timed how long it took to transfer a multi-file 5-megabyte folder from the server to the client and from the client to the server. We also timed how long file transfers took over LocalTalk for each of our test platforms: Macintosh IICl's, SE/30's, LC's, and Classics.

### Overall Relative Performance

The higher up you are on the Macintosh evolutionary ladder, the more reason you have for switching to 10BASE-T Ethernet. In our real-world file transfers from the server to the client, Ethernet is about five times as fast as LocalTalk on a Mac IICl and four times as fast on an SE/30 or Mac LC. The 10BASE-T SCSI adapters, however, are forced to deal with the Classic's SCSI bus—a bottleneck that degrades performance dramatically.

### From Server to Client:

In file-transfer tests on our simple two-Mac network, the Mac IICl's 25-megahertz 68030 helped feed the data through the pipeline much faster than did the SE/30's 16-megahertz 68030 or the LC's 16-megahertz 68020.

### From Client to Server:

When compared with a Mac on a network copying a file from an AppleShare file server, a server has more to do when receiving the same file from a client—it must keep track of the user's access privileges, for example. Accordingly, it takes longer to copy files from a client to an AppleShare server than from an AppleShare server to a client.

<table>
<thead>
<tr>
<th>NuBus cards (Mac IICl)</th>
<th>Overall Relative Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabletron Systems</td>
<td>Worse</td>
</tr>
<tr>
<td>E6010 DNI</td>
<td></td>
</tr>
<tr>
<td>David Systems</td>
<td>Better</td>
</tr>
<tr>
<td>Ether-T Mac</td>
<td></td>
</tr>
<tr>
<td>Ether-T P/NSE</td>
<td></td>
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<tr>
<td>Asante</td>
<td></td>
</tr>
<tr>
<td>MacCon+ 30i ET</td>
<td></td>
</tr>
<tr>
<td>Tri-Bus Systems</td>
<td></td>
</tr>
<tr>
<td>LanWay E-10T NuBus</td>
<td></td>
</tr>
<tr>
<td>Assist</td>
<td></td>
</tr>
<tr>
<td>Farallon</td>
<td></td>
</tr>
<tr>
<td>MacConnect NIA10-10BT</td>
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</tr>
<tr>
<td>Sonic Systems</td>
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<tr>
<td>Ether TwP/I1</td>
<td></td>
</tr>
<tr>
<td>Technology Works</td>
<td></td>
</tr>
<tr>
<td>NAbus 10I/Thin/AAUI Ethernet</td>
<td></td>
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<tr>
<td>MacProducts</td>
<td></td>
</tr>
<tr>
<td>Magic Ethernet II/10T</td>
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<tr>
<td>EMAC</td>
<td></td>
</tr>
<tr>
<td>SpeedLink/II TP</td>
<td></td>
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<tr>
<td>Shiva</td>
<td></td>
</tr>
<tr>
<td>EtherPort IIT</td>
<td></td>
</tr>
<tr>
<td>Funktion</td>
<td></td>
</tr>
<tr>
<td>PhoneNET Card for Ethernet</td>
<td></td>
</tr>
<tr>
<td>Daysa</td>
<td></td>
</tr>
<tr>
<td>DaynPort E/LC T</td>
<td></td>
</tr>
<tr>
<td>National Semiconductor</td>
<td></td>
</tr>
<tr>
<td>EtherNODE-16 NB-T</td>
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</tr>
<tr>
<td>Navitech</td>
<td></td>
</tr>
<tr>
<td>NavoLink II-T</td>
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</tr>
<tr>
<td>SRC</td>
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<tr>
<td>Mac 1000TP</td>
<td></td>
</tr>
<tr>
<td>Compatible Systems</td>
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<tr>
<td>Ether2 TP</td>
<td></td>
</tr>
<tr>
<td>Apple Computer</td>
<td></td>
</tr>
<tr>
<td>LocalTalk</td>
<td></td>
</tr>
</tbody>
</table>

| Mac SE/30 cards        |                             |
| Cabletron Systems      |                             |
| E6010 DNI              |                             |
| Sonic Systems          |                             |
| Ether Tw/P/NSE         |                             |
| Asante                 |                             |
| MacCon+ 30i ET         |                             |
| Tri-Bus Systems         |                             |
| LanWay E-10T Direct Slot |                       |
| National Semiconductor |                             |
| EtherNODE-16 SE/30-T   |                             |
| EMAC                   |                             |
| SpeedLink SE/30 TP     |                             |
| Farallon               |                             |
| PhoneNET Card for EtherNet |                       |
| Apple Computer         |                             |
| LocalTalk              |                             |

| Mac LC cards           |                             |
| Daysa                  |                             |
| DaynPort E/LC T        |                             |
| Sonic Systems          |                             |
| Ether Tw/PLC           |                             |
| Asante                 |                             |
| MacCon+ LC             |                             |
| Apple Computer         |                             |
| LocalTalk              |                             |

| SCSI adapters (Mac Classic) |                             |
| Navitech                 |                             |
| NavoLink SC-T            |                             |
| Compatible Systems       |                             |
| Ether+                   |                             |
| LRU Systems              |                             |
| Node systems             |                             |
| Apple Computer           |                             |
| LocalTalk                |                             |

**Performance factor**

<table>
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<tr>
<th>1</th>
<th>2</th>
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<td></td>
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</table>
### From Server to Client

<table>
<thead>
<tr>
<th>Worse</th>
<th>Better</th>
</tr>
</thead>
</table>

### From Client to Server

<table>
<thead>
<tr>
<th>Worse</th>
<th>Better</th>
</tr>
</thead>
</table>

### NuBus cards (Mac IIci)

- AppleShare
- EtherShare
- EtherShare III
- LanWay E-10T NuBus
- Apple
- MacCon+ HET
- fural
- MacConnect NIAHD-10BT
- Sonic Systems
- Ether TwP/II
- Technology Work
- NuBus 10FT/Thin/AUI Ethernet
- MacPorter
- Magic Ethernet II/10T
- EMAC
- SpeedLink/II TP
- Nova
- EtherPort IIT
- fural
- PhoneNET Card for Ethernet
- Dayna
- Dayna PORT E/II-T
- National Semiconductor
- EtherNOD::16NB-T
- Nurolink
- Nurolink II-T
- NEC
- Mac 1000TP
- Compatible Systems
- EtherII TP
- Apple Computer
- LocalTalk

### Mac SE/30 cards

- AppleShare
- EtherShare
- EtherShare III
- LanWay E-10T NuBus
- Apple
- MacCon+ 30 ET
- Sonic Systems
- EtherNOD::16NB-T
- National Semiconductor
- EtherNOD::16NB-T
- EMA
- SpeedLink/II TP
- fural
- PhoneNET Card for EtherNet
- Apple Computer
- LocalTalk

### Mac LC cards

- Dayna
- Dayna PORT E/LCT
- Sonic Systems
- EtherTwP/LC
- Apple
- MacCon+ LC
- Apple Computer
- LocalTalk

### SCSI adapters (Mac Classic)

- Novatech
- Nurolink SC-T
- Compatible Systems
- EtherNet
- IDE Systems
- Node
- Apple Computer
- LocalTalk

### Kilobytes per second

<table>
<thead>
<tr>
<th>25</th>
<th>50</th>
<th>75</th>
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</thead>
</table>

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performance pays a penalty. Our tests show that SCSI adapters to an Ethernet network don’t give you much better performance than LocalTalk.

But don’t dismiss SCSI adapters entirely. They’re convenient to move among machines and simple to install. All three SCSI adapters have easily accessible switches for setting the SCSI ID. The LRU Systems NodeM is the easiest to fit into your SCSI bus, with two 50-pin SCSI ports and an external terminator plug that lets you place the NodeM anywhere on the SCSI chain. Although the Compatible Systems Ether+ and Nuvotech NuVoLink SC-T are internally terminated and must be placed at the end of the SCSI chain, both offer greater networking flexibility than the LRU Systems NodeM, because they have a connector for thicknet as well as for 10BASE-T.

After you’ve popped the card into its slot or plugged in the SCSI adapter, you must install driver software. EtherTalk — Apple’s Ethernet driver software — replaces the LocalTalk-specific part of the AppleTalk protocol to enable the Mac to communicate over Ethernet cabling while still obeying AppleTalk’s rules. All vendors use Apple’s System Installer to install their EtherTalk drivers into the System file and to copy other necessary files into the System Folder (see Figure 3).

Although installing the card — and the software to drive it — is a relatively straightforward task, actually establishing a connection between your Mac and a file server, for example, can be another matter entirely. If you can’t log on to your file server, is it because of the card? Is it the software? Is it the cable? Is it sunspots?

Here’s where diagnostic software comes into play. After installing the card and its driver software, be sure to use the manufacturer’s diagnostic software to ensure that the card is working properly. Some diagnostic programs are more full-featured than others. All Cabletron and National Semiconductor cards come with sophisticated diagnostic software — for example, both include tests that check the circuitry and chip sets of the board and check the board’s ability to transmit a signal. Both also let you test the communication from the board over the network — if your Mac won’t connect to the network after you’ve installed either of these cards, you’ll know if it’s because of a bad chip set, a problem with the port, or a problem with the cable.

On the other hand, the diagnostic

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**The Bottom Line**

Upgrading your network from LocalTalk to Ethernet might not be as costly or difficult as you think. The new 10BASE-T Ethernet specification is designed to work over unshielded twisted-pair wiring, which may already be installed throughout your office building. Because it relies on a star topology, 10BASE-T also makes your network easier to manage.

A slew of new Ethernet cards hit the market shortly after the 10BASE-T specification became final last year. Our real-world tests revealed few differences in performance among the cards — it’s the Mac you put them into that makes the difference. When it comes to network hardware, performance is less of an issue than are reliability and support. For that reason, we recommend the Asante MacCon+ IET, MacCon+ 30i ET, and MacCon+ LC 10BASE-T Ethernet cards. All three cards are reasonably priced at $379 ($269 street) and come with a five-year warranty. In addition, Asante provides Neon Software’s NetMinder network-analyzer software, a tool that not only diagnoses board-level problems but also helps you manage your network — by monitoring network traffic to pinpoint bottlenecks, for example. Although you can mix and match cards from any vendors, why bother doing so if you can buy all your cards — and your 10BASE-T hub — from the same source? If you have any problems with your network hardware, you’ll have to make only one phone call.

By its very nature, SCSI-adapter performance can’t be dazzling — the Mac’s SCSI bus is slower than either the NuBus or the PDS, so SCSI Ethernet performance pays a penalty. But if you need to connect a Mac Classic, Portable, or Plus to Ethernet, try the Nuvotech NuVoLink SC-T ($549); it was the fastest of the SCSI cards in our tests and comes with a five-year warranty.

You won’t go wrong choosing a 10BASE-T card from the Asante line. If you need to connect a Macintosh Classic, Portable, or Plus to Ethernet, try the Nuvotech NuVoLink SC-T (center).
software that comes with the DaynaDaynaPORTE/II-TandE/LC-T, Racial Interlan MacConnect NIA310-10BT, and Shiva EtherPort IIT simply sends packets over the network as a test — you won’t be able to discover if any problem is on the card or on the network itself. And cards from David Systems, Farallon, LRU Systems, MacProducts, NRC, Nuvotech, Technology Works, and Tri-Data Systems don’t come with any type of diagnostic software at all. At test time, Farallon did ship Timbuktu with both of its cards, but that’s due to change (see the “On the Horizon” sidebar). The Asante MacCon+ HET and MacCon+ 30i ET come with Neon Software’s NetMinder 1.5 software, which comprises diagnostic software for the board as well as a network-management tool.

**Neck-’n’-Neck File Transfer**

As we discovered during our testing, card performance as shown by artificial benchmark tests of a board’s components doesn’t necessarily match performance in real-world situations. To real-world network users, however, performance is a simple matter — how long that darn wristwatch stays on the screen while you’re copying files onto or reading files from your server.

To keep the variables to a minimum, we kept our test network simple — just one Mac client and one Mac server — and tested platform by platform, card by card. For example, we slipped two EMAC SpeedLink/I1 TP cards into two Mac IICI’s and connected the Macs to a Farallon StarController EN. We installed Apple’s AppleShare 2.01 file-server software on one Mac and installed System 6.0.7 software, which includes AppleShare client software, on the second Mac.

With the AppleShare server software running, we copied a 5-megabyte folder of various-sized files between the client and the server, netting how long it took for each transfer, and averaged the results of hundreds of transfers. We then ran the same tests on cards for the SE/30 and the LC and the SCSI adapters attached to a pair of Mac Classics. As we expected, performance was best at the top of the Mac family tree, on the IIci.

In addition, to show the dramatic difference between LocalTalk and EtherTalk, we ran the same sequence of file transfers over LocalTalk between two of each of our Mac platforms. In this case, the Mac’s power — or lack of it — made little difference to file-transfer speed: LocalTalk trudged along equally slowly on all Macs.

Although Ethernet has a speed rating of 10 megabits per second and LocalTalk is rated at 230.4 kilobits per second, real-world factors such as network overhead, disk-drive-access speed, and CPU bottlenecks all take a toll on throughput. Real-world Ethernet performance with the fastest NuBus card, the Cabletron Systems E6010 DNI, was just over five times as fast as with LocalTalk (see Figure 4). The fastest SCSI adapter, on the other hand, the Nuvotech NuvoLink SC-T, transferred files from server to client less than twice as fast as LocalTalk. And because of the overhead associated with the AppleShare file-server software — such as keeping track of user access privileges — transferring files from client to server was slower than from server to client in all cases.

**LocalTalk No Longer**

The LocalTalk connection built in to the Mac may be convenient, but it can’t keep pace with the demands placed on it by color graphics, sound, video, or multiuser databases — not to mention the added strain of System 7’s file-sharing capabilities. Ethernet is not only a much more powerful transmission method but it’s also gained long-term acceptance in corporate environments, universities, and government. With the recently adopted 10BASE-T specification, existing telephone-type twisted-pair wiring can often be used as the cable for an Ethernet network. And because 10BASE-T uses a star topology built around a central hub, it brings greater reliability and manageability to an Ethernet network.

Performance among the many 10BASE-T cards and SCSI adapters available today doesn’t vary as widely as it did when we tested Ethernet cards last year. Your choice should be guided by pricing, warranty, quality of documentation, additional features, and whether a manufacturer offers a card for each type of Mac you need to connect. Prices among the current crop of cards are wide-ranging, and there are some real bargains out there — but look at the “Bottom Line” sidebar for our recommendations.

**Table 1 Criteria**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>The list price is the manufacturer’s suggested retail price.</td>
</tr>
<tr>
<td>Street price</td>
<td>The street price is an average actual price charged by dealers around the United States in May 1991 or the price charged by those vendors that sell direct.</td>
</tr>
<tr>
<td>10BASE-T chip</td>
<td>The manufacturer of the transceiver chip, which controls the sending and receiving of network signals and the link-integrity test function, among other functions.</td>
</tr>
<tr>
<td>Ethernet controller chip</td>
<td>The manufacturer of the network-interface controller chip, which controls the memory buffer as well as performing other functions.</td>
</tr>
<tr>
<td>Additional ports</td>
<td>Additional network-attachment ports for thicknet (AUI), thinnet (BNC), or Apple AUI (AUI).</td>
</tr>
<tr>
<td>Auto-configuring</td>
<td>Does the card sense which media type is attached and automatically configure itself, saving you the trouble of settling jumper switches?</td>
</tr>
<tr>
<td>Diagnostic software</td>
<td>Does the card come with diagnostic software for confirming that it is functioning as it should?</td>
</tr>
<tr>
<td>Link-integrity LED</td>
<td>Does the card contain an LED that indicates link integrity, saving you a trip to the hub to determine if there’s a problem with your 10BASE-T cable?</td>
</tr>
</tbody>
</table>

Stephanie N. Gleason is a systems analyst and consultant. Kelli Winsett is a MacUser associate editor.
### Table 1: Features of 10BASE-T Ethernet Cards

<table>
<thead>
<tr>
<th>NuBus</th>
<th>Asante MacCon+ IET</th>
<th>Cabletron Systems E6010 DNI</th>
<th>Compatible Systems EtherZ TP</th>
<th>David Systems Ether-T Mac</th>
<th>Dayna DaynaPORT E/II-T</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>$379</td>
<td>$699</td>
<td>$395</td>
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<td>$699</td>
<td>$395</td>
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<td>$270</td>
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<td>Pros</td>
<td>Excellent warranty</td>
<td>Excellent manual and diagnostic software.</td>
<td>Has port for thicknet.</td>
<td>Good warranty.</td>
<td>Lifetime warranty.</td>
</tr>
<tr>
<td>Features</td>
<td>10BASE-T chip</td>
<td>Level One</td>
<td>Cabletron Gate Array</td>
<td>MicroLinear</td>
<td>Advanced Micro Devices</td>
</tr>
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<td>Ethernet controller chip</td>
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<td>National Semiconductor</td>
<td>National Semiconductor</td>
<td>National Semiconductor</td>
<td>National Semiconductor</td>
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<td>☑</td>
<td>☑</td>
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<tr>
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<td>☑</td>
<td>☑</td>
<td>☑</td>
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<td>Link-integrity LED</td>
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<td>☑</td>
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<tr>
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<td>2 years</td>
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<tr>
<td></td>
<td>404 Tasman Dr.</td>
<td>35 industrial Way</td>
<td>P.O. Box 17220</td>
<td>701 E. Evelyn Ave.</td>
<td>50 S. Main, 5th Floor</td>
</tr>
<tr>
<td></td>
<td>Sunnyvale, CA 94089</td>
<td>Rochester, NH 03867</td>
<td>Boulder, CO 80308</td>
<td>Sunnyvale, CA 94088</td>
<td>Salt Lake City, UT 84114</td>
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<tr>
<td></td>
<td>(408) 752-8388</td>
<td>(603) 332-9400</td>
<td>(303) 444-9352</td>
<td>(408) 720-6867</td>
<td>(801) 531-0600</td>
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### Table 1: Features of 10BASE-T Ethernet Cards, continued

<table>
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<tr>
<th>NuBus</th>
<th>EMAC SpeedLink/II TP</th>
<th>Farallon PhoneNET Card for Ethernet</th>
<th>MacProducts Magic Ethernet II/16T</th>
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<td>Cons</td>
<td>Confusing manual.</td>
<td>No diagnostic software.</td>
<td>No link-integrity LED.</td>
<td>No diagnostic software.</td>
<td>No additional ports.</td>
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<td>Features</td>
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<td>Ethernet controller chip</td>
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<tr>
<td>Link-integrity LED</td>
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<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
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<td>Company</td>
<td>EMAC</td>
<td>Farallon Computing, Inc.</td>
<td>MacProducts USA</td>
<td>National Semiconductor</td>
<td>Network Resources Corp.</td>
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<tr>
<td></td>
<td>48431 Millmont Dr.</td>
<td>2000 Powell St., Ste. 900</td>
<td>8303 Mopac, Ste. 218</td>
<td>2900 Semiconductor Dr.</td>
<td>2450 Autumnvale Dr.</td>
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<td>Fremont, CA 94538</td>
<td>Emeryville, CA 94606</td>
<td>Austin, TX 78759</td>
<td>Santa Clara, CA 95052</td>
<td>San Jose, CA 95131</td>
</tr>
<tr>
<td></td>
<td>(800) 821-0806</td>
<td>(415) 596-9000</td>
<td>(512) 343-9441</td>
<td>(800) 538-8510</td>
<td>(408) 263-8100</td>
</tr>
</tbody>
</table>
Flexibility
Only MagicBUS gives you Ethernet, PLUS the pass through capabilities for a second board. Now you can transform your Mac II/III or SE/30 into a powerful workstation by attaching to the MagicBUS any PDS board, including monochrome or color video boards, accelerator boards, fax/modem boards, or cache cards and also get the speed and connectivity of 32 bit Ethernet. The MagicBUS II/III even has an FPU socket built onto the board for added performance.

Features
The MagicBUS boards are the size of the Apple Mac II/III PDS slot adapter and are System 7.0 compatible. MagicBUS has an upgradeable Static RAM buffer for greater data throughput and is available in Thin Coax or Twisted Pair versions.

Don't limit the potential of your computer with any ordinary Ethernet Board. Even if you're not ready now, MagicBUS's features will support your upgrade needs for years to come.

Ethernet for other Macs
Sonic Systems also makes Ethernet Boards for the Mac SE, SE/30, II family, LC and IIi. All boards are available with Thin Coax or Twisted Pair. In addition, cabling and connectors are now available from Sonic Systems. Call for pricing.

Support
All Sonic Ethernet Boards come with a 5 year warranty, free network diagnostic software and unlimited technical support.

Call Today to order or for more info.

1-800-535-0725
Sonic Systems Inc.

<table>
<thead>
<tr>
<th>Features</th>
<th>MagicBUS</th>
<th>Asante MacCon 30IE</th>
</tr>
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<tbody>
<tr>
<td>Connect any Video Boards</td>
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<td>✔</td>
</tr>
<tr>
<td>Connect Accelerator Boards</td>
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<td>Connect Fax/Modem Boards</td>
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<td>✔</td>
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<tr>
<td>Connect Cache Cards</td>
<td>✔</td>
<td>✔</td>
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©1991 Sonic Systems Inc. 21211 Rainbow Dr. Cupertino CA, 95014 408-725-1400 fax 408-725-0759 MagicBUS is a trademark of Sonic Systems Inc. All other product names are Trademarks or Registered Trademarks of their respective companies.

Please circle 354 on reader service card.
This just might be as portable as a 40MB drive ever gets.

Among the many interesting objects you’ve wedged into your pockets over the years, we can safely guess that a 40MB hard drive wasn’t one of them.

Because until now, no 40MB drive has come close to being anywhere as small, portable, and easy to use as the new La Cie PocketDrive™

Who says you can’t take it with you?

After you’ve seen a PocketDrive, the ultimate truth is going to hit you like a bolt of lightening: as long as you’re buying a hard drive, why not get one that’s easy to take with you and doesn’t hog any desk space when you get there? Especially when PocketDrive offers all-new 2½ inch drive technology, fast 19 ms seek time, and whisper-quiet operation.

You’ve heard that compact drives are a pain to connect and disconnect? Not anymore. Instead of plugging directly into the back of your Mac®, PocketDrive connects to a cable. So you don’t have to root around at the back of your computer, connecting, disconnecting, and reconnecting everything. And PocketDrive comes with two cables, allowing you to leave one cable at work and one at home, plus a T-connector so you can plug PocketDrive into any other Mac.

A funny thing happens when you use 2½” Quantum drives.

They work and work and work. For what seems like forever.

La Cie’s enviable reliability record is due to the fact that we use Quantum’s ultra dependable drive mechanisms.

In fact, our reliability as a hard drive manufacturer and stability as a company prompted a MacWeek columnist to observe... "The Good Housekeeping Seal. I’m now taking the safer course of buying from corporate-owned companies such
as Quantum-backed La Cie...”

Conclusion? Your PocketDrive will perform flawlessly, even after being carelessly packed into countless overhead luggage compartments. And if it doesn’t, at least we’ll be around to do something about it.

**With every 40MB PocketDrive comes a Silverlining.**

One of the reasons your PocketDrive operates so efficiently is because it comes with Silverlining, a set of utilities the magazine reviewers are gushing over. MacUser noted that “Silverlining is one of the most powerful and useful hard disk utilities you can find—most Apple engineers prefer it to Apple’s own partitioning software.”

All of which goes to prove one significant thing about La Cie’s remarkable new PocketDrive. It’s simply the smallest, fastest and most portable pocketful of miracles you’ve ever seen.

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Call (800) 999-0143 to order or for more information.

40MB PocketDrive $449
Comes with 2 cables, T-connector, Silverlining software, and 2 year limited warranty.

See a PocketDrive for yourself at our MacWorld booth #1309 in the Bayside Expo Center.
### Table 1: Features of 10BASE-T Ethernet Cards, continued

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194 September 1991 MacUser
DataLink Modems from Applied Engineering were designed specifically for the Macintosh from the ground up, not "ported over" from MS-DOS designs.

DataLink/Mac Portable™ (left) incorporates an ultra-low power design to extend the Mac Portable's battery life and includes Send-Fax and MNP-5 as standard features. DataLink/Mac™ our internal modem for the Mac II series, includes an extra serial port for another peripheral, and MNP-5 (optional). DataLink LC™ also includes an extra serial port as well as a Math coprocessor socket, and V.42bis option (giving you an effective transfer rate of up to 9600 baud and error free transfers). DataLink Express™ our Mac-platinum colored external modem for all Macs, has both mini-8 and DB-25 connectors and features 12 status lights including our exclusive "Line Engaged" indicator to show a shared line in use.

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Symantec ... 30 day MBG 2237 | ♦ | $124. |

GreatWorks ... 30 day MBG 2237 | ♦ | $124. |

Systec ... 30 day MBG 2237 | ♦ | $124. |
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Adobe Type Libraries (Vol. 1-224) ... call
6957 Adobe Type Library 1-224 ... 41.
5750 Adobe Type Library 1-224 ... 2.
5790 Adobe Type Library 1-224 ... 5.
8794 Adobe Type Library 1-224 ... 47.
1053 Adobe Type Library 1-224 ... 3.
8156 Adobe PlusPack/ATM ... 174.
1098 Adobe PlusPack/ATM ... 62.
6671 Adobe Type Library 1-224 ... 62.
6672 Adobe Type Library 1-224 ... 116.
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6779 Adobe PlusPack/ATM ... 62.
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**Microsoft** ... 30 day MBG
3987 PowerPoint 2.01D ... $245.

**Monotype Typography ... 30 day MBG**
7089 Monotype Imprints-TrueType ea. $22.

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8767 Multi-Ad Creator 2.5 ... 455.

**Paracomp ... 30 day MBG**
5028 ModelShop 2.0 ... 599.

**Quark**
7612 QuarkXPress 3.0 ... 519.

**Springboard ... 30 day MBG**
3530 Certificate Maker 2.02 ... 22.

**Strata**
7773 Stratavision 3D 2.0 (July '91) ... 549.

**Stratavision 3D SRX/Renderman** ... 999.

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6512 SnapShot 3.01 ... $31.

**Zedcor ... 60 day MBG**
3986 DeskPaint & DeskDraw 3.0.3 ... 113.

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**Advanced Software ... 30 day MBG**
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**Aladdin Systems ... 30 day MBG**
9986 Intouch Server (3-Pack) ... 112.

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**Apple Computer/Claris**
1074 System 7.0 ... 99.

**Arqos Software ... 30 day MBG**
8734 HyperCard Developm. Kit 2.0/2 ... 149.

**Broderbund ... 30 day MBG**
5100 SuperCard 1.5 ... 199.

**AI Software ... 30 day MBG**
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**Easy Color Paint 2.0 ... 30 day MBG**
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**Entura Software ... 30 day MBG**
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**Font Library**
7628 Font Library (1 user) ... 169.

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5440 Macromedia Reader (req. FileGuard) ... 299.

**Affinity Microsystems ... 30 day MBG**
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- **Remote (10 Pack of inits)** .... 147.
- **Design Science** ... 30 day MBG
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- **Digitalk** ... 60 day MBG
- **SmallTalk/V Mac 1.1**. ....... 123.
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- **ClickChange 1.04**. ............ 56.
- **Calculation Set 2.09 6**. ... 62.
- **ElseWare Corp.** ... 30 day MBG
- **Bar Code Kit** .................... 135.
- **Fifth Generation** ... 30 day MBG
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- **Suitcase II 1.2 10**. .......... 49.
- **SuperSpool 5.0**. ............... 62.
- **SuperLaserSpool 2.02**. ...... 93.
- **FastBack II 2.5**. ............... 118.
- **DiskLock 2.01**. ................. 118.
- **Go Technology** ... 60 day MBG
- **Hot Keys Universal (word process.)**. 36.
- **Hot Keys PageMaker**. ..... 36.
- **Hyperpress** ... 30 day MBG
- **Icon Factory 2.0**. .......... 56.
- **ICOM Simulations**
- **On Cue 1.3**. .................... 35.
- **TMON Professional**. .......... 142.
- **Insight Development** ... 30 day MBG
- **MacPrint 1.23**. ............... 93.
- **JAM Software USA** ... 30 day MBG
- **SmartAlarms w/Appt. Diary 3.1**. 63.
- **Kensington** ... 30 day MBG
- **PassProof (right) or 9300 (left) ea**. 65.
- **Kent Marsh Ltd.** ... 30 day MBG
- **QuickLock 2.0**. ............... 34.
- **FolderBolt 1.01**. ............. 73.
- **The NightWatch 1.03**. ...... 84.
- **FolderBolt/NightWatch Bundle**. 139.
- **MacSafe II 2.0**. .............. 106.
- **Kiwi Software** ... 60 day MBG
- **Kiwi Envelopes! 3.1.1**. .... 32.
- **KiwiFinder Extender 1.02**. ... 63.
- **Loop Software** ... 30 day MBG
- **PictureBook 3.2A**. .......... 39.
- **Magic Software** ... 30 day MBG
- **AutoSave II 2.0**. .......... 26.
- **Backmatic 2.0**. .............. 50.
- **Microwom** ... 30 day MBG
- **Complete Undelete 1.1**. .... 48.
- **Virex 3.2**. ..................... 57.
- **Virex Plus 2.0**. ............. 89.
- **Microseeds Pub.** ... 60 day MBG
- **INITPacker 2.01**. ............ 34.
- **Redux 1.63 49.** 7116 **Rival 1.1.6 49.**
- **Microsoft** ... 30 day MBG
- **QuickBasic 1.0**. .............. 64.
- **Multi-Ad Services**
- **Multi-Ad Search 1.0**. ....... 115.
- **Nine to Five Software** ... 30 day MBG
- **Reports 2.0**. ................. 94.
- **Now Software** ... 30 day MBG
- **Now Utilities 3.0 (August '91)**. 84.
- **Prototype 3.0**. ............. 184.

### Microcom
- **Virex 3.2**—Comprehensive solution to the threat of computer viruses. $57.
- **Virex Utilities—Troubleshooting, file/disk recovery, complete undelete, isolate bad sectors, & Virex.** 89.
- **Complete Undelete 1.1—Tracks & recovers files in the trash.** 48.

### Other Software
- **Olduvai** ... 30 day MBG
- **MultiClip 2.1.7**. .............. 69.
- **ON Technology** ... 1 year MBG
- **Meeting Maker (5) 269.** 9800 (10) 549.
- **Palomar Software** ... 30 day MBG
- **Plottergeist 2.0 (June '91)**. 249.
- **Salient Software** ... 30 day MBG
- **DiskDoubler 3.7**. .......... 37.
- **Softstream** ... 30 day MBG
- **HyperHit 3.0 119.** 1568 (network) 389.
- **Solutions, Inc.** ... 60 day MBG
- **SmartScrap & The Clipper 2.1.1**. 56.
- **SuperGlue II 2.01**. .......... 75.
- **Spinnaker** ... 30 day MBG
- **Rival 1.1.6**. ................. 279.
- **SuperMac Tech.** ... 60 day MBG
- **DiskFit 2.0**. ................. 58.
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8994 2400 V.42bis modem ... 209.
7934 PM9600SA modem 1.26 ... 489.
9849 SmartPack 9600 ... 529.

Shiva ... 30 day MBG
3444 @ NetSerial 3.3 ... 275.
3437 @ NetBridge 04.1 ... 408.
3443 @ NetModem V2400 3.3 ... 339.
6519 @ EtherGate 1.50.1 ... 1299.
8189 @ FastPath V (July 91) ... 1899.

Symmetry ... 30 day MBG
9969 EasyShare 1.2.1 ... 669.

Abaton ... 30 day MBG
7432 @ Scan 300/30 (reqs. Scan Kit) ... 999.

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7754 @ TalkBox—More than humor & more... 23.
3056 @ ScreenShot—The one-step screen graphics solution... 33.
System 7? Lon Poole tells all!

As a Macworld Contributing Editor, author of *The Macworld Guide to System 7*, and all-around operating system aficionado, Lon Poole has been writing a lot about System 7 lately. But the best way to get a writer to really start making sense is to take his hands off the keyboard and put his face in front of the camera. So that’s what we’re doing—a video of Lon Poole explaining all about System 7 produced at the studios of PCTV®, somewhere in the wilderness near Marlow, NH.

If you’ve been trying to figure out what System 7 can do for you, this is a great way to find out. And it’s free to anyone who places an order over $100. (Limit one per customer.) Or you can buy a copy for $9.

By the way, Lon’s publisher and accountant asked us to remind you that we’ll also sell you his book on System 7 for just $19. Or buy the book and video for $25. You’ll be System 7 savvy in no time.
Free with $100 orders!

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20 - 40 MHz Gemini Classier, call 68882 Math Coprocessors

**ACCESSORIES**

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Apple Computer

7748 Personal LaserWriter Toner Cartr. … 89.
115 LaserWriter II Toner Cartridge … 105.

**Avery** … 60 day MBG

4811 Transparencies 6½" x 11" (Qty. 50) … 22.
4807 Laser Labels 1" x 2½" (Qty. 3000) … 24.
5392 Disk Labels 3½"-Laser (Qty. 630) … 29.
1603 1st Impression (desktop binder) … 229.
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**Basic Needs** … 60 day MBG

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9750 Mac LC w/13" Monitor Cover … 10.

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7453 The Organizer Jr. … 82.
6091 The Organizer … 199.

**Curta Manufacturing** … 30 day MBG

9742 Til & Swivel (MT-1) … 19.
9793 Apple Security Kit (SL-2) … 22.
8046 MVP Mouse … 89.

Ergotron

MacTilt (Classic, SE or SE/30) … ea. 68.

**Goldstein & Blair** … 30 day MBG

8198 “What Do I Do Now” Book … 10.
1913 The Mac Bible Guide to System 7 … 10.
8374 The Macintosh Bible (with disks) … 25.

**IDG Books**

2238 Macworld Guide to System 7 … 19.

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Available in black (lazed) or blue.

8812 Ultimate Classic Carrying Case … 64.
6129 Ultimate SE/Ext. Carrying Case … 79.

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2578 Extra Long ADB Kybd. (7 ft.) … 24.
2559 Apple Security Kit … 33.
9303 Keyboard Shee … 39.
6763 SE Radiation/Anti-Glare Filter … 52.
5064 Apple Color Monitor Polishing Filter … 63.

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1505 Oak Disk Case (36) … 32. 4632 (60) … 32.
8795 Switch Box (2 Pos.) … 8796 (4 Pos.) … 49.

**Mobius Technologies** … 60 day MBG

4470 Fanny Mac QT (Platinum) … 53.

**Moustrak** … 60 day MBG

2594 Moustrak Pad (7"x9") 8. 2692 (9"x11") … 9.
2693 Moustrak Pad Low Friction (9"x11") … 10.

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**Targus** … 60 day MBG

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3617 Mac Classic/Plus/SE Case … 59.
4015 Mac SE & Ext. Kybd. Carry Case … 75.

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6199 Isolab 4 (surge suppressor, 4 outlets) … 49.
6200 Isolab 6 (surge suppressor, 6 outlets) … 59.

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2215 3½" HD Disks (10) … 18. 2241 (50) … 79.
2243 3½" DS Disks Color (10) … 12.
2239 3½" HD Disks Color (10) … 19.

**MacConnection** … 60 day MBG

5692 44 Meg Cartridge … 74. 9728 (10) … 699.

**Sony** … 60 day MBG

3297 3½" DS Disks (10) … 11. 6148 (30) … 29.
3298 3½" HD Disks Color (10) … 18. 6375 (30) … 49.
8185 QD2640 Tape Cartridge … 19.

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3943 DC2000 40 Mba Data Cartridge … 19.

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2792 3½" DS Disks (10) … 13.
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6514 HP DeskWriter Printer $569.
9953 HP LaserJet IIIP (with toner) $1149.
6754 HP LaserJet III (with toner) $1699.

Hitachi
9492 14" Color Monitor (w/ Mac II adaptor) $599.
*Kensington ... 30 day MBG
Turbo Mouse 3.0 (Plus or ADB) ea. $107.

Kraft Systems
7519 KM30 ADB Joystick $42.

Logitech ... 30 day MBG
MouseMan $77.
TrackMan $89.

ScanMan Model 32 G Scale Scanner $299.

MegaGraphics

MicroSpeed ... 30 day MBG
6620 MacTRAC for $512, 512C & Plus $62.
6621 MacTRAC ADB for $512, 512C & II family $75.

*Microtek ... 30 day MBG
1981 MS-II OCR Scanner $849.
1978 Scanmaker 600GS $1199.
1985 Scanmaker 600S2 $1599.
1982 Scanmaker 1800S $2299.

Monster Design Group
1486 Monster Speakers (two, stereo) $175.

Mouse Systems ... 30 day MBG
7560 Trackball ADB $68.
9471 A3 Mouse $85.

Nutmeg Systems ... 30 day MBG
19" for G Scale SE/30, II, Ilsa $129.

Orange Micro ... 30 day MBG
3036 Grappler 2.0 (9 pin) $92.
6229 Grappler LX $134.

Pacific Data Products
7412 Pacific Page (PE) 529 $1473 (XL) $979.

Sophisticated Circuits ... 30 day MBG
6009 PowerKey 1.01 $64.
6008 PowerKey Remote $32.

Software Ventures ... 30 day MBG

TheComplete PC
6104 Half-Page Scanner/400 $289.
4994 LightningScan 400 $385.

SOFTWARE & DRIVES

SIMMs ... 2 year warranty
Includes free instructional video tape.
1107 1 Meg SIMMs (80ns) $49.
8316 1 Meg SIMMs (80ns, set of 2) $95.
9437 2 Meg SIMMs for Ilsa or II LC $129.
7497 1 Meg SIMMs for Ilsa (set of 4) $199.

Applied Engineering
8360 3.5 Mac 800k Drive $195.
8361 1.44 Meg High Density Drive $229.
Macram Classic with 0.1, 0.3, or 3 Mb. call 1971 FastMath LC $175.

CD Technology
9962 PowerCache 320 MB $1395.
3989 800K External Disk Drive $59.
5456 44 Meg Removable Drive $59.

DayStar Digital ... 30 day MBG
40 & 50 MHz PowerCache Ilsa—New from DayStar Digital! Double the performance of your 20 MHz Mac Ilsa with DayStar's PowerCache Ilsa. PDS adapter included.
2035 40 MHz $949.
2040 50 MHz $1699.

Dove Computer
MaraThon 030 UPGRADES ... call MaraThon 030 Racer (Plus, SE, or II) $1199.
5909 FastBack Tape $699.
Iomega
7551 44 Meg Transportable (reqs. kit) $799.
2224 90 Meg Transportable (reqs. kit) $799.

Micron ... 30 day MBG
7149 Xceed Ilsa-128 Cache Card $239.
6680 Xceed for SE/30 (840 x 480) $279.
Peripheral Land, Inc. (PLI)
8335 Pli Turbo Floppy 1.4 $429.
8334 Pli Super Floppy $429.
8333 Pli Sony 40 Turbo Ext. Drive $439.
8327 Pli Infinity 40 Turbo $699.
9752 Pli Infinity 88 Turbo $1199.
9862 Pli Infinity 40 Twin $1199.
8330 Pli 100 Meg Ext. Drive $699.
8329 Pli 200 Meg Ext. Drive $1179.
1666 Quick SCSI Card $319.
Sigma Designs
1501 DoubleUp $159.
### Table 1: Features of 10BASE-T Ethernet Cards, continued

<table>
<thead>
<tr>
<th>Mac SE/30</th>
<th>Sonic Systems</th>
<th>Tri-Data Systems</th>
<th>Mac LC</th>
<th>DaynaDaynaPort E/LC-T</th>
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<tr>
<td><strong>List price</strong></td>
<td>$449</td>
<td>$290</td>
<td>$379</td>
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<td>$290</td>
<td>$199</td>
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<tr>
<td><strong>Cons</strong></td>
<td>Out-of-date installer.</td>
<td>No link-integrity LED.</td>
<td>No diagnostic software.</td>
<td>None.</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10BASE-T chip</td>
<td>National Semiconductor</td>
<td>MicroLinear</td>
<td>Level One</td>
<td>Advanced Micro Devices</td>
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<tr>
<td>Additional ports</td>
<td>AUI</td>
<td>AUI</td>
<td>AUI</td>
<td>none</td>
</tr>
<tr>
<td>Auto-configuring</td>
<td>O</td>
<td>NA</td>
<td>O</td>
<td>NA</td>
</tr>
<tr>
<td>Diagnostic software</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Link-integrity LED</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Warranty</td>
<td>5 years</td>
<td>1 year</td>
<td>1 year</td>
<td>5 years</td>
</tr>
<tr>
<td>Company</td>
<td>National Semiconductor</td>
<td>Sonic Systems, Inc.</td>
<td>Tri-Data Systems</td>
<td>Asante Technologies</td>
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<tr>
<td></td>
<td>2900 Semiconductor Dr.</td>
<td>21211 Rainbow Dr.</td>
<td>3270 Scott Blvd.</td>
<td>404 Tasman Dr.</td>
</tr>
<tr>
<td></td>
<td>Santa Clara, CA 95052</td>
<td>Cupertino, CA 95014</td>
<td>Santa Clara, CA 95054</td>
<td>Sunnyvale, CA 94089</td>
</tr>
<tr>
<td></td>
<td>(800) 538-8510</td>
<td>(408) 725-1400</td>
<td>(408) 727-3270</td>
<td>(408) 752-8388</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dayna Communications, Inc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50 S. Main, 5th Floor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Salt Lake City, UT 84144</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(801) 531-0600</td>
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</table>

### Table 1: Features of 10BASE-T Ethernet Cards, continued

<table>
<thead>
<tr>
<th>Mac LC</th>
<th>SCSI adapter</th>
<th>LRU Systems</th>
<th>Nuvotech</th>
<th>Nuvotetech Nuvolink SC-T</th>
</tr>
</thead>
<tbody>
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<td>$495</td>
<td>$495</td>
<td>$549</td>
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<tr>
<td><strong>Street price</strong></td>
<td>$199</td>
<td>$495</td>
<td>$410</td>
<td>$549</td>
</tr>
<tr>
<td><strong>Pros</strong></td>
<td>Tied for least expensive. Has port for thickenet. FPU socket on board.</td>
<td>Has port for thickenet. Can be anywhere in SCSI chain. Excellent warranty.</td>
<td>Has port for thickenet.</td>
<td>Must be at end of SCSI chain.</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>No additional ports. No link-integrity LED.</td>
<td>Must be at end of SCSI chain.</td>
<td>No additional ports for other cable types.</td>
<td>Must be at end of SCSI chain.</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10BASE-T chip</td>
<td>MicroLinear</td>
<td>MicroLinear</td>
<td>MicroLinear</td>
<td>MicroLinear</td>
</tr>
<tr>
<td>Additional ports</td>
<td>none</td>
<td>AUI</td>
<td>AUI</td>
<td>none</td>
</tr>
<tr>
<td>Auto-configuring</td>
<td>NA</td>
<td>NA</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Diagnostic software</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Link-integrity LED</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>5 years</td>
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<tr>
<td></td>
<td>21211 Rainbow Dr.</td>
<td>P.O. Box 17220</td>
<td>17861 Los Felice Dr.</td>
<td>2015 Bridgeway</td>
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<tr>
<td></td>
<td>Cupertino, CA 95014</td>
<td>Boulder, CO 80308</td>
<td>Saratoga, CA 95070</td>
<td>Sausalito, CA 94965</td>
</tr>
<tr>
<td></td>
<td>(408) 725-1400</td>
<td>(303) 444-9352</td>
<td>(408) 370-7480</td>
<td>(415) 341-7819</td>
</tr>
</tbody>
</table>
When it comes to selecting the right scanner, be forewarned. There is a difference you can see in black and white. And color.

Just look at this comparison between the La Cie Silverscanner and the Microtek 300ZS. Both images were scanned at default settings with no corrections. This entire ad was then created and separated using Adobe Photoshop, Quark XPress 3.0 and a Linotronic 330.

As you can see, Silverscanner produced a better-looking image than the Microtek scan. Silverscanner lets you scan color, gray-scale, halftone and line art with dazzling clarity. La Cie gives you more with OCR compatibility, faster color previews, versatile scanning controls and up to 1200 dpi.

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More publishable
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More sharing
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More productive
MacDraw Pro lets you concentrate on your work, and not on the software. When needed, context-sensitive help is always available.

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AFTER DISCOVERING PLUTO, THE NINTH PLANET, PROFESSOR TOMBAUGH KEPT RIGHT ON GOING. HE SPENT ANOTHER 14 YEARS LOOKING AT 90 MILLION STAR IMAGES, TWO-THIRDS OF THE ENTIRE SKY. — AND YOUR SEARCH FOR THE BRIGHTEST, MOST FAITHFUL SOURCE OF POSTSCRIPT® FONTS FOR THE MACINTOSH®?
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Adobe isn't jumping on the TrueType bandwagon, but it has promised System 7 compatibility for all its products by year's end. New revs of Illustrator and Photoshop will support publish-and-subscribe; Illustrator will support TrueType fonts; and Illustrator, ATM, and Streamline will be 32-bit clean. Type 1 fonts and the INITs for Type Reunion and TypeAlign will work correctly in the Extensions folder.

Meanwhile, call Adobe at (415) 961-0911 if you have questions about its products and System 7.

By Aileen Abernathy

Color correctness: We've seen numerous announcements of ever-better solutions to the problem of color fidelity between screen display and paper output. Now RasterOps offers the CorrectColor Calibrator, the first device that measures the color values of monitor displays and printed media — paper, film, and photographs. Other key advantages: It performs calibrations across the entire screen, ensuring color uniformity, and it works with PCs and SPARCstations, letting you control color across platforms. The CorrectColor Calibrator achieves all this by combining the capabilities of a monitor calibrator, a densitometer, and a colorimeter into a single $2,999 instrument. Although it can't perform color adjustments among scanner, screen, and printer, the CorrectColor supports color WYSIWYG products such as Kodak's new Color Management System — which may be bundled with the calibrator. Thus far, the CorrectColor is compatible only with RasterOps monitors (surprise!) and the Apple 13-inch display, but it's still a giant leap forward in calibration for high-end color work.

Printer power: In-house color comping just got more affordable. The new PhaserJet PXi uses Tektronix's phase-change inkjet technology to produce smooth, brilliant colors at 300 dpi on plain paper (see last month's New on the Menu section). The tabloid-sized PhaserJet PXi is also the first printer to sport the long-awaited PostScript Level 2 RIP. The printer is networkable (parallel, serial, and AppleTalk ports), ships with 10 megabytes of RAM (expandable to 18 megabytes), produces color pages in as little as two minutes — and costs $9,995.

> Wish you had more than 35 resident fonts in your LaserWriter IINTX? The FontCard NTX, from Sonnet Technologies (714) 261-2800, plugs in to the printer's controller board and adds 25 more Adobe Type 1 fonts to the printer's on-board ROM. $595.

Product news: EPS Exchange, a nifty new utility from Altsy's, can reliably export FreeHand artwork as fully editable Illustrator 88 or 3.0 files. It adds two new file-save options to FreeHand 3.0's Save As and Export dialog boxes; converted documents retain all original elements, including fills and text along a path. $149. > Want to reduce production times for your presentations or video productions? Check out VisualMagic, a new series of "clip animations." Each VisualMagic volume has 12 megabytes of animated titles, charts, transitions, and sequences in PICS format, which most animation programs can import. Six volumes are shipping ($89 each for high-density floppies or a CD-ROM); themes include Business, and Buttons and Backgrounds. Barrington Stephens (800) 367-6240.
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Customized DTP

Thanks to the growing market in add-on software, you can now tailor PageMaker, QuarkXPress, and DesignStudio to meet your needs.

By Eric Taub

While laboring with your favorite (or not-so-favorite) page-layout program, you've probably muttered, "Gee, I wish PageMaker let you edit its tracking tables" or "Gosh, wouldn't it be nice if XPress could do indexes?" (But you may not have said "gee" or "gosh.") Until recently, you couldn't do much to customize page-layout programs — for better or worse, you were stuck with the packaged features. But now there's a healthy, growing market in third-party software specifically developed to beef up programs such as PageMaker and QuarkXPress.

These add-on utilities let you change the design of the program itself, not just its pages. Some are stand-alone applications that you must use separately from the page-layout program but that offer added features such as color-separation capabilities. Others are plug-in modules that add features you can access from within the page-layout program, usually by selecting them from a menu.

Most third-party utilities have been developed to work with either PageMaker or QuarkXPress, although DesignStudio also supports plug-in modules. For little or no investment, you can obtain freeware or shareware goodies that supply shortcuts to make your page-layout program simpler to use. (These offerings are usually available from on-line services or from user groups.) At the high end, you can spend thousands of dollars — far more than you paid for the page-layout program — on full-blown pagination and workgroup publishing systems.

PageMaker

Aldus' PageMaker 4.0 has a full complement of auxiliary utilities, beginning with its bundled Table Editor, which lets you create tables and bring them into PageMaker as PICT graphics. PageMaker offers built-in capabilities that must be supplied by add-ons in other programs, most notably its hooks to Microsoft Mail and its powerful facilities for indexing and creating tables of contents. Furthermore, PageMaker can automatically link stories to external text files, whereas QuarkXPress requires an add-on utility such as CopyFlow to achieve similar text-updating capabilities.

On the other hand, PageMaker — unlike QuarkXPress and DesignStudio — doesn't support plug-in modules, so most PageMaker enhancements are stand-alone utilities. Aldus, however, has announced that future versions of PageMaker will support Additions, a programming language that combines features of DesignStudio's DesignScript and QuarkXPress' XTensions. Additions provides a scripting language for users, enables third parties to write plug-in modules, and provides a way to link PageMaker with other applications dynamically.
Freeware and Shareware. For just $10, you can use PM4 ShortCuts, a shareware DA (see Figure 1) that gives you a readily accessible list of common and not-so-common ways of manipulating PageMaker — from keyboard commands to the intricacies of kerning — including undocumented features.

If you've ever sent a PageMaker document to a service bureau for high-resolution output and been stymied because you forgot to include an essential font or graphics file, you'll appreciate CheckList 1.0, a $45 shareware utility from ElseWare (see Figure 2). This little gem scans a PageMaker file and compiles a list of crucial information about it — including the name of all its fonts and linked graphics files. Version 2.0 of CheckList (scheduled to ship this summer) is a commercial program with a higher price tag ($179), but it's a must-have utility for PageMaker users who work with service bureaus. In addition to providing information on PageMaker files, CheckList 2.0 reports on print-to-disk PostScript files from a variety of sources, including FreeHand, Illustrator, and QuarkXPress. It can also gather all the files needed to output a particular document and copy them to a common folder or floppy disk. It even compresses a job's files automatically, segmenting them as necessary to fit onto floppies — and the compressed files are self-extracting.

Database Publishing. ElseWare also makes DataShaper, a $179 database-publishing utility. This slick PageMaker add-on helps you turn information from database or spreadsheet files into fully formatted PageMaker documents such as mailing labels, catalogs, and directories. DataShaper isn't a stand-alone program but rather a cleverly designed set of import and export filters that let you work within PageMaker to design formats for publishing tab- or comma-delimited text.

Refined Tracking. PageMaker 4.0's five levels of tracking — very tight, tight, normal, loose, and very loose — don't have the flexibility that some users demand. PMTracker ($99), from EDCO Services, lets you tweak the values in PageMaker's Kern Tracks file, enabling you to customize the tracking settings for each installed font or for Font/Style Groups you can create (see Figure 3). You can set up different tracking levels for different point sizes of a font, which gives you a typographical flexibility and precision that's far beyond what's available in QuarkXPress.

Color Separations. Unlike rivals QuarkXPress and DesignStudio, PageMaker can't perform four-color separations, but two add-on products are specifically designed to separate PageMaker documents. Aldus offers PrePrint ($495), which separates PageMaker files that have been printed to disk as PostScript .sef files. PrePrint can't separate PICT graphics, but it does let you open and color-correct TIFF images. SpectreSeps PM ($295), from Pre-Press Technologies, also opens and separates PageMaker .sef files, including PICT graphics. SpectreSeps doesn't let you edit individual TIFF images, however. Version 1.5 of PrePrint (due out sometime this summer) adds numerous refinements, including image resampling; separation of selected page ranges; and the ability to separate files created in FreeHand, Illustrator, or Photoshop.

Other Add-ons. Foreign-language publishers will appreciate Aldus' PageMaker Dictionaries ($89 each), which include Central European, Scandinavian, Spanish & Portuguese, and British English. Aldus also markets the PageMaker Portfolio Series, $89 packages of pre-designed layouts designed for general business needs, newsletters, and manuals. (There are also several third-party template packages for PageMaker and QuarkXPress, but that's another story for another issue.)

Another PageMaker enhancement to consider, particularly if you frequently get files from DOS users, is Mastersoft's Word for PageMaker (which should be shipping now). This $79.95 set of filters enables PageMaker to import and export text formats it ordinarily doesn't support (and some it does), including DOS formats such as WordStar, MultiMate, Lotus 1-2-3, and DisplayWrite, as well as Macintosh formats such as FullWrite and WordPerfect.

QuarkXPress Quark has been heavily promoting XTensions, the plug-in modules for QuarkXPress that let developers add special features to the program, and not surprisingly, the XTensions industry is robust, with more than three dozen modules currently available. Even stand-alone applications that work with QuarkXPress use an XTension to get information into and out of QuarkXPress layouts. You can find XTensions that run from the subliminal to the ridiculous — from the $5,100 Autopage...
automatic-paginaton system (K. Erf Associates) to frivolous freebies such as the Sounds XTension (Nocturnal Creations).

To let you know what’s available for QuarkXPress, Quark publishes a free XTensions catalog (to get a copy, send a postcard to Quark). There are far too many XTensions and other QuarkXPress add-ons to list them all (and more are being released every day), so here are some of the highlights. By the time you read this, many of these XTensions should be available from a single source. XChange, a subsidiary of AutoMatrix, has signed agreements to distribute XTensions from North Atlantic Publishing Systems, Managing Editor Software, and Em Software.

XChange will also provide technical support, installation, and training for QuarkXPress as well as XTensions. The company can even connect developers with QuarkXPress users who need custom XTensions written.

**Freeware and Shareware.** The best-known free XTension is QuarkFreebies 3.0, available from on-line services or directly from Quark for a $25 handling fee. QuarkFreebies is actually two XTensions. FeaturesPlus adds several convenient features to QuarkXPress, including a slew of new user-definable defaults, Make Fraction and Make Price text styles, a measurement-conversion palette, and commands for word-space tracking and removing manual kerning. NetworkConnection lets you communicate and exchange text and picture files with other QuarkXPress users on a network.

Default Settings ($20), a shareware XTension from A Lowly Apprentice Production, covers some of the same ground as FeaturesPlus, but it adds cute touches such as NeXT-style scroll bars. One handy feature lets you set the display resolution for imported TIFF images.

TypesettingMarksXT, a free XTension from the British Mac Publishing Magazine, lets you add typographical sophistication to your text via the Typesetting Marks dialog box. You can convert straight quotes to curly (smart) ones, change / and / into ligature characters, strip out extra spaces after periods, and turn a space-hyphen-space into an em dash.

Two separate XTensions perform file-reconnaissance duties similar to what CheckList does for PageMaker documents. FlashEditing is a free XTension, from the French company Rescaux, that prepares a cover sheet about your QuarkXPress document for a service bureau. You enter the necessary imagesetting specs (such as output resolution and media) in FlashEditing’s dialog box, and FlashEditing compiles a list of all the fonts and graphics used in the document. Simply print the form and send it with your files to the service bureau. QuarkLog, from Quark, is a stand-alone application that scans QuarkXPress documents and compiles lists of included fonts and graphics files. Although QuarkLog is handy (and free),
Quark distributes it only to service bureaus that participate in its support program. However, Quark doesn't prevent service bureaus from giving out copies of QuarkLog, so if you've been a faithful imagesetter customer, ask your service bureau if you can have a copy.

**Guides.** XTensions developers clearly feel a need to beef up QuarkXPress' handling of page guides. Grid Layout ($19.91), from J. Michael Marriner, lets you specify custom grids of vertical and horizontal guides and even choose a color for grid lines so you can distinguish them from other kind of guides. Liberty Engraving offers Grids & Guides ($49.95), an XTension that lets you position guides and grids, and it provides many options (gutter width, page offset, and so on) for grid creation.

**Style Palettes.** Another favorite target of XTensions developers is floating palettes for accessing QuarkXPress' style sheets — inspired, no doubt, by PageMaker's Style palette (see Figure 4). Reseaux's Stylist ($50) is a simple palette that has a pop-up menu of available styles and the ability to let you apply just the character-based part of a style sheet to a range of text. Em Software's Xstyle ($39) provides three new floating palettes. Two are for applying character and paragraph attributes (which were omitted from QuarkXPress' floating Measurements palette); attributes such as horizontal scaling; left and right margins; and, of course, style sheets. The third palette lets you define styles, so you don't have to wade through QuarkXPress' seemingly endless layers of dialog boxes whenever you want to edit or add a style. You can also compare and duplicate styles among QuarkXPress documents.

Before plunking down cash for these palettes, note that QuarkXPress 3.1, due to ship this fall, will have its own style-sheet palette. Xstyle's numerous palettes should still be valuable, however, as should Stylist's ability to apply style attributes to a range of characters.

**Database Publishing.** In many ways, Em Software's Xdata ($199) is remarkably similar in approach and capabilities to ElseWare's PageMaker product, DataShaper. Xdata lets you automatically apply all of QuarkXPress' formatting capabilities to information that's been exported from a database or spreadsheet program in tab-, comma-delimited, or fixed-formatted (see Figure 5). With Xdata, you first build a QuarkXPress template to show how a page should look and then create an Xdata "prototype."
QuarkXPress has the best publication-management tools, with XTensions that handle the tracking, assembly, and configuration of all publication elements.

that specifies the formatting and placement of the text. Although DataShaper uses somewhat arcane codes to indicate conditional statements and mail-merge functions, Xdata has a simple but surprisingly powerful scripting language that should be comfortable for anyone used to HyperTalk or BASIC. You can produce impressive, complicated reports, using Xdata to automatically assemble, arrange, and format information.

More from Quark. You can get more XTensions from Quark, but you have to pay. The $79.95 QuarkXTras package has XTensions that are useful to high- and low-end publishers, including Print Area (prints selected areas of a page), Line Check (searches for poorly justified or poorly hyphenated lines), Adobe Screen Values (reduces moiré patterns in the printing of color separations), and Printer Calibration (adjusts halftone screens to compensate for dot gain). XTras also has drivers for Sharp, Howtek, and Apple scanners, so graphics can be scanned directly into QuarkXPress.

Indexing and TOC. QuarkXPress has no built-in facilities for indexing or producing tables of contents, but Virginia Systems addresses this deficiency with Sonar Bookends and Sonar TOC ($129.95 and $99.95, respectively). Both products use XTensions to add a Sonar menu to QuarkXPress. To index a document with Bookends, you first export it as an ASCII text file, and Bookends can rapidly index every word in the file, words that occur no more than a specified number of times, or words from a list you supply. Bookends supports multiple-level indexes, and it saves the finished index as a text file, which you can import into QuarkXPress and format there. Sonar TOC extends the capabilities of Bookends (which is required for its operation), letting you tag words for a table of contents from inside QuarkXPress by creating and applying special style sheets. Once you have applied the appropriate styles to items you want included, a single command generates the table of contents as a text file, which, like the index file, can be imported back into QuarkXPress for formatting.

A companion product, Sonar Professional ($795), is a text-retrieval program with text-analysis and indexing capabilities. Not only can Sonar Pro find all instances of a particular word or phrase but it can also locate words a specific distance from other words or those associated with a given topic. It can search several documents sequentially, display relationships between words contained in those documents, and produce a text report.

Color Separations. Just as Pre-Press Technologies makes SpectreSeps PM for PageMaker, it also makes SpectreSeps QX ($495) for QuarkXPress. Although the PageMaker version color-separates an entire document after it's been printed to disk, SpectreSeps QX is more specialized, supplying only capabilities lacking in QuarkXPress' internal separator—namely the separation of continuous-tone images (color TIFF and PICT2). SpectreSeps QX lets you apply sophisticated color corrections (including compensation for scanner anomalies) and specify printing options (including screen angles) within QuarkXPress. You can create, edit, and move the program's separation styles among documents, so you can quickly build a collection of styles that are optimized for the scanners and output devices you use most frequently.

A related XTension, SpectreScan QX ($285), lets you operate many popular color scanners from within QuarkXPress. SpectreScan ships with drivers for the Microtek MSF-300Z and La Cie Silverscanner; drivers are also available for scanners from Eikonix, Howtek, Nikon, and Sharp.

Publication Management. Thanks to numerous specialized XTensions, QuarkXPress is the best equipped of all Mac page-layout programs for publication management—that is, the tracking, assembly, and configuration of all elements of a publication. Although some of the tools are niche products—developed for newspapers or advertising layout, for example—others have universal appeal for harried desktop publishers.

Reseaux's Alias and Info XTensions ($65 each) provide simple tools for copy manipulation and management. Alias is actually a set of three XTensions for batch search-and-replace operations on text...
Within a QuarkXPress document or as it’s being imported (see Figure 6), operations include inserting typographical niceties (such as smart quotes, em dashes, and figurative), converting PC files to Mac format, and filtering control characters out of downloaded files. Info compiles lists of detailed (even esoteric) information about every text and picture box in a document as well as all defined style sheets, H&J (hyphenation and justification) settings, and custom colors. This data can then be printed or saved to disk as a QuarkXPress file.

North Atlantic Publishing Systems’ series of CopyFlow products is rapidly becoming standard equipment along with QuarkXPress at many magazines and newspapers. NAPS’ flagship product, CopyFlow ($395), provides powerful automatic links between text and picture boxes in QuarkXPress and the original word-processing and graphics files. CopyFlow’s document linking provides page-assembly capabilities that are far more powerful than those of PageMaker. The CopyFlow XTension lets you assign names to text and picture boxes in a QuarkXPress document and set which graphics or word-processing files belong in each box (or linked chain of boxes). Once you’ve identified the picture or story that goes in a particular box, CopyFlow can perform quick batch imports of individual, selected, or all text or picture items in a document, with a single command. Then you never have to manually import an item again, no matter how many times it’s been edited. CopyFlow can also perform batch exports of elements and even combine all the text in a publication into a single text file for centralized editing.

Once you’ve used CopyFlow to name boxes in a document, you can keep track of where elements go, with CopyFlow Reports ($225). This XTension creates a separate QuarkXPress document that contains a thumbnail view of each of your source document’s pages, indicating the names you’ve assigned to each box. It can also create an ASCII text file with information about box names, number of lines in each story, and overest text (text that overflows the last box in a text chain).

Speaking of Overest, that’s the name of another XTension from NAPS. In QuarkXPress, whenever you have overest text, a small black box appears at the lower right corner of the text box. If you’re using Overest ($69), just click on the overest mark and Overest creates a temporary text box on your page’s pasteboard so you can see exactly how much extra text there really is. After you’ve taken care of the extra text, the Overest box disappears automatically.

NAPS’ CopyFlow Geometry ($395) lets you automate the creation of QuarkXPress documents with a scripting language similar to the one used by Xdata or DesignStudio’s DesignScript. You create an ASCII text file with the necessary page-geometry descriptions; CopyFlow Geometry then reads this file as if it were reading a recipe, automatically creating a...

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**Figure 6:** Alias, from the French company Reseaux, is an XTension that performs batch search-and-replace operations on text. You can then insert typographically correct characters into imported text.
QuarkXPress file and importing and placing all the elements. NAPS also offers Relink ($150), an XTension that can automatically reflow text in the correct order if you move text boxes around.

At $895, Page Director (Managing Editor Software) is just as expensive as QuarkXPress. Designed to automate the creation and layout of newspapers and magazines, Page Director is a stand-alone program that gathers, assembles, formats, and tracks every element of a publication. Two of Page Director’s strengths are the accuracy with which it keeps track of the space required for stories, graphics, and advertisements and the speed with which it lets you dummy a page. Drag a story or picture from the Items List onto a document page, and the selected item will automatically adjust itself to fit within the free space most efficiently. Page Director to QuarkXPress is now strictly a one-way street: the Managing Editor developers speak confidently of future two-way interactivity between the programs, using the IAC capabilities of System 7.

In Development. Four other XTensions weren’t shipping at press time but offer interesting capabilities. Publication Locking ($250), another NAPS product, will let you lock elements within a QuarkXPress document as well as the source files for text and pictures, thus preventing others from changing them. Baseview Products is developing QEdit, an XTension that will give QuarkXPress a text-editing window much like PageMaker 4.0’s story editor. QEdit’s price should be less than $100.

Npath will rectify another QuarkXPress omission — table creation and editing — with Tableworks. This $299 XTension, which was due out in July, creates its table cells from QuarkXPress text or picture boxes. It offers numerous features for table configuration, resizing, and duplication, and it supports multiple tables. Tableworks Plus, an $859 professional version shipping in September, will offer beefed-up support for long, complex tables and will allow direct importing of data from database and spreadsheet programs.
For a mere $1,750, you can obtain page signatures for your QuarkXPress documents. DK&A’s InPosition, if this summer, will take an existing QuarkXPress document and assemble a new one with pages in the requested signature order and rotation, which eliminates the need for manual stripping.

**Sounds.** Adding sounds to QuarkXPress documents may seem as necessary as providing the celebrated fish with a bicycle. But just in case the need arises (for training or presentations, perhaps), SoundTack, a $145 XTension from SecondGlance, lets you “tack” sounds to any object on a QuarkXPress page. Sounds can be imported from existing sources, or you can create them if you have a Macintosh with built-in sound support (or MacRecorder). On a more whimsical note, Sounds (a free XTension that’s available from on-line services) makes QuarkXPress play sounds in response to certain specified events, such as opening and closing files, saving, printing, or reverting to a previously saved version.

**Fancy Borders.** One intriguing addition for Quark that’s not an XTension is Electronic Border Tape ($99), from Computer Support Professionals. This collection of custom-made frames can be applied to any rectangular text or picture box, and it comes with FrameMover, an application that lets you move frames from one QuarkXPress Data file to another. PostScript purists may look down their noses at QuarkXPress’ bit-mapped frame borders, but many of those in Electronic Border Tape are witty and could be quite useful for seasonal or other special-occasion publications.

**DesignStudio**

There are currently no third-party products specifically geared for Letraset’s DesignStudio, although the program does contain hooks for plug-in-modules, which Letraset calls Annexes. DesignStudio ships with several Annexes of its own, including Auto Kern, Fancy Borders, Fonts Used, and Pictures Used. Version 2.0 contains the Separator Annex, which lets you perform four-color separations from within DesignStudio (see Figure 8). The Separator Annex color-separates elements created within DesignStudio as well as imported graphics. The Separator Annex is a more sophisticated offering than QuarkXPress’ internal separator; for example, if you have set printing specs (such as screen angles and resolution) within a DesignStudio document, you can opt to have the program override the specs contained in imported EPS images so the artwork looks more consistent with the rest of the document.

Letraset also offers DesignScript ($125), a powerful scripting language and Annex that lets you automate the creation of DesignStudio documents—a real boon for database publishing, mail-merge, and report creation. You create DesignScript scripts in a word processor (it helps to have a little programming experience) and then access them in...
Figure 8: Version 2.0 of DesignStudio comes with the Separator Annex, which gives you extensive control over four-color separations. The greatly enhanced Printer Setup dialog box (left) has several subdialog boxes such as Process SepS.

DesignStudio via the Open Script command. Most of DesignStudio’s commands and formatting features are available in DesignScript, enabling you to create and position page elements, format text, and work with graphics.

And More to Come
There’s no need to despair if DesignStudio, PageMaker, or QuarkXPress can’t perform a certain task. The market for third-party enhancements is robust, with add-ons that can do almost everything you want. And in a year, you’ll have even more options for customizing your page-layout program.

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Mixing Paint and PostScript

ColorStudio's Shapes annex lets you add PostScript type and objects to a bit-mapped image.

By Janet Ashford

Image-editing programs such as Photoshop and ColorStudio can produce beautiful illustrations, but they can’t handle type and other geometric shapes with the same facility that an object-oriented drawing program can. Letraset, however, now offers the Shapes annex for ColorStudio. This add-on module provides a PostScript drawing layer above ColorStudio’s bit-mapped image and mask layers.

Shapes' tools and functions are similar to those in a PostScript illustration program, and you can use Shapes to draw original PostScript art, import EPS graphics, or set type. You can move, resize, and layer objects without disturbing the underlying bit-mapped image. When you’re finished, ColorStudio renders Shapes’ PostScript layer to the image layer with automatic anti-aliasing (smoothing of edges to reduce the stair-stepped look).

Jeff Bricke, a Seattle-based computer illustrator, used ColorStudio and Shapes to add PostScript objects and type to a CD cover for jazz musician Kenny Blake, who records for Heads Up International. Illustrator Don Baker, also of Seattle, created the type elements in FreeHand.

Graphic designer Janet Ashford is a contributing editor to Step-by-Step Electronic Design.
The lasso and paintbrush tools are used to select and delete unwanted parts of the background. Brice then uses the Color Correction palette to increase the image contrast, to add warmth to flesh tones, and to produce blue highlights in the tuxedo. The Sharpen More filter is applied to the image to bring out additional details.

When a TIFF image is opened in the Color & Mask layer, the mask layer is filled with solid black. As parts of the image are deleted from the color layer (see Figure 2), these areas become white in the mask layer, creating a black silhouette that can be used as a mask for the figure. Conversely, the white area can be used as a mask to protect the background.

An angled, linear fill from teal to black is created, with the Paintbucket Options dialog box, which contains specifications for the colors and orientation of the blend. Using the paintbucket tool, Brice pours the graduated fill into a selected area to the right of the figure.

Brice pastes the previously copied silhouette (Figure 2) back into the image, placing the silhouette on top of the blend. To prevent the white area around the silhouette from obliterating the blend, the mask layer (Figure 3) is activated by the Mask White command. This turns the white portion of the mask layer into a mask, protecting whatever it covers — in this case, the blend — from being changed.
Creating PostScript Shapes

Moving to the Shapes layer, Brice draws several rectangles and layers them over one another, using the Bring to Front and Send to Back commands. (The color layer is still visible behind the Shapes layer.) A color and level of transparency is assigned to each rectangle, and then the Shapes layer is merged with the color layer by a click on the Render Shapes icon in the Shapes window. (Transparency effects are not visible on-screen until the Shapes layer is rendered.) The rendering process converts the PostScript objects into anti-aliased, bit-mapped objects with the same resolution as the underlying image.

Applying a Border and Texture

Brice creates a frame by pasting the image into the center of a slightly larger graphic filled with solid purple. Using the fingertip tool at 80-percent transparency, he smudges the border between the image and the purple background. To make the image look as if it were printed on rough paper, Brice uses the Mask Texture and Add Noise effects to create a texture in the mask layer. The Relief effect is used to emboss texture onto the color layer. (The Mask Texture and Relief effects are new filters available in ColorStudio 1.5.)

Adding the Type

The text elements are produced and colored in FreeHand, saved as EPS files, and imported into the Shapes layer, where they’re positioned over the image and rendered. The imported type for Interior Design is duplicated, colored black, offset to the bottom right, and sent behind the original to produce a drop shadow. (Type can also be created directly in the Shapes layer, with the text tool.) The type elements are added last so that their crisp anti-aliased outlines are not affected by the applied texture. The finished image is color-separated in ColorStudio and output to film at a resolution of 300 dpi.
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By Henry Bortman

Talking Big Blue: Apple has expanded its IBM-mainframe-connectivity offerings with two new software packages: SNA•ps Gateway and SNA•ps 3270. The Gateway runs on a Mac outfitted with Apple’s token-ring, twinaxial/coaxial, or serial NuBus card. Connect the Gateway machine to an AppleTalk network, and any Mac on the network (provided it’s running the SNA•ps 3270 software) can establish a terminal session with an IBM System/370 or System/390 mainframe or an AS400 midrange computer. SNA•ps Gateway pricing: for 8 sessions, $1,495; for 64 sessions, $4,495. SNA•ps 3270 Gateway pricing: $125; SNA•ps 3270 pricing: for the Gateway node, $125; for network-based clients, $345 per node. Also — it’s about time — Apple APIs for 3270- and APPC-type connections.

Meanwhile, Avatar is now shipping version 4.0 of its MacMainFrame client and gateway software, which supports System 7’s balloon help and publish-and-subscribe. MacMainFrame comes bundled with Avatar’s coax, token-ring, and SDLC cards. Prices range from $995 to $6,495, depending on the card and software. DCA is offering MacIRMA Graphics 2.0.0 ($195), which lets Macs emulate IBM 3179G or 3192G graphics terminals, and MacIRMA Workstation 2.0.0 ($295), which includes DataViz file-translation technology.

Speaking of translations: Ever wished you could double-click on a WordPerfect PC file icon and have the file automatically be translated and opened in MacWrite? Now you can. Software Bridge/Mac provides translators between 25 PC word-processing programs and the big 3 Mac word crunchers: Word, MacWrite, and WordPerfect. Software Bridge/Mac comes bundled with MountPC, which mounts PC-formatted 3.5-inch disks on the Mac desktop; but the double-click translate-and-launch trick works equally well with DOS Mounter and Access PC. Less than $200; available now from Argosy Software ([212] 274-1199).
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The DataClub Difference

DataClub is a distributed file server with the look and feel of a dedicated server. Can it compete with the file-sharing capabilities built into System 7?

By John Battelle

If your Mac is part of a network, chances are you exchange files with other users. File sharing ranks right up there with printing and electronic mail as one of the most common reasons for using a Mac network. Until recently, however, if you wanted to trade files with other users, you had to invest in a commercial product such as AppleShare, from Apple, or MacTOPS, from Sitka. Now Apple has made this task easier—and cheaper—by building file-sharing capabilities into System 7.

System 7's file-sharing strategy is an example of a distributed—or peer-to-peer—server, meaning that each user can be both a server (provider) and a client (recipient) for shared information (see Figure 1). You share the contents of your hard disk with others (your peers) by specifying which folders are to be shared as server volumes. In turn, you (as a client) can directly access information that's shared by other users on the network, by mounting their volumes—that is, by selecting the shared volume in the Chooser, which causes it to appear on your desktop. The client portion of file sharing is provided by the AppleShare software that comes with your System software. Select it in the Chooser, and you'll see all the volumes shared by other users.

In contrast, a dedicated file server such as the AppleShare File Server stores all shared files in a single location. Again, AppleShare's client portion is part of the Mac's System software, but the server function—which stores and presents shared data—is managed by separate software on a dedicated machine. Your own hard disks are never accessed by anyone else, and you mount volumes only from the dedicated server. This spares your Mac from the processing load of serving data to other users and provides a unified view of shared data. But you can't directly send files to other users, and you must pay for both the dedicated machine and the AppleShare File Server software.

Even before System 7's file sharing appeared, users welcomed the idea of being able to exchange files among computers without dedicating an entire machine to the task. The first third-party distributed server was MacTOPS, which has been followed in the past two years by four other peer-to-peer (also called point-to-point) products: allShare (EveryWare), DataClub (International Business Software), EasyShare (Symmetry Software), and Personal Server Network (Information Presentation Technologies).

All of these products (except MacTOPS) have one thing in common with both AppleShare and System 7's file sharing—they use the client/server metaphor specified by Apple's AFP (AppleTalk Filing Protocol). MacTOPS has its own proprietary file-sharing protocol. AFP provides a standard interface—the AppleShare client software—and a common
FILE SERVERS

Figure 1: Distributed Versus Dedicated Server

- Distributed server
- Dedicated server

A Unique Metaphor

Although this is not a comparative review, DataClub invites comparison, because it is essentially a peer-to-peer solution that looks and feels like a dedicated AppleShare server. IBS calls DataClub a virtual server, because — as with the AppleShare File Server — you see only one volume icon. DataClub takes shared folders from each participating Mac’s hard disk and displays this combined storage to the user as a single, shared volume. With standard peer-to-peer servers, you must mount three volumes to see folders that are shared from three different machines. With DataClub, the same three shared folders appear as part of a single volume.

This ability to separate the logical location of a folder (where it appears on the DataClub server’s file-directory structure) from its physical location (the disk on which it actually is stored) is a dramatic first in Mac file sharing. DataClub also provides a mechanism that lets you change the physical location of a folder from one user’s machine to another without altering where it appears to be (see Figure 2). With other server products, working on files stored on the server ties up both the server and the network. DataClub lets you avoid this performance slowdown by moving a DataClub folder to your local hard disk. It still appears to all users in the same place on the DataClub volume, but the network is affected only while you’re moving the folder. This trick can also be handy if, for example, you want to turn off your computer but still need to share a folder with coworkers. Simply move the folder to another DataClub user’s hard disk; no one using the enclosed files will notice the change in physical location.

Each DataClub node is responsible for a portion of the processing power necessary to maintain the illusion of a unified server. As we discovered during testing, DataClub has pulled off this gymnastic feat of engineering with only a few glitches. In this review, we examine version 1.1.1 of DataClub. At press time, IBS planned an August release for version 2.0, a revision that fully supports System 7 and addresses several of the problems we found in version 1.1.1.

Installation and Setup

The DataClub package includes three floppy disks: a installation disk, a program disk, and an administration disk. DataClub requires System 6, and one server can support up to 76 users. (Version 1.1.1 does not work with System 7, although System 7 users can use AppleShare client software to access files on machines running DataClub under System 6.) The program is quite simple to set up. The installer, which must be the startup disk during installation, steps you through the setup procedure. In the MacUser Labs NetworkShop, we created an Ethernet network consisting of two Mac IIsi’s and one SE. During installation, however, we ran into two major flaws.

The first, which the company plans to fix in version 2.0, is that DataClub doesn’t run on an AppleTalk Phase 2 network unless a router is present. AppleTalk Phase 2 is Apple’s latest version of network-addressing software for EtherTalk and TokenTalk networks. It enables network managers to assign individual computers to different AppleTalk zones even if all the computers are physically connected to the same network-cable segment (zones determine how shared resources, such as file servers and network printers, are grouped in the Chooser).

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but shortsighted move on IBS’ part, DataClub will not work on a Phase 2 network if it senses that there is no router present to ensure the integrity of Phase 2’s software-configured zones. The reason: DataClub combines the storage resources of all the participating nodes in a zone, so only one DataClub server can exist per zone. DataClub assumes that the absence of a router on the network means that the router has failed.

This restriction makes a certain amount of sense: If a Phase 2 router did fail and the software-generated zones were lost, all the DataClub servers from the various zones would combine into a single server and data could be corrupted. That is, it makes sense if you have multiple zones. Our test network, however, contained only three Macs, and although we were using Phase 2 drivers with our Asanté Ethernet cards, we had no need for more than one zone — or for a router. But DataClub didn’t care. It wouldn’t let us complete the installation.

To top it off, the alert message explaining our dilemma didn’t specifically mention Phase 2; instead, it informed us that “DataClub cannot be restarted on an extended AppleTalk network without an AppleTalk router.” At this point, we tried to consult the DataClub manuals’ indexes under Ethernet and extended network, but DataClub’s manuals are not indexed and they lack any discussion of AppleTalk Phase 2. This illustrated DataClub’s second major flaw: In general, we found its manuals to be slim on troubleshooting and optimization tips, although (again) the company plans to add a chapter specifically devoted to these topics in version 2.0.

Configuration

We installed a router and logged on to the DataClub server. Once the software has been installed, accessing the DataClub server is as easy as selecting the Chooser and clicking on the AppleShare icon. The DataClub server immediately pops up with Guest selected in the connection dialog box. To log on as a registered user, you must first have a user account with its attendant password, which is created by DataClub’s administration program.

The administration program can be run from any DataClub node, a feature that will be appreciated by any network administrator who has to walk down the hall — or drive across town — to a dedicated server to do system maintenance. The password-protected program lets an administrator create groups, add and delete users, and show a list of DataClub folders and owners. Network administrators will also appreciate the simplicity of backing up the single-logical-volume DataClub server. Restoring after a crash, however, is somewhat complicated — it requires several steps, including using the administration program to determine which DataClub folders need to be restored to which Macs.

Users configure DataClub through a control panel that lets them choose the Mac’s DataClub name, turn DataClub on or off, and select the hard disk on which newly created folders will be stored (see Figure 3). DataClub’s default storage location for folders is your own hard disk, but a pop-up menu lets you designate any other node on the network as the original storage location. Besides listing all other possible nodes, the pop-up menu also contains an Anywhere setting, which allows DataClub to decide where best to store a folder and its contents.

The DataClub control panel includes a check box for dedicating the Mac to DataClub file serving, which the manual suggests be done if the file server will be used primarily for multiuser databases. The control panel also provides a check box for preventing other users from storing files and folders on your local disks, but it doesn’t offer a mechanism for dedicating only a certain percentage of a local disk to network activities. We feel that this would be a useful feature, as peer-to-peer networks can often consume a
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disproportionate amount of your local hard disk. IBS suggests using partitioning software to restrict the amount of hard-disk space DataClub occupies, but it doesn’t include such a utility with the program.

Because the folder is the basic unit of distribution, DataClub supports all nine levels of AFP’s access privileges for folders, which gives the creator of a folder the means to decide who can view and change a folder or its contents. As with AppleShare, the owner of a folder chooses these settings, using the Access Privileges DA or the Get Privileges command from the Finder’s File menu (this approach may change in version 2.0, which is System 7-compatible).

The control panel also has a check box that enables the Mac to become a gateway entry point. If you, as a client, want to access a DataClub server on a zone different from your own, you must have one machine in your zone designated as a gateway to other zones. Otherwise, you won’t be able to see DataClub servers in zones other than your own. This feature seems unnatural and certainly not in keeping with AppleShare’s philosophy.

The gateway entry point must also be used to provide access to a DataClub server to a computer that’s running AppleShare client software other than DataClub. If you wanted to access a DataClub server from an IBM PC, for example, it would have to be running AppleShare PC (AppleShare software for DOS machines) and your server would have to have one machine designated as a gateway entry point. If you wanted to access the DataClub server from a non-DataClub Mac, you would also need a DataClub machine designated as a gateway entry point. Non-DataClub clients can’t provide storage resources for the DataClub server.

Should a Mac storing DataClub files crash or be turned off, the files on that machine will automatically be dimmed in the server windows of other users until the machine is restored to the network. DataClub constantly updates its location directory, so even when a Mac leaves the network, each node "remembers" where the files were.

Performance

For the most part, DataClub delivers on its promises, copying files back and forth between nodes with a speed close to that of the AppleShare File Server. Because DataClub is a peer-to-peer server, however, it suffers considerably if you try to copy a file to or from a busy machine. Even worse, if the user of that machine is performing repetitive actions that require the mouse button to be held down (such as desktop publishing or CAD), you may be in for a long, silent wait.

When this happens, DataClub returns — after a period in which nothing happens at all — with a message that simply states, "DataClub can’t reach the location storing that file or folder just now, but will continue to try." This message is annoyingly vague, and it offers no Cancel button or information about which node is tying up your network operation.

IBS has promised to fix the problem in version 2.0 by identifying the mouse-happy Mac, but we would still like to see a Cancel button built in to this dialog box to prevent an office full of employees shouting "Get your finger off the mouse!" at each other. If you are mousing around quite a bit, we suggest that you become a DataClub client only — that is, check the "Prevent others from putting folders on my disks" box in DataClub’s control panel and don’t store files that other users might need. This scenario undermines a major advantage of DataClub, but it should be necessary only in extreme cases.

On the side of the user whose disk is being accessed, however, we found DataClub to be very forgiving. We rarely noticed performance drag as DataClub lifted files from our disks. We did find DataClub to be somewhat memory-hungry — our system-memory overhead shot up by as much as 500K once we’d installed it. The company recommends at least 2 megabytes of RAM, but when loaded with a reasonable number of INITS, our 2-megabyte machine could not run both DataClub and a memory-intensive program such as QuarkXPress or HyperCard.

The Bottom Line

Because file sharing is now part of System 7, peer-to-peer products will have to lay claim to a unique feature to compete. A file-sharing market will still exist for users interested in running System 6, and the makers of allShare and EasyShare have said that they don’t plan to upgrade their products for System 7. IBS plans to focus PSN on sharing files between Macs and UNIX-based servers; likewise, Sitka will focus on MacTOPS’ cross-platform strengths.

For Mac-only networks, IBS’ DataClub is best positioned to survive the transition to System 7. Its unique metaphor — distributed file sharing that appears as a single volume — offers advantages not available with System 7’s file sharing. Unfortunately, version 1.1.1 doesn’t run under System 7, although System 7 users can be clients of DataClub servers on System 6 machines by going through a gateway entry point. Version 2.0 of DataClub, due out this August, will be fully compatible with System 7 and will support the server/client relationship in System 6 and System 7 environments.

In summary, DataClub is an elegant extension of the peer-to-peer-server approach. Version 1.1.1 still contains significant problems, including incomplete manuals and an inability to run on an AppleTalk Phase 2 network that doesn’t have a router installed. However, the company plans to address these flaws in version 2.0, which purportedly will be five times as fast as the current release (upgrades to 2.0 will be free). We would like to see some added features, including the option of partitioning your hard disk between server and local use, but all in all, DataClub works as advertised and may even give Apple’s dedicated AppleShare File Server a run for its money.

John Battelle is a free-lance journalist in the San Francisco Bay Area.
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One of System 7's best features is that 7-savvy applications can work together and share their functionality. Eddy winners Virtus, Robyn Miller, and Rand Miller (of Cosmic Osmo fame) recently demonstrated this concept by linking Virtus WalkThrough and HyperCard. You use the mouse to navigate WalkThrough’s 3-D world until you enter a building, when you suddenly find yourself in an Osmo-like environment. Not magic, but close.

By John Rizzo

One to hang on your belt: From Hewlett-Packard’s calculator division comes what may be the world’s smallest computer — the HP 95LX, a PC XT computer and business calculator rolled into one. This 11-ounce palmtop comes with Lotus 1-2-3, an appointment book, and a file manager built in to ROM — all for $699. Hardware includes a 16-line LCD screen, 512K of RAM, and a slot for memory cards. You can download files to your Mac, using the Kermit protocol and the cable for HP’s 48SX calculator.

RAM power: You don’t need lots of cash (or cache) to be a power user, but it’s certainly more challenging to be a power user on a Classic than it is on a IIfx. If 4 megabytes is the most your Mac can hold, try not upgrading to the latest wave of software — System 7 and Excel 3.0 will take up all your RAM, and one open application does not a power user make. On the high end, Mac IIfx users have a new RAM option — 8-megabyte SIMMs from Newer Technology (800) 678-3726. The price ($1,125 at press time but continually dropping) includes Connectix’s Optima 128, an INIT that breaks System 6’s 8-megabyte RAM limit. Because you can mix ’n’ match quartets of the new SIMMs with for-somes of 1-megabyte, 4-megabyte, or 16-megabyte SIMMs, it’s possible for your Mac to hold from 4 to 128 megabytes of RAM.

Jukebox CD-ROM: Pioneer’s DRM-600 disc changer lets you put six CD-ROMs on its drive, but if you want to look at the contents of each disc, you have to wait for each one to swap in and out of the drive. Now Optical Access International offers the Access CD/6 Pak ($1,495), which lets you mount all six discs on the desktop at once. The CD/6 Pak comes with Pioneer’s changer and OAI’s SuperCache software. (800) 433-5133.

Programming news: Ever dream of a universal scripting language for the Mac? UserLand’s Frontier (shipping in October) lets you automate operating-system and application functions, such as backing up, renaming, and deleting files and launching and controlling applications. (415) 325-5700. For those who are crazy enough about LISP to buy prerelease, or beta, software, Apple has released Macintosh Common LISP 2.0B1 through APDA for a mere $495. The new version of the object-oriented language incorporates Common LISP and CLOS (Common LISP Object System) standards and the Interface Toolkit for graphically creating a user interface. If you buy the beta version, you’ll get a free copy of the finished product when it ships.
Breaking In to TV

Creating effective Mac-based video demos is inexpensive and easy. Here's what you should know before you start.

By Salvatore Parascandolo

If you've ever wanted to set up an in-house facility for producing Mac-based video demos or training tapes, the time is right. Chances are that you already have many of the components you need, such as a videocassette recorder and the appropriate video card installed in your Mac. (For information on the Mac-to-video hardware and software you'll need, see "Putting Your Mac on TV: Desktop Video," August '91, page 94; to learn about a low-cost Mac-to-video setup, see the "Video on a Budget" sidebar accompanying this article.) But creating a successful video presentation involves more than just finding the right hardware — you also need to recognize desktop video's limitations and know how to get around them by choosing the best graphics for your presentation.

On Display

There are two display problems — overscanning and flickering — that you should take into consideration when designing a presentation. Overscanning occurs because a TV picture covers the screen from edge to edge, extending past the visible edges of the picture tube. You never see the outer edges of a broadcast image, but that usually doesn't matter. However, when you send a 640-x-480-pixel computer image to a TV, overscanning magnifies the image, placing important items — such as the menu bar, Trash, and disk icons — at the edges of the TV's display area and practically out of sight. When designing your presentation, try to keep important items within the viewable screen area (see Figure 1).

A bigger display problem is the flickering that occurs in display of thin horizontal lines, such as those in a spreadsheet. Computer monitors refresh the entire screen 60 times per second or faster. A TV, however, paints the screen only 30 times per second, in two interlaced passes. One pass lays down the even-numbered rows, and the next lays down the odd-numbered rows. Any thin horizontal line in a document occupies a single odd or even row, so it's painted only during odd or even passes — or just 15 times per second.

Figure 1: In a typical TV display, overscanning magnifies an ordinary 640-x-480-pixel desktop (above) so that items at the edges, such as menus and disk icons, are barely visible (below). Some video cards correct for overscanning, but you should also design your presentation so that all items are visible on the TV screen.
which creates a flickering effect. There’s an expensive (about $2,500) flicker-free solution in the form of VideoLogic’s Mediator (a scan-converter/NTSC-encoder-box combination), but the following tips offer some cheaper solutions.

Licking Flicker

Here are some hardware and software flicker-correcting solutions:

• Two video cards that correct flicker are Apple’s Macintosh Display Card 8•24 and Macintosh Display Card 8•24 ac. These cards also produce a smaller desktop that compensates for overscanning on the TV display. To set the flicker-free option, go to the Monitors control panel and select the monitor icon that represents the video card you’re using with the TV or VCR. Set the monitor to black-and-white or 4, 16, or 256 colors (or gray). Select Options, and click on the Flicker Filter check box in the subsequent dialog box. Close the control panel, and restart. After startup, you’ll see a smaller desktop on your video device and the image will be flicker-free.
• You can also get a flicker-free presentation with the older (and now discontinued) Macintosh High-Resolution Display Video Card. You need to use the Macintosh II Video Card Utility (available from user groups) to adjust this card’s display rate for TV/VCR output. The utility’s flicker correction works only in black-and-white mode.
• If you’re working without a flicker-fixing setup, avoid background grids when using graphics programs and don’t display spreadsheet grid lines. Tuck the window’s title bar as far as possible under the top of the screen or menu bar so that the horizontal lines won’t flicker.
• Try using 2-pixel-wide lines for drawing. This eliminates most flicker. Lines angled at 20 degrees or more from horizontal don’t flicker.
• Use a colored background to reduce the contrast between the foreground objects and the background.

• Avoid using patterns. If you must use them, open your application’s Pattern palette and check it on the TV screen to see which patterns flicker most.
• To reduce the contrast between the edges of the text and the background, use a program such as Photoshop to create anti-aliased (smooth-edged) text whenever possible (see Figure 2).

Improving Your Image

Try these tips when you’re composing a presentation:

• Design for the kind of equipment that will be used to display the presentation to an audience. Make allowances for the loss of quality from duplicated videotape.
• Judge the size and readability of elements such as text and graphics on the TV display from the distance at which your audience will be viewing it. Make adjustments accordingly.

Figure 2: To reduce contrast and therefore flickering, use anti-aliased (smooth-edged) text whenever you can. The magnified character (right) shows how the anti-aliased pixels along the edge of the character blend the letter’s color with that of the background.

Figure 3: Simple steps for clearer text on a TV screen include using boldface styles, colored text to reduce contrast and flicker, larger font sizes, and shadowed text to occasionally add contrast. Frequently used symbols such as + and = demand even larger point sizes than does text, because they’re naturally small and can be indistinguishable on a TV screen.
- Compose presentations to fit the TV screen, not the Mac screen. If you don't want to work directly with a TV as your composition monitor, use a drawing program to construct a 512 x 342-pixel rectangle and save it in the Scrapbook or in a template document. Use it as a guide for composition.
- Use larger font sizes than usual, because a TV display's lower resolution makes small font sizes hard to read. Try boldface styles. Font legibility depends upon the quality and compatibility of your video card, converter box, recording unit, and display system. The better they are, the smaller the point size you can get away with. Typically, 18 points is legible on most screens. 12-point Geneva Bold and 12-point Chicago are good regular-sized starting fonts (see Figure 3).
- Use shadowed text occasionally to add contrast between text and the background.
- For spreadsheets, use larger font sizes so that important symbols such as + and = are clear.
- Record your session at your VCR's standard-play (SP) setting for the best playback quality.
- At show time, use your TV or VCR sharpness control and adjust it until you get the best-looking image. This generally helps reduce residual flickering, false color, and ghost-edged pixels.
- Your video production will be a silent film unless you use a sound-capturing system that includes a good microphone (these cost $20 or so) and a tape deck and microphone amplifier or audiomixer. You don't need anything elaborate or expensive — you're not using the tape deck to record sound, only to accept and control the microphone input and send it through the Line-OUT or Play jack to the VCR's Audio-IN jack.

Salvatore Farascandolo has discovered that recording a good, smooth presentation is far harder than choosing the hardware.

### Video on a Budget

There are various ways of channeling and converting the Mac's video information to the NTSC (National Television Standards Committee) format understood by TVs and VCRs. At the bare minimum, you need a video-output card installed in your Mac that can synchronize to the requirements of TV/video output and an NTSC encoder that can convert the Mac's video information to NTSC format. Some video cards have this capability built in; others require you to use an encoder box or special cable between the Mac and the TV or VCR.

As long as you're happy with a black-and-white or gray-scale presentation, you can go to video without investing in an NTSC encoder or special board. With a small-tip soldering iron, you can make a cable for about $5 that will let you connect your Mac's video card to a TV or VCR. You can use this cable with Apple's Macintosh Display Card 8x24 and 8x24 or, the Macintosh High-Resolution Display Video Card (assisted by the Macintosh II Video Card utility), the Macintosh Display Card 48, the Radius DirectColor GX card, and the RasterOps ColorBoard 264 and ColorBoard 364.

To make the cable, you need a DB-15 male connector and a shielded coaxial cable attached to an RCA plug (a typical stereo-hookup plug), available from electronics stores (see Figure A). You also need a small-tip soldering iron and needle-nose pliers.

Solder the center wire from the RCA plug/cable to pin 5 on the back of the DB-15 connector and the outer wire to pin 6. Using a piece of wire, connect pins 4, 7, and 11 and twist the wire's ends together and solder them (see Figure B). To avoid inadvertently connecting the wrong pins, double-check the numbers by each connector pin before you solder. When you've finished connecting the pins, triple-check the final assembly by pin number.

To use the cable, plug the DB-15 connector in the Mac's video-card port. Plug the RCA plug into your VCR's Video-In port, and connect the VCR to the TV. Set the display in the Monitors control panel to gray, not colors — you'll get gray scale anyway, but by setting the monitor to gray, you get much smoother shading. If you're using the Macintosh High-Resolution Display Video Card with the Macintosh II Video Card utility, you need to set the monitor to black-and-white (make sure also that you check the Flicker Filter box in the Options dialog box). The TV screen now becomes the monitor, and you can use the VCR to record your presentation.

![Figure A: For about $5, you can create a Mac-to-video cable from an RCA (phono) plug connected to a shielded coaxial cable (top) and a DB-15 male connector (bottom).](image)

![Figure B: If you're handy with a soldering iron, you can make this cable for about $5. It connects several popular video cards directly to your VCR or TV without requiring an NTSC-encoder box. To make the cable, connect the RCA plug's center wire to pin 5 of the DB-15 connector and the outer braid wire to pin 6. Use wire to connect pins 4, 7, and 11, and solder the wires' ends together.](image)
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File Sharing Made Easy

System 7’s file-sharing capability brings real networking power to individuals—and the price is right. Here's a quick course in what it does, what it doesn't do, and how it fits into the scheme of things.

By Bob LeVitus

System 7 gives you built-in file sharing—the ability to share folders and their contents with others on the network. It’s not the fastest or most powerful way to share files, but it has two seductive advantages—it comes with System 7, and it works. In fact, for small work groups (or for larger groups that share files only occasionally), file sharing works great. If you don’t already have a way to share files across your network (and maybe even if you do), System 7’s built-in file sharing may be just what you need.

So what’s the catch? Well, file sharing does have drawbacks, some of them quite severe. For example, it’s not as fast as using a dedicated server, it doesn’t allow centralized administration and backup, and only ten users at a time can log on to your Mac to access shared volumes.

If you remember that System 7’s file sharing is not for big, complex, or heavily used networks, everything’s fine. Also remember that file sharing requires about an extra 268K of RAM, so when you’re not using it, make sure you turn it off, via the Sharing Setup control panel. You must be connected on an AppleTalk network to use file sharing. If you have a networkable printer such as a laser printer, your network is already in place.

How It Works

File sharing is a personal version of AppleShare—it lets you share volumes and folders (and the files inside them) with other users on an AppleTalk network. With your permission, other users can view or edit documents that are on your hard-disk drive from their Macs. File sharing includes some security features that provide password control over who can see or change files on your hard disk.

What you get with System 7 is distributed (also known as peer-to-peer) file sharing—meaning that it doesn’t require a dedicated file server as AppleShare does. (With distributed file sharing, any users on the network can make their files available to any others; dedicated file sharing, in comparison, requires that one machine, the server, contain all shared files.)

Installing file sharing is a breeze—it’s automatically installed when you install System 7 (unless you perform a custom System installation, in which case you need to install the file-sharing software). There are five easy-to-use components: the Sharing Setup, Users & Groups, and File Sharing Monitor control panels; the Chooser; and the Sharing command on the File menu.

File sharing is easy to use. If you’ve never tried it, here’s a quick tutorial that will let you share files in minutes. First, open the Sharing Setup control panel and type in your name, a password, and your computer’s name. (Your name is your account name for the network. It lets you log on to your Mac’s shared folders and volumes if you want to access them from another Mac on the network. The computer name you enter is the name that will appear in
the list of available file servers on the network when another user clicks on the AppleShare icon in the Chooser.) Click on the Start button for file sharing, and close the Sharing Setup window; File sharing is now turned on.

Next select a folder to share, and choose Sharing from the File menu. After the privileges window appears, click on the check box next to “Share this item and its contents,” and your name appears as the folder’s owner. Make sure you have the following privileges: See Folders, See Files, and Make Changes (these are usually selected as defaults). Close the window, and click on the Save button when you’re prompted. That’s all you have to do to make a folder available for sharing.

Accessing a shared folder or disk is the same as accessing an AppleShare server. Simply go to another Mac on the network, use the Chooser to select AppleShare, select your computer’s name, and click on OK. Type in your name and password; click on OK; and when the dialog box appears, select the shared folder and click on OK. An icon (the same one you’d see if you accessed an AppleShare server) with the name of the folder appears on the desktop, and you can access anything in the folder, as long as you are using someone else’s Mac. You can even use file sharing to access your entire hard disk across the network by making your hard disk a shared volume, as described in the “office on a floppy disk” trick in last month’s column.

Generally you’re going to want to make volumes and folders available to other users. The Sharing command lets you give privileges to everyone on the network. You can also restrict access to certain users or groups, however. To do this, go to the Users & Groups control panel, choose New User from the File menu, type in the name of the user to whom you want to give access to the folder, and then double-click on the icon with that user’s name. The dialog box that appears lets you assign a password and privileges to that user (and any group to which that user is assigned). Close the window, and save your changes. To make a shared folder available to the new user, select the folder, choose Sharing from the File menu, and select the new user’s name in the pop-up User/Group menu.

If you want to create a group of registered users, the process is similar: Select New Group from the Users & Groups control panel’s File menu, and then give it a name. When the New Group icon appears, drag in the icons of the users you want to make members of that group.

If you have a mixed System 6/System 7 network, you can still use file sharing. Although System 6 users can’t share folders from their Macs, they can access shared volumes and folders that are on Macs running under System 7. The procedure is the same as accessing a normal AppleShare server, so if you don’t already have it, System 6 users must install the AppleShare client software, which is part of the Mac’s System software.

If you use removable media, such as CD-ROMs or SyQuest cartridges, and you have file sharing turned on, the removable media are shared automatically (only you have privileges, however, until you give privileges to other users). This means that all mounted volumes on your desktop are available to you from other Macs on the network, but it also means that to eject these disks or cartridges, you must turn file sharing off.

Clearly, file sharing is pretty simple. However, if you’re new to the Mac and your copy of System 7 came from the Personal Upgrade Kit, take some time to go over the materials in the kit. For basic information and a hands-on introduction to using file sharing, check out the Macintosh Networking Basics on-disk tutorial — you’ll be up and running in no
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**What It Doesn't Do**

The limitation that will affect the most users is the fact that file sharing lets you share only ten folders at a time. Furthermore, only ten users can simultaneously be connected to any shared volume. If you need more capacity than this, you need more-powerful file-sharing software. If your network is big, heavily used, or complex, it's probably better to use AppleShare — Apple's heavy-duty dedicated file-server software — or a third-party alternative such as Novell NetWare for Mac (for a complete report on dedicated file servers, see “Mac, DOS, and VAX File Servers,” June '91, page 134).

According to Apple, using System 7's personal file sharing is slower than using a dedicated server. File sharing is optimized for small workgroups, and you get the best performance when traffic isn't too heavy. Dedicated file servers, on the other hand, are designed for high traffic and many users, so depending on your network configuration, an AppleShare server can be about 25-percent faster than a Mac using file sharing. If performance is an issue, look beyond System 7's built-in file sharing.

Another drawback, particularly if you have a Mac Classic or an LC, is a perceptible performance degradation when other users are accessing your files over the network. Some of the symptoms include erratic cursor control and windows that flicker as they open or close. If this is bothersome, switch to a dedicated file server.

File sharing doesn't involve any kind of centralized administration. All administrative responsibility (deciding who has access to files and who can make changes, for example) is in the hands of individual users. There's no network-administration software, no way to monitor which users are added and deleted, no systemized backups, and so on. Although such a democratic system can work for small groups, I discourage it for larger networks, where good network administration is vital for a smooth-functioning network.

Another potential problem is the unavailability of files on Macs that are shut down or disconnected from the network. A dedicated file server eliminates this problem, because when it's on, all files are available.
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The Big Picture

Perhaps you're wondering where file sharing fits into the grand scheme of things. Will it be the death of third-party distributed-server software such as Sitka's MacTOPS and DataClub, from IBS? Will it make inroads into the dedicated-file-server market?

Probably not. In fact, it'll probably inspire a new generation of file-sharing software that's easier to use, is more powerful, and offers more choices. Why? Because by building file sharing into System 7, Apple has raised the stakes. Now other file-sharing products have no choice but to improve if they want to survive. And they will. I've seen preliminary information on System 7-friendly versions of MacTOPS and DataClub — both products should be available by the time you read this — and each has powerful features that aren't found in personal file sharing.

Remember when Apple began including the utility MacroMaker in System software? There was speculation that it would kill similar third-party products such as QuickKeys and Tempo. It didn't, though: It made them healthier. Now we have QuickKeys 2 and Tempo II Plus, and MacroMaker is history. The same thing happened with HD Backup, the backup software that used to be included with System software. It didn't kill programs such as Redux, DiskFit, or Retrospect — it didn't even make them sick.

So just as MacroMaker and HD Backup fired up third-party publishers to write better programs, personal file sharing should mean better third-party file-sharing software.

The Bottom Line

With modest needs, a small network, and light file-sharing demands, System 7's file sharing works well. If your network is big and/or busy, you need to investigate more-powerful solutions you can use with file sharing.

Regardless of your network's size, file sharing is convenient, even if you use it only to create a folder on your Mac into which other users can drop files for your review, without giving them any other access privileges. For small offices with fewer than ten Macs, it's a cheap way to finally kill off SneakerNet. I can't count the number of small businesses I've visited that don't have any file-sharing software and offer excuses such as "It's too much hassle." "It's too expensive," or "We haven't gotten around to it yet."

From now on, these alibis are unacceptable. File sharing is not a hassle, it costs nothing, and — assuming you're already sharing printers — all you have to do is turn it on. There's nothing to lose. If it turns out you need more-powerful software, all it's cost you is a little time.

Bob LeVitus is working on an update to Dr. Macintosh as well as Son of Stupid Mac Tricks, both from Addison-Wesley (Reading, Massachusetts, 1991).

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Excel's Add-In Value

Excel's new add-in macro sheets let you add custom features to worksheets, databases, and graphs.

By Julianne C. Sharer and Steven S. Wexler

Even though Microsoft has added many new spreadsheet, graph, and database features to Excel 3.0, there's probably something from your wish list of features that wasn't included. Well, if Excel 3.0 doesn't have everything you want right out of the box, you may be able to build that desired feature yourself, using Excel's add-in macros.

Excel's macros—sequences of stored commands that can be played back as desired—are stored on macro sheets, which look like standard Excel worksheets but which have wider columns for writing and storing the macro code. Basically, an add-in is just a macro sheet that has been saved in the Add-In file format. You open it just as you would any other file; after that, however, you have no access to it and it becomes a transparent part of the program. The only way you can tell that you've loaded an add-in is by the added abilities (such as new menu options and functions) it gives the program. You can also get Excel to load an add-in file automatically by placing it in the Excel Startup Folder in the System Folder. If you do this, the add-in will behave as though it were an integral component of Excel.

Add-ins differ from standard macro sheets in three important ways:

1. Once an add-in has been loaded, you can't examine it and it remains loaded until you quit Excel. This means that developers don't have to worry about hiding the macro sheet or protecting it from curious users.

2. Because they can run automatically, command macros (command sequences stored as macros) that are part of the add-in do not appear in the Macro Run dialog box.

3. Custom functions that are part of an add-in appear in alphabetical order within the Paste Function dialog box, rather than at the end, and are not preceded by the add-in's filename. (You create custom functions by combining formulas and built-in functions and use them to simplify frequently used calculations.)

Add-ins can be as simple or as complex as you like. Because they add transparent functions to Excel, add-ins are an ideal way to add company-specific features to the program. For example, if your company has guidelines on how charts should appear, add-in macros let you easily modify Excel's Set Preferred command so that users can choose from predefined chart types, complete with corporate logo and font preferences. In this article, we'll show you how to create an add-in by writing a macro that enhances the way Excel sorts a database. (This macro is also available from Zmac's MacUser Forum, in Library 3 [Utilities]. The filename is XLSORT.SIT.) You create, edit, and format macro sheets, using the same procedures as for worksheets. If you've never written or used a macro, look at Excel's User's Guide for a good introduction.

Improving Excel's Sorting

Creating a database in Excel is an easy matter—you simply highlight the column headings (field names) and rows (records) you
want to include and then choose Set Database from the Data menu. Excel then creates an area called Database that expands and contracts automatically as you add or delete records by using the Data menu’s Form command. This works fine until it’s time to sort the records in your database. Even though you’ve already defined an area called Database, when you want to sort the records, Excel requires that you first highlight the area you want to sort—in this case, the Database area less the field names—before you issue a Sort command. Wouldn’t it be nice if Excel could figure out that because you’ve already got an area called Database, it should just go ahead and sort those data records? Well, with Excel’s add-in capability, you can modify the built-in sorting routine to do just that.

The NewDataSort add-in (see Example 1) does the following: When you click on Sort, it first determines whether or not the Database area has been defined on the active worksheet. If it has not been defined, Excel will display the standard Sort dialog box, which asks you how you want to sort the data. If the area has been defined, Excel will go ahead and select only the records from the database and then display the Sort dialog box.

The NewDataSort macro is formatted in the style recommended by Microsoft, where the code is in the center column, any cells named within the macro are labeled in the left column, and brief descriptions of what the code means are in the right column. Here’s how the macro works:

### Finding Database

To see if the name Database exists on the active worksheet, the macro calls Excel’s NAMES function to obtain a list of the names defined on the sheet. Using the MATCH function, it then searches for Database within that list. If there is an exact match, it returns 0; if not, MATCH returns the error value #NA to show that no value was returned.

If MATCH returns #NA, there is no Database area and the standard Sort dialog box is called up. If the result is a number, the macro needs to select the database records, which it does by using the block functions IF and END. IF.

If the macro has determined that the database exists, it can find the cells it should sort, using Excel’s powerful OFFSET function, which calculates the location of a cell area. OFFSET has five arguments, starting with the reference argument, which gives a starting reference point for finding the database range. The remaining arguments—row offset, col offset, height, and width—describe the differences between this starting reference point and the range you’re interested in.

#### Example 1

```
NewDataSort:
NameIndex = MATCH("Database", NAMES(1), 0)
         = IF (ISNUMBER(NameIndex))
         = SELECT (OFFSET (Database, 1, 0, ROWS (Database) -1))
         = END. IF ()
         = ERROR (TRUE, BadSelection)
         = SORT (?,) = ERROR (TRUE)
         = RETURN ()

BadSelection = ALERT("Cannot do that command on a multiple selection.",)
          = ERROR (TRUE)
          = RETURN ()
```

```
Returns #NA if name not in list. Database defined on worksheet. First record row through Last data row.
In case selection is noncontiguous. Bring up Excel’s Sort dialog box. Back to normal error messages. Same message Excel gives. Back to normal error messages.
```

#### Example 2

```
=SELECT (OFFSET (Database, 1, 0, ROWS (Database) -1,))
```

```
```
Because the database records are in the second through the last rows of the database range, you want the calculated reference to begin one row and zero columns from the top of the database, extend down as many rows as there are in the database, and extend across the same number of columns as there are in the database. To select this range, you enter the function as an argument of the SELECT function, resulting in the formula given in Example 2.

**Sorting the Selection**

At this point, the cells to be sorted have been selected, either by the macro or by the user if no database range exists. But before calling the SORT? function, which calls up Excel's Sort dialog box, you need to add a trap for possible selection errors. If, for example, a user selects a noncontiguous range of cells and has not defined a database on the active sheet, Excel will display an error message ("Cannot do that command on a multiple selection") when the SORT? macro function is processing and will then display a second error message, prompting the user to choose between halting the macro, continuing it, or debugging it.

To prevent this scenario from happening, the macro includes the function =ERROR(TRUE, BadSelection), which tells Excel to branch to the cell named BadSelection if an error occurs while it's executing SORT?. Then, using the ALERT function, you can duplicate Excel's standard error message. To restore Excel's normal error handling, use the ERROR(TRUE) function; otherwise Excel will continue to display the error message in response to any error, even after the macro has executed.

**Sorting Other Areas**

The NewDataSort macro works great if all you ever need to do is sort a database. But what if you want to sort another part of the worksheet in addition to the Database area? You can revise the NewDataSort macro so that it lets the user choose what area on the worksheet should be sorted. To do this, the macro first sees if there is an area called Database. If not, the macro tells Excel to display the standard Sort dialog box. If there is an area called Database, however, the macro will determine if the user is highlighting an area of cells. If so, the macro will prompt the user to choose between sorting the database and sorting the selected area. When the user has chosen, the macro displays the Sort dialog box as usual. If only one cell is highlighted, however, the macro will select the database records and then display the Sort dialog box.

The code for the revised NewDataSort macro is shown in Example 3. Because the

---

**Example 3**

```
Example 3

NewDataSort

NameIndex =MATCH("Database", NAMES(1), 0)
=IF(ISNUMBER(NameIndex),
=IF(ISREFACT(ActiveCell()))
UseDatabase =ALERT("Sort Database records?", 1)
=IF(UseDatabase, CUTO(ListRecords)
=ELSE()

SelectRecords=SELECT(OFFSET(Database, 1, 0, ROWS(Database)-1),)
=END. IF()
=END. IF()
=ERROR(TRUE, BadSelection)
=SORT()
=ERROR(TRUE)
=RETURN()

BadSelection =ALERT("Cannot do that command on a multiple selection.")
=ERROR(TRUE)
=RETURN()

```

---

Returns NA if name not in list.
Database defined on worksheet.
Highlighting more than one cell
Ask if user wants to sort database.
If sorting the database, select the records.
Highlighting only one cell, use Database.
First record row through last data row.
In case selection is noncontiguous.
Bring up Excel's Sort dialog box.
Back to normal error messages.
Same message Excel gives.
Back to normal error messages.
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Example 4

Auto_Open
DELETE COMMAND ["Data", "Sort..."])
DELETE COMMAND [5, "Data", "Sort..."]) 
ADD COMMAND [1, "Data", NewSortCommand, 10] 
ADD COMMAND [5, "Data", NewSortCommand, 7] 
RETURN()

Remove default Sort command from Full and Short menus.
Add our menu in its place.

Example 5

DELETE COMMAND (MenuBar, MenuName, CommandName)

Example 6

DELETE COMMAND [1, "Data", "Sort..."]) 

Example 7

ADD COMMAND (MenuBar, MenuName, Command_ref, Position)

Changing the Menu
The point of this add-in is to extend Excel’s Sort command, so the final task in writing the macro is to tell Excel to run NewDataSort instead of its own routine when the user selects Sort from the Data menu. To do this, you need to remove the Sort command from Excel’s Data menu and insert your own command in its place. So that this substitution takes place when the add-in is loaded, create a separate macro called Auto_Open (see Example 4) on the add-in sheet. The Auto_Open name is reserved for a macro that executes as the sheet containing it is opened.

The macro function for deleting commands from menus is shown in Example 5. MenuBar is the menu bar’s ID number, MenuName is the text of the menu within that menu bar, and CommandName is the text of the command within that menu. Of the six menu bars that Excel uses, the two that affect this macro are Full Menus and Short Menus, to which Excel assigns the ID numbers 1 and 5, respectively. So to remove the Sort command from the Full Menus version of the worksheet Data menu, the function should be as shown in Example 6.

Example 7 contains the macro function for adding menu commands. The MenuBar and MenuName arguments are identical to those used by DELETE_COMMAND. Command_ref is the address of a range of cells describing the new command, and Position is the position in the menu where the new command should be inserted.

Example 4

Auto_Open
DELETE COMMAND [1, "Data", "Sort..."]) 
DELETE COMMAND [5, "Data", "Sort..."]) 
ADD COMMAND [1, "Data", NewSortCommand, 10] 
ADD COMMAND [5, "Data", NewSortCommand, 7] 
RETURN()

Example 5

DELETE COMMAND (MenuBar, MenuName, CommandName)

Example 6

DELETE COMMAND [1, "Data", "Sort..."]) 

Example 7

ADD COMMAND (MenuBar, MenuName, Command_ref, Position)
Making the Add-In

The macro sheet is now almost ready to save as an add-in file, but before we explain how to do so, we should mention one of the advantages add-ins have over regular macro sheets. When writing macros for earlier versions of Excel, you had to include certain "housecleaning" chores within the macro that you don't need to worry about with add-ins. For example, when a well-behaved macro application is closed, it should remove any custom commands from Excel's menu bars; otherwise, if Excel remains running, those commands are still visible to the user even though Excel can't execute them. Because the add-in can be closed only when the user exits from Excel, it's no longer necessary to remove these custom commands. Likewise, because add-ins are hidden, there's no need to worry about the macro sheet's appearance.

To save the macro sheet as an add-in, simply select Save As from the File menu, click on Options in the dialog box that appears, and select Add-in from the list of available file formats. To load the add-in, simply open it from the File menu or, if you want it to load automatically when Excel launches, put it into the Excel Startup Folder in the System Folder. In either case, Excel will run NewDataSort in place of the standard Sort command for the remainder of the Excel session.

Once you've loaded an add-in, you can't examine or edit it. However, you can get around this by holding down the Shift key as you load the file. This way you bypass both the Auto_Open macro and the special routine that loads add-ins as hidden files, so the add-in looks and acts just like a regular macro window. At this point, you can edit the add-in.

Use the Library

In addition to fine-tuning existing Excel commands, make use of the library of custom functions that comes with Excel 3.0. The file called Add-in Functions in the Macro Library folder that ships with Excel contains several useful examples, and you can read more about them in Excel's reference manual. Whether you're an occasional user or a macro expert, add-ins allow you to enhance Excel as well as build slicker, friendlier applications.

Julianne Sharrer is director of application development and Steve Wexler is president of WexTech Systems, a New York-based consulting and training firm.
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Compiled by Gregory Wasson

PageMaker

In FreeHand, if you want to repeat an item (such as grid lines that you want to be a specific distance apart), you can clone the item, move it, and then duplicate the action. PageMaker offers the same capability but requires a different set of steps:

1. Draw the item (a line, for example) you want to repeat.
2. Copy it, and paste it on top of itself by using the Option-Paste command (Command-Option-V). Move the duplicated item to where you want it to be on the page.
3. Use the Option-Paste command again. PageMaker will paste another line at the same distance as specified in the last move. You can keep using Option-Paste until you have all the lines you need.

Gregory Wasson

Compiled electronically via Mac, the on-line service for MacUser.

FileMaker Pro

After creating an address book in FileMaker Pro and using it for a while, I discovered that I couldn’t remember the two-letter abbreviations for some state names. Rather than looking up the abbreviations each time I input a new address, I decided to create a predefined list associated with the State field that I could access each time I wanted to add a state-name abbreviation.

You can use the following technique to add any sort of predefined list to your FileMaker Pro database:

1. Choose Define Fields from the Select menu. Select the State field (or whatever field you want to add a predefined list to) in the dialog box, click on Options, and select “Use a pre-defined value list.”
2. In the Display Values dialog box, type each state’s name, followed by a Return, the two-letter abbreviation, and finally another Return.
3. Switch to the Layout mode (on the Select menu), and select the State field.
4. Choose Field Format from the Format menu. In the dialog box that follows, select the “Use field’s value list to display fields as” check box and choose “pop-up list.” Go to the Select menu, and switch to Browse mode.

Now whenever you select the State field to input information, a pop-up list with all the states’ names and abbreviations will open. Just start typing the first few letters of the state name, and the pop-up box will automatically scroll to that state. Then use the mouse or down-arrow key to select the two-letter abbreviation following the state name, and press Return to insert it into the field.

Robb Wesche
Grand Rapids, MI

General

Several programs — FreeHand, QuarkXPress, and MacDraw, for example — let you revert to an earlier saved version of the document you’re working on. Sometimes, however, you might want to look at the earlier version without losing your current version. You can save the new version, using the Save As command, but here’s a faster solution: Select the entire document, and cut it before reverting to the previously saved version. Then, if you don’t like the earlier version, simply delete the contents of the document and paste in the new version. If after making the deletion, you decide you prefer the earlier version after all, simply revert again to the previously saved version.

Dave Shapiro
Minneapolis, MN

Tip of the Month

Microsoft Works 2.0

The Microsoft Works database and spreadsheet modules don’t round off numbers consistently — vital for teachers when assigning grades.

Here’s the formula I used initially to round off grades: =Round(((B7+C7)/200),2).

When this formula averages the test scores of 87 and 84, it rounds up the result, 85.5, to 86. But with scores of 91 and 100, the average, 95.5, is instead rounded down to 95. By adding a very small number (.000001) to the formula, as in =Round(((B7+C7)/200)+.000001),2), you can force Works to consistently round up to the next-higher whole number.

Bob Kimmie
Quincy, CA

Figure A: Microsoft Works’ spreadsheet and database modules don’t always round up numbers consistently. For example, the average of 91 and 100 (95.5) is rounded down to 95 whereas the average of 87 and 84 (85.5) is rounded up to 86 (top). You can get consistent results just by adding a very small number to the normal formula (bottom).
DesignStudio

If you need to check a small portion of text in DesignStudio but it's too small to read on the screen, select the text (up to 20 characters) with the I-beam tool and pull down the Text menu at the far right of the menu bar. The Find Selection command displays your selected text on the menu so you can read it (see Figure 1). You save time doing it this way rather than changing the page magnification, which redraws the entire page.

Jonathan Macagba
Philadelphia, PA

Persuasion

If you find the arrowheads in Aldus Persuasion too large for your taste, you can change their size by changing the length of the line to which they're attached. On longer lines, Persuasion consistently makes the arrows the same size, but by adjusting shorter lines, you can obtain a variety of sizes.

Draw the line in the position you want, and make it the length you want. Instead of choosing the arrow style from the Effect menu and applying it to your line, draw a shorter line off to one side, make it the arrow line, and then adjust the length until you get the arrowhead size you want. Copy and paste this arrowhead on top of the first line. You can also create a selection of arrowheads and copy them to the Scrapbook so you can use them later. Be sure to create them pointing in different directions.

George E. Thompson
Chicago, IL

Norton Utilities for the Macintosh

Although Norton Utilities' Fast Find command is extremely speedy, you can make it work even faster if you hold down the space bar while it's searching—this stops the animated printing-man icon.

Michael D. Bourgon
El Paso, TX

Extra ADB Port for the New Macs

Because the Mac Classic, LC, and IIsi have only one ADB port, you can't plug in more than one pointing device. To get around this, replace the coil cable on your keyboard...
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with the cable that comes with Sophisticated Circuit’s Power-Key. This cable is an L-connector you can plug into the back of your Macintosh (where you would normally plug in the keyboard) that gives you an extra connector for a pointing device. Plug one end of the connector into the back of the Mac and another into the keyboard. Plug your mouse (or other pointing device) into the other ADB port on the keyboard, and plug your second pointing device into the second connector on the PowerKey cable.

You don’t need to buy PowerKey to get the cable: Sophisticated Circuits sells it separately for $10. You can reach the company at (800) 827-4669.

Sven Nielsen
Sanatoga, CA

---

**Tips from the Experts**

**Excel 3.0**
The folks at Microsoft recently sent us some information on something other than Word 4.0! Here’s a tip for the newest version of Excel:

**Aligning Number Formats.** It’s possible to modify noncurrency number formats in Excel 3.0 so that they align properly with currency formats by using the Format Number command. In previous versions of Excel, the numbers in noncurrency cells didn’t line up properly with cash or currency numbers in columns. This was because positive numbers formatted as currency included a space the width of a right parenthesis; thus they aligned with negative currency amounts, which are always enclosed in parentheses. In order to avoid encountering this problem in Excel 3.0, select the noncurrency number cells and choose Number from the Format menu. After the number format, which appears in the Format box, type an underline character and a right parenthesis: _)

When you press Return, the noncurrency and currency numbers should align properly (see Figure B). Note: This tip does not work with the General number format.

---

**Figure B:** Numbers in currency and noncurrency formats don’t line up in Excel when you input the numbers. You can fix this problem in Excel 3.0 by using the Format Number dialog box.

---

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Microsoft Works 2.0

Here are some undocumented navigation tips for anyone who is using Microsoft Works 2.0 without an extended keyboard:

• To go to the top of a document, press Command-A.
• To go to the end of a document, press Command-D.
• To move up approximately one page at a time, press Command-K.
• To move down one screen at a time, press Control-L.

Matthew D. Meera
Columbus, OH

Double Helix

When I use Double Helix, I often want to look at two collections (the Double Helix word for databases) simultaneously. Double Helix can open only one collection at a time. Although Odesta has copy-protected the program so that copies with the same serial number cannot run on a network at the same time, you can run duplicate copies of Double Helix on one computer under MultiFinder with no problems. Just copy the program by using the Duplicate command on the Finder’s File menu to make as many copies of Double Helix as you need. You can then open the copies under MultiFinder. Of course, you need generous amounts of RAM to make this work.

David Koeltzer
Fairfield, IA

The Finder

To organize your files so they appear vertically in the window, you have to view them by name, date, size, or kind—not by icon or small icon. The advantage of tall, thin windows so that you can see your disk size too (right).

Figure 2: Viewing by name saves desktop space by letting you have tall, narrow windows (left). You can combine the best of this view and View by Small Icon so that you can see your disk size too (right).

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Tips from the Experts

Nisus 3.05
Paragon Concept's tech-support experts share some tips about their word processor that make Nisus even nicer.

Nonbreaking Spaces. Sometimes you don't want a sequence of characters that includes spaces to break between lines (for example, in a mathematical equation). You can avoid this in Nisus 3.05 by using an Option-space (called a nonbreaking space in other programs). To create such a space, hold the Option key down while you press the space bar.

Figure C: Hold the Command key down while you click on the title bar of any window in Nisus 3.05, and the Windows menu pops up on-screen, letting you quickly jump to any other open window.

If you want to globally change the spaces within a selection to Option-spaces, you can do so by creating the following one-line macro:

1. Choose New from the Macro submenu, on the Tools menu.

2. Type the words Find/Replace, followed by a space. Type a pair of straight (dumb) quotation marks with a space between them. Type a second pair of quotes, this time with an Option-space between them. Type a final set of quotes containing an s (this tells the macro to replace the spaces in the current selection only).

Your macro should look like this: Find/Replace " " "s".

3. Save the new macro, and assign a key to it. Select the text that you want to change, and invoke the macro with this key.

Going Windows. Here's a tip that's very useful if you have several windows open simultaneously. Press the Command key, and click on the title bar of any window (including the Catalog and Macro windows). The Windows submenu (which you ordinarily access on the Tools menu) will pop up and show you which windows are open. You can then access any window by double-clicking on its name on the Windows submenu (see Figure C).

Zooming the Unzoomable. Sometimes you might position a window on the screen so that its zoom box in the right corner of the menu bar (for resizing) is off the screen. However, Nisus lets you use the zoom box—even if it's off-screen—simply by double-clicking on the window's title bar. This is true for all windows, even those that are maximized.

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of your windows, including the Macro, Glossary, and Catalog windows.

Making Smart Quotes Stupid. If you use smart quotation marks a lot, you should probably set up your Editing Preferences with Smart Quotes checked. Then whenever you type an ordinary quote (double or single), the correct curly quote will be substituted automatically. Sometimes, however, you want to insert straight quotes (when using the symbols for feet or inches, for example). Rather than going to the Editing Preferences menu and changing the settings each time, all you have to do is hold the Command key down while you type the quotes. Holding down the Command-key modifier reverses the Smart Quotes setting for that entry.

is that you maximize the number of windows you can have open on your desktop. However, because my 40-megabyte hard disk always seems to contain 38,456K of data, I need to see the available disk space, which is possible only if I view by icon or small icon, neither of which lists files vertically.

My solution: Depending on how you want the files listed in the window, choose View by Name or View by Date (or one of the other vertical views), select all the items in your window, move them to the desktop (which forces them to be displayed as large icons), and then switch the View mode of the window you just emptied to Small Icons. When you bring your still-highlighted selection back to the window, your files will stay in the same vertical order you had before but you'll have slightly larger targets to click on and you will be able to view your disk size in the top right corner of the window (see Figure 2).

Scott A. Farley
Seattle, WA

Word 4.0
Microsoft Word is a great tool for making tables to export into page-layout and drawing programs. To capture the table's borders and cell relationships, you must use Word's Copy as Picture command (Command-Option-D), but this command doesn't work properly when you want to include text that is not part of the table with the table (as a title or caption, for instance). Here's a workaround:

First, move the table away from the header or caption to another part of the document. Select the table, choose Copy as Picture, and paste the picture where the table was before you moved it. Select the picture you just pasted, along with the accompanying title or caption, and choose Copy as Picture again. The whole thing can now be pasted into the DTP or drawing program, and you still have a copy that's suitable for editing in your Word document.

At first glance, it may seem easier just to make the caption or header part of the table by putting the text into a table cell, but because this involves deleting columns, repositioning cell boundaries, removing cell borders, and applying styles, it's generally quicker and easier to use the two-step Copy as Picture solution.

Ward Barnett
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Fixing Your Formatting

Q. I often download text files from my company's DEC VAX mainframe onto my Mac. These files are 132 columns long and look like a spreadsheet. When I list the files using my terminal emulator, the report looks fine. However, after I download the file and try to edit it with MacWrite, the character spacing seems to have taken on a life of its own. What's happening here?

Steven A. Duhon
Chicago, IL

Andy: If there were a Hall of Fame for common questions, Steven, I promise that your question would be enshrined in its first year of eligibility. Almost everyone has asked this question at one time or another.

The problem is this: The data you got from the VAX was formatted for use with a monospaced font, such as the one your terminal emulator uses. In a monospaced font, all characters are the same width (W is as wide as an i, a comma, or a space). This lets you line up columns by eye, inserting spaces between elements until they look right. It'll always print out properly — as long as you use a monospaced font, such as Monaco or Courier. Switch to a proportional font (most fonts used with the Mac are proportional), and you're in trouble. Because every character in a proportional font has a different width, those perfectly formatted columns become ASCII spaghetti in MacWrite.

The simple solution is to switch to a monospaced font when you open the file in MacWrite. Everything should line up in perfect columns, just as it did in your terminal-emulation program.

The best solution, however, is to format the columns with tabs rather than spaces. That way, you can use whichever font you want without messing up the formatting. Numerous shareware programs change sequences of spaces to tabs (see Figure 1). The most popular is the freeware program Add/Strip, which also performs such niceties as stripping out control characters and changing straight quotes and apostrophes to the correct, curly variety. But when you're dealing with a text file formatted in columns, the best choice is David Craig's

Figure 1: The best way to line up columns of information is with tabs rather than spaces — that way the columns always line up, no matter what font you're using. Add/Strip and Columbo are a couple of programs that automatically replace spaces with tabs. Columbo is shown here in action: The two vertical dotted lines represent where tabs will go in the reformatted file.

But Were Afraid to Ask

Obviously, MacUser sends most of its subscription forms to Brainie-S types who need to know only about 68040 bi-redundancy codes — but take heart. We at Help Folder also appreciate those simple questions that allow us to write simple, patient responses and then go to bed early. If your question is so simple or odd that you're ashamed to even ask, we'll say it was sent in by a whimsical character from the Beatles' White Album:

Q. A shareware game I play a lot (1,000 Miles) uses a set of black-and-white icons. Using ResEdit, I added an lcx4 resource and colorized these icons. Is there any way to tell the program to use these color icons instead of the black-and-white ones? I'm obsessed with color now that I've traded up from a Mac Plus to a II.

Rocky Raccoon
Disc 1, Track 13

Andy: Precisely which planet are you from? Are you really trying to tell me that you think it's possible to get extra functionality out of a computer-related item without having to send someone a little extra cash?

Unfortunately, if a program hasn't been designed to use color icons, it can't use 'em . . . period. When Apple added support for color icons, it created an entirely new QuickDraw data structure for the icons called CIcon and three new QuickDraw routines to support them called GetCIcon, DisposeCIcon, and PlotCIcon.

The color-icon functions are nearly identical to those for black-and-white icons, so you may wonder why Apple bothered to make such a blatant distinction between the two. My guess is that the company didn't want to create any compatibility problems with old software. That's why Apple gave us System 7, after all.
Columbo (the name alone is worth the $15 shareware fee). Just open the file and click where each column begins, and Columbo exports a new text file properly formatted with tabs. Both Add/Strip and Columbo are available from on-line freeware and shareware sources such as Zmac or from user groups.

**Word Identity Crisis**

Q. When I bought Microsoft Word 4.0, I ran it for the first time directly off the master disks. Word asked me for my name and the name of my company and, not thinking, I just typed in any old garbage.

When I installed Word onto my hard drive, I found I was stuck with the information I'd entered on the master disks. How do I fix this?

Wayne Young
Thirroul, Australia

Andy: I don't want to have to remind you of this, but they'll probably take away my official Mr. Know-It-All propeller beanie if I don't, so here we go: Never run a program directly from a master disk. The whole point of having a master disk is to be sure that no matter what boneheaded thing you do to the program, you'll always have a pristine copy tucked away. This gives you the highly sought-after sensation that your butt is covered.

OK. That garbage registration information you entered is stored in the data fork of Word itself, so you can fix things pretty easily with a disk editor such as Symantec's SumTools (part of SUM II). You can't input a new serial number, but you can reenter the Name and Company info. Here's how:

Launch SumTools, and from the File menu, select Edit File. Choose the program you want to fix. To make sure you're editing the program's data fork, go to the File menu, choose Which Fork, and select Data Fork (you know you're editing the data fork if you see the current registration information on the right side of the window). Then, from the File menu, select Set Logical End-Of-File. In the dialog box that appears, type 0 in the empty box next to New Logical EOF (see Figure 2). Click on Set EOF, save your changes, and quit. The next time you run the program, Word will think it's not registered and will ask you to reenter your name and company information.

**Screen Real Estate Poached?**

Q. Ever since I got my Mac Plus a couple of years ago, there's one question I've wanted answered: Is there some way that the Mac's 9-inch screen can actually give you a 9-inch-diagonal display? The black band on the perimeter of the display, which takes up one third of the surface area, is extremely annoying. Is there some electronic reason for this, or is it just "narrow"-mindedness?

E.D. Sewell
Upper Darby, PA

Andy: Well, E.D., it actually has something to do with the solution to the infamous Beale Cipher, the as-yet-uncracked code that reveals the location of billions of dollars in gold and silver buried somewhere out West. But as I don't want anyone to get to the treasure before I do, I'll just give you the technical explanation.

If you had text right on the border of the display, it'd probably be too fuzzy to read. The electron beam has to travel farther to get to the edges of the display than it does to get to any other part of the screen. As a result, it has trouble holding focus. Also, surface aberrations in the screen tend to be most pronounced at the corners. In fact, this is one of the best ways to determine the quality of a display: If it provides a nice, sharp image at the corners, you can be sure it's a top-quality screen.

If you're a Mac II user with an Apple-brand color card (such as the Macintosh Display Card 8244 or 8245), you can reclaim some of that real estate with a freeware INIT called MaxAppleZoom (available from user groups and other freeware sources). This INIT extends more pixels out into the normally used edge of the screen. But for Plus owners, well, if it bothers you that much, there are well-labeled adjustment knobs inside the Mac (along the left side) that control the vertical and horizontal size.
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HELP FOLDER

of the display. Equipped with the specialized tools required to open the case, you could conceivably enlarge your display a mine, but you'd be doing it at your own peril and you should try it only if you know what you're doing.

Bob: If you're going to muck around adjusting your monitor, you need to be careful not to mess up the aspect ratio. For best results, use a program such as MacPaint to draw a perfect square on-screen. You can then judge how much you need to adjust the display's horizontal and vertical display by the square's appearance.

Also, you should find a copy of Larry Pina's excellent shareware program Test Pattern Generator, which comes with his book *Macintosh Repair & Upgrade Secrets* (Carmel, Indiana: Hayden Books, 1990). It contains a mechanism to assist you in sizing the display properly (see Figure 3) plus test patterns to help you adjust linearity, focus, brightness, and contrast.

**The INIT That Would Not Die**

Q. I've been carrying around a piece of software baggage for the past five years that I desperately want to get rid of. The software in question is the INIT JClock, which puts a clock onto the menu bar. I thought it was great back when Reagan was president, but my affection for it has waned considerably over the years (same goes for Reagan).

I've looked in my System Folder and elsewhere for a JClock file to throw out, but I can't find it anywhere, not even when I use Find File. How do I get rid of this useless thing?

Steve Thompson
Easton, MA

Andy: You're probably using an old, old, old version of JClock. See, nowadays the System has a standard mechanism for loading and running INIT's, called the INIT 31 mechanism. You just drag INIT files into the System Folder, and the System automatically finds the INIT's and runs them at every startup. However, in the old days, INITs were low-level resources that actually had to be installed inside the System file, much as fonts and DAs were before System 7. Typically this was done either with ResEdit or with a special program that came with the INIT.

To get rid of JClock (or any other System-installed INIT-from-Hell such as ScreenSaver), you have to restart your Mac from a floppy disk and use ResEdit to seek and destroy the foul code. After you've launched ResEdit, double-click on the INIT resource in a copy of the System file (move the original System file to a safe place, just in case), and you'll see an INIT named JClock. Click on that INIT, select Clear from ResEdit's Edit menu, save, and restart. Simplicity itself.

Before we go on, however, I am contractually obliged to deliver the standard ResEdit harangue, so here goes: ResEdit can be a wickedly destructive program. Use it only to edit backup copies of files and applications. You should never use ResEdit on active System files or applications. Failure to do so will inevitably result in spontaneous decapitation.

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**SE Screen Shimmy**

**Q.** A few months ago, I installed a 40-megabyte internal hard drive in my SE. Periodically the screen shakes. Can this harm the hardware? Should I have purchased an external drive instead?

**Tracy Swan**

**Lake Charles, LA**

**Andy:** The answer depends on what you mean by “the screen shakes.” If you mean “The lower part of the screen seems to warp a bit when the drive is being accessed but then goes back to normal,” I’d say that the drive is causing magnetic interference with your screen. The magnetic field in the hard drive (normally shielded) is “pulling” at the electrons as they’re being fired at the glass, resulting in a wacky ‘60s-type lava-lamp effect. Annoying but no real hazard to your hardware. As to the causes, well, it could be the result of a drive that is a lot “noisier,” magnetically speaking, than normal, or it could be that there was a problem when the drive was installed. I’d call the company bought the drive from and ask if other customers have had similar problems and if so, what you can do about it.

However, if you mean “The top corner of the screen twitches occasionally” and your SE was manufactured in 1987, check to see if it has the original reel-type fan. These fans caused some early SEs to develop an irritating shimmying defect, which Apple agreed to repair at no charge when SE owners appeared in Cupertino with torches and pitchforks. As I recall, the condition was cause more for annoyance than alarm, but you may want to have the problem attended to.

Finally, if you mean “The screen breaks up into a snowlike mess, and sometimes I hear a high-pitched whine,” then it’s likely that your power supply is in bad shape. In this case, there’s a real hazard to your hardware. Although you may get lucky (ha!) and just lose power to your Mac, you should know that a bad power supply can fry your whole computer, not to mention wreck your whole day, so get thee to your neighborhood Apple dealer — pronto!

Although the shimmying could be just a minor annoyance (such as when it’s caused by interference), it should generally be treated as a potentially Mac-crippling problem, so have a technician check it out. And don’t forget that, according to Apple’s standard warranty card, if technicians tell you, “Oh, they all do that,” you’re allowed to poke them right in the eye.

On the subject of internal versus external drives, internal drives have obvious advantages: They take up zero space on your desk, they require no additional cables, and they’re generally less expensive than external drives. I, however, have always preferred external drives, mainly because you can move them from machine to machine. Also, when your SE’s power supply finally does explode, the SE can go to the shop while your hard drive stays home, ready to be hooked up to another Mac. It works the other way around too — a malfunctioning hard drive won’t leave you without a Mac, because you’ll still be able to

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work from floppies. Well, maybe not work, but you'll still be able to get Tetris up and running, which is better than nothing.

Bob: Excellent advice. I disagree only on one point: I don't recommend going around poking technicians in the eye. A better technique is to loudly proclaim, "To hell with this! I can buy an IBM clone and Windows 3 for one-tenth the cost of a similarly equipped Mac!" I guarantee your Mac will be fixed on the spot.

Why Do I Quit Unexpectedly?

Q. I use an SE/30 with 5 megabytes of RAM and am using MultiFinder with System 6.0.5. Every once in a while, the application I'm using will quit for no apparent reason and I get a message saying, "The Application has unexpectedly quit (1)."

Why does this happen? What does (1) mean? I can't find an answer in any of my reference books, and this can be disturbing, because I lose all changes I made since my last save.

Eric Caspole
Arlington, MA

Bob: Unexpectedly quitting under MultiFinder is similar to bombing under the Finder, but since I don't know what (1) means and I can't provide a technical explanation suitable for a family magazine, I turned to Apple's Chris Espinosa, Help Folder author emeritus. According to Chris, with System 6.0.5 under MultiFinder, the "Application has unexpectedly quit (1)" error is a system bomb that isn't serious enough to cause the entire machine to crash but one that terminates that application. Other applications continue to run, and you won't lose any data from these applications. The (1) is identical to the ID=01 error ID that appears in a standard system crash.

Of course, with Systems 6.0.7 and 7, Apple has replaced the meaningless error-ID numbers (1, 2, 12, 25, and so on) with meaningless phrases such as "Co-processor not installed," "Bus error," and the ever-popular "Address error." Not only are these phrases meaningful only to people who understand the internal architecture of the 68000 microprocessor family (and therefore fairly useless to the average Mac user) but they also often have nothing to do with the cause of the problem.

As Chris puts it, a system crash is like finding a car crashed against a tree. "Address Error" is a crushed bumper. "Stack collided with heap" is a broken windshield. Neither the crushed bumper nor the broken windshield will give you the cause of the crash — they're usually just things that happen as a result of the crash. Only by using debugging tools during the crash can a programmer or tester find the actual cause of the crash and fix it.

One last thing: Whenever an application unexpectedly quits, be sure to save any documents that are open in other applications and restart your Macintosh. Unexpected quitting is a signal that something is seriously wrong; saving and restarting will minimize the likelihood of further trouble.

---

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- 44MB REMOVABLE $448.00
- 88MB REMOVABLE $948.00
  - Both Drives Include Cartridge
  - Dual AC Outlets, SCSI Select and 2 Year Warranty

**19" Color Monitors!**

- 19" Ikegami Color $1098
- 19" Trinitron Color $2398
- 19" Sony Color $2398

**DM-2060 19" Trinitron**

- Like Gamakatsu CT-20

60 East Chestnut - 145, Chicago, IL 60611
Visa, Mastercard, Amex, COD, Telecheck Approved Checks, Gov., Corp., Univ., P.O.s welcome
New Drives/ Preformatted with latest stably running software
Factory warranty, Bracket, cables and software included/
30 Day Money back Guarantee

800-621-8469
Hours: 8:30 - 7:00 CST, Saturdays 10:00 - 4:00

Please circle 403 on reader service card.
Laser Printer Sale!

**CrystalPrint Express Laser Printer**
- 12 pages per minute
- 11 Font Families (39 typefaces)
- 3 megs of RAM
- Dual paper trays
- Solid Blacks for graphics
- Letter, Legal and transparencies
- **$3,599**

**Crystal Print MacPublisher Laser Printer**
- 6 pages per minute
- 11 Font Families (39 typefaces)
- 2 megs of RAM
- Adobe type one support
- Solid Blacks for graphics
- Letter, Legal and Transparencies
- **$1,699**

**Crystal Print Publisher II Laser Printer**
- 6 pages per minute
- 11 Font Families (39 typefaces)
- 3 megs of RAM
- Adobe type one support
- Solid Blacks for graphics
- Letter, Legal and Transparencies
- **$2,125**

**Microlaser PostScript Laser Printer**
- 1.5 Megabytes of RAM
- 6 pages per minute
- Letter, Legal and transparencies
- AppleTalk Interface Included!
- **PS17 $1,345**
- **PS35 $1,645**

**NEC SilentWriter 90 PostScript Laser Printer**
- 6 pages per minute
- Adobe PostScript®
- 35 scalable fonts
- 2 Megabytes of RAM
- Letter, Legal, Envelopes, Transparencies and Labels
- **$1,649**

**QMS-PS® 410 PostScript® Laser Printer**
- 2 Megabytes of RAM
- 4 pages per minute
- Letter, Legal, Envelopes, and Transparencies
- Auto switching between Macintosh and IBM
- **$1,949**

*PostScript® is a registered trademark of Adobe Systems Incorporated.*

To Order Call 1-800-333-3353/Technical Info and Customer Service Call 1-800-388-3118

Most major credit cards accepted. All shipments made by Airborne Express Standard Air which is 1- to 3-day service. Call for shipping costs.
When you call MacLand for technical information, or to place an order, the call is absolutely FREE! Why pay for information when you can obtain professional answers from technically trained MacLand technicians for FREE!

Seagate/Wren
Seagate/Wren Drives Now Have a TWO Year Warranty!

<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5&quot; Drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seagate 204Mb 15ms</td>
<td>$899</td>
<td>$999</td>
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<tr>
<td>Seagate 426Mb 14ms</td>
<td>$1,549</td>
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<td>5.25&quot; Drives</td>
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<td>Wren 300Mb 14ms</td>
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<td>Wren Runner 337Mb 10.7ms</td>
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<tr>
<td>Wren 676Mb 15.5ms</td>
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<td>$1,849</td>
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<tr>
<td>Wren Runner 676Mb 11.9ms</td>
<td>$1,999</td>
<td>$2,099</td>
</tr>
<tr>
<td>Wren 1.2 Gigabyte 16ms</td>
<td>$2,699</td>
<td>$2,799</td>
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Hard Disk Drive Megabyte Sale!

Quantum

<table>
<thead>
<tr>
<th>Drive Type</th>
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</thead>
<tbody>
<tr>
<td>Quantum 52 12ms</td>
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<td>$349</td>
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<tr>
<td>Quantum 105 12ms</td>
<td>$449</td>
<td>$529</td>
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<td>Quantum 210 15ms</td>
<td>$699</td>
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<tr>
<td>Quantum 400 15ms</td>
<td>$1,495</td>
<td>$1,595</td>
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Quantum drives have a 2 year warranty!

SyQuest
42 Megabyte Removable Hard Disk Drives

$425

Cartridge not included

SyQuest Removable Cartridges

<table>
<thead>
<tr>
<th>Pack Type</th>
<th>Price</th>
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<tbody>
<tr>
<td>Single Cartridge</td>
<td>$69 Each</td>
</tr>
<tr>
<td>Five Pak</td>
<td>$67 Each</td>
</tr>
<tr>
<td>Ten Pak</td>
<td>$64 Each</td>
</tr>
</tbody>
</table>

Will fit ANY 44 Removable Hard Disk Drive

Upgrade your Mac's Memory Simm Sale

$43

FREE! Included with your Simm order is our 22 page, step by step, easy installation guide.

SyQuest Express

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Desk Writer
$499

Questronics
2.0 Gigabyte DAT Tape
$1,499

Radius
Monitors
Pivot IIc/IIlsi
$799
Pivot II, SE/30, LC w/Card
$999
New Item
Color Pivot IIc/IIlsi
$1,499
Color Pivot 8 bit System
$1,999
New Item
Full Page Display
Mac Classic, SE, LC
$899
Direct Color/GX Interface
$599

Monitors
Magnavox 14" Color
$469
NEC MacSync 14" Color
$449
Seiko 14" Color
$589

Fax Modems
Abaton 24/96
$289
Dove 24/96
$349

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Accelerator 16 SE
$399
Accelerator 25 SE 68881
$949
New Item
Rocket 040 Accelerator
$2,299

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$469
14" Color Monitor w/8 bit
$699
14" Color Monitor w/8 bit SE/30
$699
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$799

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MacPro Plus Keyboard
$139

RasterOps
24si Color Board
$599
24s Color Board
$425
264STV
$1,199
364 Color Board
$699

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Microtek 600ZS Color
$1,499
Microtek 600GS
$1,199
Caere Hand Scanner
$459
Logitec Hand Scanner
$399

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Products purchased in error are subject to a 20% restocking fee. All prices subject to change without notice. All products subject to availability.
Here's what MacUser Magazine said about the CrystalPrint Express in the October 1990 issue:

"We expect the Express to live up to its name and emerge as the fastest of all PostScript® printers for both text and graphics."

**CrystalPrint Express**

- Super fast 12 pages per minute
- 3 Megabytes of RAM
- Dual Paper Trays
- Letter, Legal, Labels, Transparencies, and Envelopes

Retail Price: $5,595  
Sale Price: $3,599

**CrystalPrint Publisher II**

- 6 pages per minute
- 3 Megabytes of RAM
- 39 Typefaces
- Letter, Legal, Labels, Transparencies, and Envelopes

Retail Price: $3,795  
Sale Price: $2,125

**New CrystalPrint MacPublisher**

- 6 pages per minute
- 2 Megabytes of RAM
- 39 Typefaces
- Letter, Legal, Labels, Transparencies, and Envelopes

Retail Price: $2,995  
Sale Price: $1,699

To Order Call 1-800-333-3353/Technical Info and Customer Service Call 1-800-388-3118

4685 South Ash Avenue, Suite H-5, Tempe, Arizona 85282  (602) 820-5802

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<tr>
<td>387</td>
<td>Kensington</td>
<td>7</td>
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</tbody>
</table>

**AD INDEX**

### MacUser

MacUser is a magazine dedicated to Macintosh users and their applications. It covers a wide range of topics related to Mac software, hardware, and services. The magazine is published monthly and includes reviews, news, and articles on Mac technologies and their applications.

### MacNetwork

MacNetwork is a directory of Mac-related businesses and services. It is a comprehensive listing of Mac-related businesses and services, including software publishers, hardware companies, and service providers. The directory is updated regularly to ensure that it remains current and relevant.
### Filling the form

**1. Fill in your name and address and check off your answers to the six research questions. (One card per person, please.)**

**2. Circle the numbers on the card that correspond to the ads or articles you'd like more information about. (Numbers for advertised products are repeated in the Advertiser Index as well.)**

**3. The literature will be mailed to you from the advertiser free of charge.**

#### MacUser Reader Service Card

**IT'S AS EASY AS 1, 2, 3**

<table>
<thead>
<tr>
<th>Product</th>
<th>Code</th>
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</thead>
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<tr>
<td>1</td>
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<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

---

**FREE INFORMATION ON MACINTOSH PRODUCTS & SERVICES**

---

**1. Please indicate which of the following computers you currently use in your company or organization: (check all that apply)**

<table>
<thead>
<tr>
<th>Computer</th>
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<tbody>
<tr>
<td>Mac Plus</td>
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<tr>
<td>IBM PC</td>
<td>2</td>
</tr>
<tr>
<td>Mac SE</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Mac II</td>
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</table>

**2. For how many micro computers do you buy products?**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>1-4</td>
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<tr>
<td>5-49</td>
<td>2</td>
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<tr>
<td>50+</td>
<td>3</td>
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</table>

**3. Your primary job function is:**

<table>
<thead>
<tr>
<th>Function</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>Admin/General Mgmt</td>
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</tr>
<tr>
<td>MIS/DP</td>
<td>2</td>
</tr>
<tr>
<td>Engineering/R&amp;D</td>
<td>3</td>
</tr>
<tr>
<td>Accounting/Financial</td>
<td>4</td>
</tr>
<tr>
<td>Marketing/Sales</td>
<td>5</td>
</tr>
<tr>
<td>Computer Dealer/VAR</td>
<td>6</td>
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</tbody>
</table>

**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)**

<table>
<thead>
<tr>
<th>Product</th>
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</thead>
<tbody>
<tr>
<td>Accounting</td>
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<td>Project Managers</td>
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<tr>
<td>Database Managers</td>
<td>5</td>
</tr>
<tr>
<td>Graphics</td>
<td>6</td>
</tr>
<tr>
<td>CAD/CAM</td>
<td>7</td>
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<tr>
<td>Communications</td>
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**5. Are you involved in the purchasing of microcomputer equipment at your company?**

<table>
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<tr>
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<tr>
<td>No</td>
<td>2</td>
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**6. If so, what function do you serve in the buying process?**

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<tr>
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<tr>
<td>Communications</td>
<td>5</td>
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</tbody>
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**PLEASE PRINT CLEARLY**

---

**MAILING ADDRESS**

- Name:
- Phone ( )
- Company:
- Title:
- Address:
- City: State: Zip:

**4. Please send me a one-year subscription to MacUser for $19.97. Offer valid in U.S. only.**

---

**Index**

- Accounting
- Spreadsheets/Financial Flns
- Project Managers
- Word Processors
- Database Managers
- Graphics
- CAD/CAM
- Communications

**Hardware**

- Mainframe
- Xylograph
- PC
- Printers/Plotters
- Monitors
- Disk/Tape Back-up
- Add-In Boards
- Communications

---

**Newspaper Advertising**

- IBM PC for $19.97.
- Mac SE.
- Other.
- Mac II.

---

**Newspaper Advertisements**

- Mac Plus.
- IBM PC.
- Mac SE.
- Other.
- Mac II.

---

**Company Name**

- MacUser

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**Subscription Form**

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**Offer Valid**

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- City: State: Zip:

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(SEE OTHER SIDE)
E-Machines Display Systems

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>E16</td>
<td>$1,195</td>
</tr>
<tr>
<td>E16/XL8</td>
<td>$1,795</td>
</tr>
<tr>
<td>E16/XL24</td>
<td>$2,195</td>
</tr>
<tr>
<td>T16</td>
<td>Call</td>
</tr>
<tr>
<td>T16/XL8</td>
<td>$2,295</td>
</tr>
<tr>
<td>T16/XL24</td>
<td>$2,795</td>
</tr>
<tr>
<td>TX/SE30</td>
<td>$2,545</td>
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<tr>
<td>TX/24</td>
<td>$3,695</td>
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<tr>
<td>T19</td>
<td>$3,595</td>
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<tr>
<td>T19/24</td>
<td>$4,895</td>
</tr>
<tr>
<td>FUTURA/24</td>
<td>$795</td>
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(24-bit accelerated color for Apple 12" & 13" displays)

Macintosh Systems

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>Mac LC, 2/40</td>
<td>$1,795</td>
</tr>
<tr>
<td>Mac IIci, 3/40</td>
<td>$2,645</td>
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<tr>
<td>Mac IIci, 5/60</td>
<td>$3,199</td>
</tr>
<tr>
<td>Mac IIci, 5/0</td>
<td>$3,565</td>
</tr>
<tr>
<td>Mac IIci, 5/105</td>
<td>$3,965</td>
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<tr>
<td>Mac IIx, 4/0</td>
<td>$4,975</td>
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<tr>
<td>Mac IIx, 8/210</td>
<td>$5,980</td>
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</table>

QMS Printers

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>QMS-PS 410</td>
<td>$1,795</td>
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<td>QMS-PS 810</td>
<td>$2,799</td>
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Complete Package Systems

<table>
<thead>
<tr>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>Mac LC, 2/40</td>
<td>$2,999</td>
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<tr>
<td>512K VRAM</td>
<td></td>
</tr>
<tr>
<td>E16, Keyboard</td>
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<tr>
<td>Mac IIci, 5/60</td>
<td>$4,545</td>
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<tr>
<td>E16, Keyboard</td>
<td></td>
</tr>
<tr>
<td>Mac IIci, 5/0</td>
<td>$5,545</td>
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<tr>
<td>E16/XL24, Keyboard</td>
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</tr>
<tr>
<td>Mac IIci, 5/105</td>
<td>$5,995</td>
</tr>
<tr>
<td>T16, Keyboard</td>
<td></td>
</tr>
<tr>
<td>Mac IIci, 5/105</td>
<td>$7,895</td>
</tr>
<tr>
<td>T16, Keyboard, QMS-PS 410</td>
<td></td>
</tr>
<tr>
<td>Mac IIx, 4/105</td>
<td>$8,295</td>
</tr>
<tr>
<td>T16/XL24, Keyboard</td>
<td></td>
</tr>
<tr>
<td>Mac IIx, 4/105</td>
<td>$9,295</td>
</tr>
<tr>
<td>T16, Keyboard, QMS-PS 410</td>
<td></td>
</tr>
</tbody>
</table>

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**HARD DRIVES**

<table>
<thead>
<tr>
<th>MB/s</th>
<th>Drives</th>
<th>Mechanism</th>
<th>Access</th>
<th>Internal</th>
<th>External</th>
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<tr>
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<td>52</td>
<td>$219</td>
<td>$299</td>
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<td>80</td>
<td>Maxtor 17</td>
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<td>$279</td>
<td>$339</td>
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<td>105</td>
<td>Quantum 16</td>
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<td>$349</td>
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<td>105</td>
<td>NA</td>
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<tr>
<td>660</td>
<td>Micropolis 16</td>
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<td>NA</td>
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<td>105</td>
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<td>Micropolis 14</td>
<td>105</td>
<td>NA</td>
<td>$2699</td>
<td>$2699</td>
</tr>
</tbody>
</table>

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Mac Ile, 5/105 ........................ $7,995
T16 (8-bit) .......................... $1,015
Keyboard, QMS-PS 410

Mac IIx, 4/105 ........................ $10,195
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Keyboard, QMS-PS 410

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- Laserwriter Personal LS: 1595
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All TI microLasers include Appletalk Interface!

<table>
<thead>
<tr>
<th>Printer Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>microLaser PS/17</td>
<td>$1245</td>
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<tr>
<td>microLaser PS/35</td>
<td>$1545</td>
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<tr>
<td>microLaser XL/17</td>
<td>$2395</td>
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<tr>
<td>microLaser XL/35</td>
<td>$2695</td>
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<tr>
<td>Replacement toner</td>
<td>$55</td>
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<tr>
<td>Legal or Letter tray</td>
<td>$55</td>
</tr>
<tr>
<td>Envelope feeder</td>
<td>$244</td>
</tr>
<tr>
<td>1 MB RAM Upgrade</td>
<td>$68</td>
</tr>
</tbody>
</table>

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- Stylewriter .......... $425
- Personal IW LS ...... $915
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- Colorscript 100/10P .. $6655
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- Squeezed 10 MB Cartridge:
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  - $269
- Quantum ProDrive 80MB:
  - $395
- Quantum ProDrive 105MB:
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RasterOps 284

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RasterOps SE 281/2 4-1/2-bit card

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$2086

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NMACSync 60 x 80 Color Monitor $399

Limited quantities available

Bottom Line Distribution

QMS

radius

Radius Rocket 900 Accelerator $2299

Radius Pixel Color Printer...

Radius Color PostScript Interface II, IIi, LC, SE/30...

Radius Two Page Display: 19"...

Radius Two Page Display: 21"...

Radius Two Page Display Interface II, IIi, LC, SE/30...

Radius Color Display: 19"...

Radius Color Display: 21"...

Radius 24 bit Interface: 72 DPI...

Radius Quick Color Graphics Engine...

Radius Precision Color Calibrator...

MacSync

60 x 80 Color Monitor...

$399

Limited quantities available

Microtek 600ZS $1425
600 DPI 2-bit Scanner with Photoshop

Microtek 600GS $1118
600 DPI Greyscale Scanner with Photoshop LE

Microtek ScanMaker 1850s Slidescanner $990

Microtek 600ZS $1425
600 DPI 2-bit Scanner with Photoshop

Microtek 600GS $1118
600 DPI Greyscale Scanner with Photoshop LE

Microtek ScanMaker 1850s Slidescanner $990

Microtek 600ZS $1425
600 DPI 2-bit Scanner with Photoshop

Microtek 600GS $1118
600 DPI Greyscale Scanner with Photoshop LE

Microtek ScanMaker 1850s Slidescanner $990
We Take Care Of You

Lowest Prices • Overnight Delivery • Money Back Guarantees*

We Provide You With The Best Value In The Industry.

Accessories

- ASCOM CARRY CASE $3.00
- CARRY CASE SEPLUS $15.00
- DUST COVER FOR CLASSIC, PLUS OR SE $15.00

MICROSPOT

- MacPALLETTE II $556
  Now turn your ImageWriter II into a full color printer. Print from almost any standard Macintosh software application including graphics, page layout, word processors, etc. Color text and color graphics are all available in true WYSIWYG. Requires a Macintosh LC or SE/30, an ImageWriter II and a four-color ribbon.

ARTICULATE SYSTEMS

- VENT AN A PRESS ABATON LOGITECH ICD

We include application including standard Macintosh Macintosh modem to send and receive data mission time and cost. The Extended Baud Rate feature accurately at speeds up to 9600bps. Compatible with all modems from 56K to 9600bps. Compatible with all modems from 56K to 9600bps.

- VENT AN A PRESS

- MACULARITY

- MICAOTEK

- ERECTOR

-國産 CENTURY 14.400 BAUD MODEM $279

- EXTENDED Baud Rate

- Communications

- EXTENDED Baud Rate COMMUNICATIONS

- TELEMARK

- MACPRES

- MOUSE SYSTEMS

- PHILLIPS & DUPONT

- VENTANA PRESS

- INFOTEX

- TEFAX $385

- SHARP

- Ethernet $149

- FASTPATH $189

- TEFAX Now you can send or receive faxes directly from your Macintosh and get a 16-level half-tone printer all in one package. Relays introduces the NEW TEFAX SYSTEM RA2125 - a complete fax system that gives you a dedicated fax machine which requires no software package, AutoFax, New AutoFax software includes graphics editing capabilities for scanned or faxed documents. TEFAX can print on a MacPlus or later with 128KB RAM, a hard disk drive and system 6.0 or later. AutoFax software and ImageWrite I can be included.

- SHARP

- ERI-960 BAUD MODEM W/MPN $279

- SHARP

- Ethernet $149

- FASTPATH $189

- PARTS

- TRU COLOR HAND SCANNER $459

- CAIRE

- TYPIST

- PERSONAL SCAN & RECOGNIZE $699

- KODAK

- DECISION PRINTED $399

- LOGITECH

- SCANNER SCANNER $299

- MASTEK

- MARS 800-MAC 64 HAND SCANNER $399

- MICROTECH

- SCANNER 1850S BL/SCANNER $229

- SCANNER 6002SS GREYSCALE $1118

- NEST

- COLORATEM 30 DIGITAL $459

- EDITION WRTY 2 Model 30 $105

- QE6

- COLORSCRIPT 100 $795

- CHS PS 810 LASER PRINTER $399

- CHS PS 410 $199

- MULTI-AD CREATOR $449

- A T T E X

- CUTTING EDGE

- 105 MB EXTERNAL QUANTUM $91

- 45 MB REMOVABLE DRIVE $578

- 52 MB EXTERNAL QUANTUM $459

- IDS

- PRO 105 MB CONNER $529

- PRO 200 MB CONNER $969

- DISK CONNER $355

- WIP 50 QUANTUM $399

- 2Mega

- ERMICOLU 44 MB TRANSPORTABLE $958

- 3-PACK CARTRIDGE S/4 MEG $255

- MASS MICRO SYSTEMS

- DATAPAK 45 REMOVEABLE HDD $699

- DATAPAK 88 REMOVEABLE HDD $1250

- L9 CARTRIDGE $79

- INFINTY 12 SINGLE INCARCARD $49

- INFINTY OPTICAL $301

- SOFTWARE DISCOVERIES

- RECORD HOLDER PLUS $78

- KEYSYMM $259

- DTP AD

- AUTO-FAX 9624E External Modem $279

- AUTO-FAX 9624E External Modem

- Extended Baud Rate (EBR-9600)* and MNP Error Correction. Powerful, yet economical performance. The value-priced Sharp 326e external modem can drastically cut transmission time and cost. The Extended Baud Rate feature allows either modem to send and receive data accurately at speeds up to 9600bps. Compatible with all modems.

- SHARP

- 2400 External Modem $279

- Hard Drives

- INFINI-D

- 105 MB EXTERNAL QUANTUM $91

- 45 MB REMOVABLE DRIVE $578

- 52 MB EXTERNAL QUANTUM $459

- IDS

- PRO 105 MB CONNER $529

- PRO 200 MB CONNER $969

- WIP 50 QUANTUM $399

- 2Mega

- ERMICOLU 44 MB TRANSPORTABLE $958

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- MASS MICRO SYSTEMS

- DATAPAK 45 REMOVEABLE HDD $699

- DATAPAK 88 REMOVEABLE HDD $1250

- L9 CARTRIDGE $79

- INFINTY 12 SINGLE INCARCARD $49

- INFINTY OPTICAL $301

- INFINI-D...

- TOTAL $749

- INFINI-D...

- TOTAL $749

- MULTI-AD CREATOR...

- Power, speed, precision and color-separating abilities make Multi-Ad Creator, the extended DTP program. Multi-Ad Creator is the high end choice for making ads or any page, fast. "If you create ads get it. -MacUser"
International Dealer Program
• We ship regularly to 65 countries worldwide
• Call about our special pricing

Corporate Accounts:
• Open an account within 24 hours
• Volume discount pricing
• School purchase orders accepted
Fed. ID# 95-4183196
Most printers are sentenced to lifelong confinement on a desktop — by their own sheer bulk or by that lifeline known as a power cord.

But now GCC Technologies® has created a printer with considerably more freedom than that. It's called WriteMove®, the "biggest" printer ever to come in an incredibly small package.

WriteMove weighs a scant three pounds and measures just 2" x 6½" x 10½". (Any smaller and you couldn't get the paper in.)

But don't let its size fool you. WriteMove gives you unlimited freedom to reduce and enlarge type and documents in any application. It's even compatible with TrueType® and ATM™. Plus, you can view your documents on screen before printing, saving valuable time and paper. WriteMove also comes with GCC's own spooling software, QuickSpool II, so you can get on with your work while the printer is busy.

You can use WriteMove to compose documents with all of your favorite applications. From Microsoft® Word and Excel, to Claris MacWrite® II and MacDraw® II. And then, quietly print them out on cut sheet or fanfold paper.

All of this has obvious advantages for the highly mobile. Since WriteMove runs on rechargeable batteries, you will have direct access to letter-quality output on airplanes, in hotel rooms, or even at home.

But best of all, WriteMove is affordable. At just $399, WriteMove costs hundreds less than Apple's low-cost printers. Acquiring your new WriteMove is easy too. Just call 800-422-7777 for the name of the dealer nearest you or to place your order directly with us. We accept MasterCard, Visa, American Express, or your company's corporate purchase order. When you buy directly from GCC you get a 30-day money back guarantee. No questions asked.
NEW!!!
ONE CARD FITS ALL!!
INCLUDING THE IIES, LC & SE/30

DayStar again leads the Mac world by delivering incredible power, convenience and cross-platform transportability for the Mac. Buy one card now and transfer it to your new Mac when you trade up. That's right, now one PowerCache card will fit any Mac II, IIX, IICx, IICI, IISi, LC or SE/30. Triple your performance. Optional math coprocessor available. Installation is easy...and the PowerCache is 100% compatible with all standard software.

**PowerCache 25 MHz, 40 MHz & 50 MHz available for Mac II, IIX, IICx, IICI, IISi, LC, & SE/30!**
- PowerCache 25 MHz: $699
- PowerCache 40 MHz: $895
- PowerCache 50 MHz: CALL!!

**ALSO NEW!!**
**DayStar FastCache**
A CACHE CARD FOR BOTH THE IICI & IISI!

DayStar, maker of the first cache card for the IICI, now extends this performance to the IISi. FastCache - the only cache card with a 30 day money back guarantee and a 3 year warranty.

- FastCache IICI & IISi: $269

**NOW SHIPPING!**
**DayStar RAM PowerCard**

Up to 256 MB of dynamic RAM on each NuBus card! This RAM PowerCard has 16 standard Mac II SIMM slots so you can stuff it with as much memory as you need. You can even "chain" cards to create one giant superfast RAM disk. Perfect for imaging, multimedia and virtual memory and those of you who just can't get enough of a good thing.

- RAM PowerCard (0 MB) $699

**Mac IICX Upgrade**
If your IICX has a soldered CPU, MacCenter can swap your motherboard for one with the DayStar accelerator already installed. No downtime!

**SCSI PowerCard**
This card is literally a "computer on a NuBus card" with CPU, memory, DMA and software. It combines an ultra-fast (5 MB/sec) SCSI port with an expandable memory cache for near RAM speeds. It works with any standard SCSI storage device - hard disk, optical disk, Syquest, internal, external or removable. You can daisy chain up to seven drives. With this card an optical drive can do a database sort faster than a 10.7 ms WrenRunner II hard drive! Client server databases can realize gains of five to ten.

- SCSI PowerCard (0 MB) $995

**If you want to go fast in your Mac, buy your speed from the #1 names in Macintosh Acceleration - MacCenter and DayStar Digital!**

Please circle 1 on reader service card.

800-950-3726
FAX 512-476-3726
International Orders 512-476-7466

This ad was created by three geeks at a Mac IICX and two Mac IIsi powered by DayStar Digital 50 MHz PowerCaches. (You didn't really expect us to say three idiots, now did you?)
100% FINANCING
For purchases of $1000 or More for Businesses with Approved Credit.*

ACCELERATORS

NewLife For the Mac SE, Plus, Classic
Classic 68030 NEW! Call!
SE 16 MHz 68030 (w/4 SIMM Sockets) $245
SE 25 MHz 68030 (w/4 SIMM Sockets) $145
"BEST VALUE" MacWorld, July '91
SE 33 MHz 68030 (w/4 SIMM Sockets) $295

Applied Engineering
QuickSilver FastMath LC
TransWarp SE 25 MHz Call!
TransWarp SE 40 MHz Call!
1R 32K Cache Card $195
PII QuickSCSI Card $449
Sigma DoubleUp Data Compression Card $179

America’s Best Value in
High Performance Data and Fax Modems.

DATA MODEMS

2400 bps
Challenge VP2400 $75
Global Village Teleport $125
Zoom V.42 bis $175

9600/14,400 bps
Hayes Ultra 144 V.32 bis Call!
Motorola CodeX 3260 Call!
Practical Peripherals 9600SA Call!
UDS Fastalk 32/42 bis $499
US Robotics $695

Hayes Ultra 9600 $525 w/$50 rebate

FAX MODEMS

Abaton InterFax 24/96 $295
Challenge VP24/96 $99
VP24/96SR (send & receive) $149
Dove DoveFax $275
DoveFax Plus $359
Global Village Teleport $175
Prometheus $689

Hayes Ultra 9600 $525 w/$50 rebate

CD ROM

Chinon $569
NEC Portable New! $495
PLI (Sony) $695
Toshiba $645

DESKTOP VIDEO

If you are interested in Desktop Video, Contact MacCenter's video specialists for the best and latest in Macintosh video, including Trivision Novastar, E-Machines Quickview Studio, Mass Microsystems ColorSpace III/FX, RasterOps ProVideo 32, SuperMac Video Spigot and Realtime, and frame accurate VCR's.

SIMMS

4 Meg (with trade in) $140
1 Meg Call!

SCANNERS

Adobe PhotoShop $445
Carrot TP100 $465
Epson ES-350C $1649
Micron ScanMaker 5000Z $1445
Sharp JX-450, JX-600 Call!
UMax UC630 Color 600 dpi $1395
OmniPage $479

OPTICAL CARTRIDGES

$125 $125 & 1024K

SYQUEST

$68 Per 45 Meg

E-MACHINES T16/XL24 $2795

MONITORS

E-Machines
E16 (why buy a Pivo?) $1195
T16 $1895
TX16 $2595

Ikegami
CT20* Trinitron w/8 bit card $2565

RasterOps
21" Hitech w/8 bit card $4189
24XLTV $3349
24STV $3159
Seiko 14" RasterOps 245 $979
Sigma L-View Multimedia $1349
SuperMac Systems Call!

CALL FOR PRICES

800-950-3726 FAX 512-476-3726
International Orders 512-476-7466

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*These payments based upon 15 month FHA loans. Actual payments will vary based upon terms and costs.
Most products available in 110 volt & 220 volt.
All returns require approval and are subject to a restocking fee.

Prices valid 7/29/91 - 8/28/91
NEW!

microLaser Turbo
This printer is so fast it gets speeding tickets!

- Weitek RISC processor
- Postscript Level 2
- 35 Adobe scalable fonts
- 2.5 Meg RAM standard
- Upgradable to 10.5 Meg RAM
- Mac & PC compatible
- 3 Interface Ports: AppleTalk, RS-422, RS-232-C
- Automatic switching between ports - all ports are hot
- Automatic emulation switching
- Free Paper Tray Management Software
- Optional envelope feeder
- Optional 500 sheet second paper drawer
- Hewlett-Packard LaserJet Series II emulation
- 6 Times Faster Than Other Postscript Printers

The Rocketeer Has Nothing On The Turbo!
Ask us about upgrading your microLaser or microLaser XL to a Turbo.

microLaser Turbo
CALL!
9 pages per minute

microLaser XL
CALL!
16 pages per minute

110 & 220 Volt microLasers Available

We stock all accessories & supplies

microLaser
CALL!

MicroLaser Turbo
9 pages per minute

MicroLaser XL
16 pages per minute

Printers

Abaton LaserScript LX $1555
Epson EPL-7500 (RISC Fastl) $2195
QMS PS410 SPECIAL $70/mo* $1895
Nec Silentwriter2 Model 90/990 $1549/$2395

Hard Drives

44 Meg Removable Drives

Eagle Syquest Drive $499
with Cartridge, Metal Case, 15 Meg of Shareware & 5 year warranty
Mass Micro DataPak $699
Mass Micro DataPak 88 $1195
Plu Infinity 40 Turbo $649
Plu Infinity 88 Turbo $1095

Input & Output

Applied Engineering
Quadralink $199
Shadow Software for Quadralink $74
LC Heavy Duty Power Supply $119

Articulate Systems
VoiceLink $185
Voice Navigator II $549

DayStar
LT200PC $195
LT200MC $295

EMAC Silhouette
$89

Wacom Tablets In Stock! Call!

800-950-3726
FAX 512-476-3726
International Orders 512-476-7466

MacCenter
The Center Of The Macintosh Universe

©MacCenter, 1991
Internal Drives and More...

Quantum and Compaq drives are the best on the market. They are fast and reliable. All ETC internal drives come with brackets, cables and software.

<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETC 52 Mb Quantum LPS, 17ms</td>
<td>$235.00</td>
</tr>
<tr>
<td>ETC 105 Mb Quantum LPS, 11 ms</td>
<td>$420.00</td>
</tr>
<tr>
<td>ETC 120 Mb Compaq 1&quot;, 14 ms</td>
<td>$458.00</td>
</tr>
<tr>
<td>ETC 120 Mb Quantum LPS, 11 ms</td>
<td>$458.00</td>
</tr>
<tr>
<td>ETC 170 Mb Quantum Pro, 11 ms</td>
<td>$640.00</td>
</tr>
<tr>
<td>ETC 210 Mb Quantum Pro, 11 ms</td>
<td>$689.00</td>
</tr>
</tbody>
</table>

External Drives and More...

ETC's external drives come in a zero-footprint half-height case with a universal power supply, power output, 50-pin, 50-pin SCSI addresses, cables, and formatting software.

<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETC 52 Mb Quantum LPS, 17ms</td>
<td>$330.00</td>
</tr>
<tr>
<td>ETC 105 Mb Quantum LPS, 11 ms</td>
<td>$459.00</td>
</tr>
<tr>
<td>ETC 170 Mb Quantum LPS, 11 ms</td>
<td>$688.00</td>
</tr>
<tr>
<td>ETC 210 Mb Quantum LPS, 11 ms</td>
<td>$715.00</td>
</tr>
</tbody>
</table>

Big Hard Drives...

If you already have an ETC's internal drive, we recommend that you also have an SGI's external drive because the SGI drives are the perfect match for your system. The SCSI interface offers up to 156 megabytes per second.

<table>
<thead>
<tr>
<th>Drive Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.5 GB Internal</td>
<td>$1,199.00</td>
</tr>
<tr>
<td>56.9 GB Internal</td>
<td>$1,399.00</td>
</tr>
<tr>
<td>80 GB Internal</td>
<td>$1,699.00</td>
</tr>
</tbody>
</table>

Macintosh Classic

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>256K</td>
<td>$785.00</td>
</tr>
<tr>
<td>240K (2x75)</td>
<td>$735.00</td>
</tr>
<tr>
<td>240K</td>
<td>$725.00</td>
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</tbody>
</table>

Macintosh LC

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>256K</td>
<td>$290.00</td>
</tr>
<tr>
<td>320K</td>
<td>$275.00</td>
</tr>
</tbody>
</table>

Macintosh IIci

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>256K</td>
<td>$340.00</td>
</tr>
<tr>
<td>512K</td>
<td>$395.00</td>
</tr>
</tbody>
</table>

Macintosh IIx

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>256K</td>
<td>$280.00</td>
</tr>
<tr>
<td>512K</td>
<td>$240.00</td>
</tr>
</tbody>
</table>

Macintosh IIcx

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>256K</td>
<td>$340.00</td>
</tr>
</tbody>
</table>

Macintosh IIiX

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>800MHz</td>
<td>$219.00</td>
</tr>
</tbody>
</table>

Macintosh IIiX NuBus Adapter Card

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro</td>
<td>$199.00</td>
</tr>
</tbody>
</table>

Apple IIc Logic Board

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>256K</td>
<td>$589.00</td>
</tr>
<tr>
<td>512K</td>
<td>$229.00</td>
</tr>
</tbody>
</table>

Macintosh IIci External Keyboard

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>512K</td>
<td>$199.00</td>
</tr>
</tbody>
</table>

Macintosh LC External Keyboard

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>512K</td>
<td>$199.00</td>
</tr>
</tbody>
</table>

System and More...

All of our packages are complete. These are not any hidden extras to buy.

Mac LC Student Package

4 MB of RAM, 48 Mb internal hard disk, Mouse, Microphone, Apple 12" RGB monitor and StyleWriter printer.

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 MB</td>
<td>$369.00</td>
</tr>
</tbody>
</table>

Mac LC Office Package

5 MB of RAM, 120 Mb internal hard disk, 40 Mb ETC External Softcard, mouse, microphone, Apple standard keyboard, Apple 12" RGB monitor, and Personal LaserWriter L.S.

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 MB</td>
<td>$369.00</td>
</tr>
</tbody>
</table>

Mac LC Design Package

8 MB of RAM, 120 Mb internal hard disk, Mouse, Apple extended keyboard, Radical Color Pict with built-in video, and Apple Personal LaserWriter NT.

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 MB</td>
<td>$369.00</td>
</tr>
</tbody>
</table>

Printers and More...

If you need to print, the collection of printers we have to offer can't be beat in performance or price!

QuickDraw

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple ImageWriter II</td>
<td>$429.00</td>
</tr>
<tr>
<td>Apple Personal LaserWriter SC</td>
<td>$1,074.00</td>
</tr>
<tr>
<td>HP DeskWriter w/AppleTalk Interface</td>
<td>$525.00</td>
</tr>
<tr>
<td>OLP &amp; 15</td>
<td>$195.00</td>
</tr>
</tbody>
</table>

Tape Type

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple StyleWriter</td>
<td>$429.00</td>
</tr>
<tr>
<td>Apple Personal LaserWriter LS</td>
<td>$429.00</td>
</tr>
<tr>
<td>Microtek True Laser</td>
<td>$1,659.00</td>
</tr>
</tbody>
</table>

TrueType Postscript Printer compatible with Postscript

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Personal LaserWriter NT</td>
<td>$1,799.00</td>
</tr>
<tr>
<td>Apple LaserWriter II NT</td>
<td>$2,759.00</td>
</tr>
<tr>
<td>Apple LaserWriter II NTX</td>
<td>$3,399.00</td>
</tr>
<tr>
<td>Apple LaserWriter II NSP</td>
<td>$2,759.00</td>
</tr>
</tbody>
</table>

Networks and More...

Networks and communications options today, we can provide you with everything from BNC connectors, cables, and terminators to LocalTalk routers, Ethernet interface card/boards, and software. Call us and we'll help you build a network at a price you can afford.

Phone network adapters

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>AppleShare File Server Software 2.0</td>
<td>$240.00</td>
</tr>
<tr>
<td>NEW Cabernet MacConn 30k/Radius</td>
<td>$249.00</td>
</tr>
<tr>
<td>NEW Cabernet MacConn L.E.T.</td>
<td>$249.00</td>
</tr>
<tr>
<td>Ethernet INTERFACE ASSEMBLY</td>
<td>$299.00</td>
</tr>
</tbody>
</table>

Scanners and More...

Scanners helps revolutionize the way graphics and text get to the desktop. Here are some of the best.

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ColorCop Model 32-30 Hand Scanner</td>
<td>$319.00</td>
</tr>
<tr>
<td>Microtek 9002 Color Scanner</td>
<td>$1,039.00</td>
</tr>
<tr>
<td>Includes Adobe Postscript</td>
<td>$1,039.00</td>
</tr>
</tbody>
</table>

Extended Warranty Service for your Macintosh

As the fastest-growing direct reseller of Macintosh systems, peripherals and software, Mac and MORE can now double the warranty on your Mac system with membership in Club 24. Services include:

- 24 month warranty on Apple products
- 72 hour repair or replace turn around
- Shipping via FedEx included both ways

Want more details?

Call 1-800-MAC-0052 now!
It's the lease we can do.
MacProducts USA's Macintosh leasing program can set you up with a complete Macintosh system at an affordable monthly rate. Leasing is available for our entire line of Macintosh systems, hardware, and software.

<table>
<thead>
<tr>
<th>Systems</th>
<th>buy</th>
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<td>Mac Classic IIfx</td>
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<tr>
<td>&quot;The Magic 88 is one of the best Macintosh drives available, offering high speed and high quality.&quot;</td>
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<th>1-800-622-5775 or (512) 72-9881</th>
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<td>Hours</td>
<td>M-F 9am-6pm, Sat 10am-5pm</td>
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<th>UK FAX</th>
<th>800-891-742 - Singapore 65-287-5181 - Canada 800-624-9307 - USA 1-800-622-3475</th>
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<tr>
<td>Lease</td>
<td>Prices quoted reflect 48 month lease based on credit approval. Minimum $600 month lease. Terms available from 24 to 60 month periods.</td>
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More System 7 stuff than you...

**Hard Drive TuneUP Includes System 7!**

### Software Architects

Everything—and we mean everything—you need to switch to System 7. Includes The System 7 Book by Craig Danuloff and exclusive Hard Disk TuneUp software that lets you prepare your hard disks for System 7 safely and easily. Allows you to upgrade your drive to take advantage of new System 7 features, including: Virtual Memory. Create multiple partitions on the same drive—one for 7.0 compatible files and one for non-compatible files. Makes your drive run faster and safer too! Supports Apple and most third party hard drives. Plus you get a set of System 7 installation disks free! Limited time offer—order today.

**The System 7 Book**

Ventana Press Mac author Craig Danuloff does the digging for you in his best-selling guide to the Mac's new feature-packed operating system. Concise and richly illustrated. Includes complete System 7 installation instructions and a number of valuable tips.

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**DataShaper**

Elseware “DataShaper and PageMaker... the most powerful database publishing duo available.”—MacWorld.

Cuts formatting hours by applying PageMaker attributes to database text on import. Indispensable for creating catalogs and directories!

**Gold Disk**

Simple 1- to 6-bit, path-based animation application. Animate objects over static or scrolling backgrounds. A large variety of wipes, color cycling, multiple palettes, looping control, and the ability to add sounds create a comprehensive animation solution.

---

**Infini-D**

Specular Integrated 3D modeling, rendering, and animation with an interface so easy you'll create stunning photorealistic graphics within hours. Includes 250 surface libraries, full tutorial, animation viewer. Free 1.1 upgrade supports System 7, 3D TrueType fonts.

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**Publish It! Easy v 2.1 with FILE-IT!**

Timeworks 1990 MacUser Eddy Award winner. Integrates all the basic tools for DTP into an affordable, easy-to-use program. Incl: 12,000-word spell checker, 240,000-word thesaurus, drawing and painting tools, comprehensive page layout tools, and 72 sample templates, and much, much more. Now with FILE-IT!, a database and mail merge program.

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**Silhouette Trackball**

Everex Systems The radical—but comfortable—mouse alternative that lessens fatigue and enhances performance. Features a specially contoured chassis, four differently weighted/colored balls, programmability, lock button with LED, cdev software, and a two-year warranty. System 7 compatible.

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**Zoom V.42 bis 2400 bps/MNP 5**

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We researched it. We installed it. We tested it. And now Mac's Place is System 7 compatible. That's something no other major Mac mail order company can say—for the simple reason that no other Mac mail order company runs completely on Macs. Fact is, Mac's Place is the only place that's Mac compatible.* After all, how can someone who works at a PC or dumb terminal all day possibly help you make good decisions about Macintosh software and hardware? So when you want to talk to someone who is System 7 savvy—and Mac compatible—call us. Otherwise you could end up talking to a salesperson who's sitting in front of a dumb terminal. Mac's Place The only place that's Mac compatible.

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Fax us your PO*—My Fax—206-881-3090.” —Mac

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Frame Technology o Fully integrated, flexible publishing software for creating, revising, and publishing a wide range of professional documents. Combines full-featured word processing, page layout, tables, equation editing, and structured document tools in one easy-to-use application. 4 1/2 mice...Mac User.

M.Y.O.B.
Teleware o This incredible accounting software for small to medium size businesses is easy to understand and simple to use. Includes fully integrated General Ledger, A/P, A/R, inventory, on-screen interactive analysis of balance sheet and P&L, fully customizable invoices, statements, forms, and reports, and much more. Great value! Winner—1991 MacWorld World Class Awards.

Nisus 3.06

Motion Works o The first animation and color paint program to be fully integrated within HyperCard 2.0—add animation, color and sound to any stack! Features intuitive interface, path-based animation, built-in color paint with 24-bit color support, and much more.

DynaPerspective
Dynaware 3D conceptual design program for powerful multimedia presentations. Lets you visualize and present complex 3D ideas. Unique ability to play high speed animations without pause. Import/export 2D 3D DXF files, export PICT and PICS.

Monet
Impressionism for Macintosh

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Fax: 206-881-3090, 206-881-3090, 206-881-3090

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System 7 Compatible System 7 Savvy Money Back Guarantee
We're seven savvy.” —Mac

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- Mac

- Includes sampled sound, textbook, and wide range of activities (scales, intervals, chords, melody & rhythm). Fun to use & fully MIDI compatible (MIDI not required), this award-winning program will be enjoyed by both beginners and advanced students.

Soft PC for the Classic & LC

Insignia Solutions - Mac

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Delta Point - Mac

- Forty 2D and 3D chart types for science, business, and presentations. Advanced features include extensive formatting options; built-in chart libraries and graphics templates; CMYK color; full System 7 compatibility; and integrated slide show.

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Bowers Development - Mac

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Dove - Mac

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ACIUS - Mac

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Gemini Classic 030

Total Systems - Mac

- Kick your Mac Classic into orbit and blast past SE/30 and IIGC users! Add 16MB RAM and run up to 100 times faster. Supports full or dual page displays. Available in 20, 25, 33, 40, and 50 MHz speeds—see listings for prices.

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7, my name isn’t Mac.” —Mac
“Take the upgrade path of least resistance.” –Mac

DataPlace Hard Drives
- Quantum hard drives and Syquest Removable Cartridge drives come with DataWare formatting software and each features a selectable SCSI ID switch, two 50 pin SCSI connectors, an external fuse and two AC Plug-ins.
- See listings for prices.

44 Meg Removable Cartridges
- Syquest Having an extra hard disk space has never been this inexpensive. Order one or order 20 for the same low price per cartridge.
- Ask about a special limited bundle offer for ON Location from ON Technology, and for pricing on the new 88 megabyte removable cartridges.

Illustrator 3.0 w/ATM
- Adobe It takes a desk full of programs to match all the capability you get with Adobe Illustrator Version 3. Still offers top-notch drawing power, plus new expanded toolbox with feedback box that guides you through your drawings.

SIMMs
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FontMonger
- Ares Software Bridges technologies by letting you easily convert between Adobe PostScript Type 1, Type 3, and TrueType. Type can also be converted to Adobe Illustrator or EPS language files, and design elements can be incorporated into a typeface.

At Your Service
- Bright Star Technology You have to see-and-hear it to believe it! Six animated utilities that give your Mac a uniquely human personality. Reminds you of appointments...notifies you when MS Mail or CE QuickMail arrives...alerts you to take breaks...and provides you with system information. Includes a Starter Version of After Dark and five unique modules. System 7 compatible.

Symmetry
- Mariah The first true mixed-media organizer that lets you manage graphic images, sound clips, animation, and text files in the same high speed environment.
- Archive unlimited quantities of mixed data and keep it at your fingertips at the same time.

After Dark 2.0 or More After Dark
- Berkeley Systems After Dark has over 30 displays including Flying Toasters and Multi Module.
- Also features password protection and sound. NEW More After Dark, $21., adds over 25 incredible new displays like Mowin’ Man, Tunnel and many beautiful new fish. (Req. After Dark). Order both and save!

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**Everex**  Access all industry standard CD ROM CDs— and even listen to your favorite CD tunes. Zero-footprint chassis fits under compact Macs. Includes built-in speaker and headphone jacks, and comes with CD ROM sampler disk.

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PowerKey Remote  $32.

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Addison-Wesley  Three of the most popular books from the Addison-Wesley Macintosh Inside Out Series—System 7 Revealed, ResEdit Complete, and The Complete Book of HyperTalk 2. Published under the direction of Scott Knaster, this series is an ideal complement to Apple's Inside Macintosh technical manuals.

BMUG PD ROM Vol. 2

**Discovery Systems**  Top public domain Software from the Berkeley Macintosh Users Group.—$88. Nautilus Introductory Disc $19 CD ROM-based multimedia subscription contains the same exceptional material you'll find each month in Nautilus. Excellent value.

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**Quantum**

**170MB $599**

High performance internal for SE, SE30, Ci, Cx, Mac II, Ilx, Ilfx, Sl. Lps-Lp Models for Classic and Ic.

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For a limited time, with any drive purchase, you can buy Redux, Init Picker or Rival by Microseeds Publishing. Any one, $20; any 2, $33.95; all three, $44.95.

Retrospect Remote "10 Pack" available with tape drive purchase for $129.00.

**Maxtor**

**120MB $419**

High performance internal selections for every Mac

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**Conner**

Low power internals (only) for LC, Classic and Ic.

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WREN
600MB
$1649

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-based sub-systems
includes
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$539

TEAC 155
599

1499

1499

2699

1499

• 30 Day Money Back Guarantee • All Drive products carry a 30 day Money-back guarantee. Your risk in the transaction is the cost of shipping.
• Disk for Disk Replacement Warranty • Quantum, Maxtor (excluding Panther 1.2G), Syquest and ARDAT Drives carry a two year "parts & labor" disk-for-disk replacement warranty. WREN, Teac, WangDAT, Comer drives and Syquest Cartridges carry a one year "parts & labor" disk-for-disk replacement warranty.
• Brackets and Cables Included • All Hard Drives include brackets, cables, cords and LED's required for operation in the specified Macintosh. All Hard Drives come pre-formatted with Apple's latest stable all-platform System software. 18.8 MB of Publicly Distributable software from the B'UG Library, and the "ALLIANCES POWER TOOLS" SCSI formatter/hard partitioner.
• 30 Day Performance Guarantee • If your drive fails to perform properly in the first 30 days and our technical support staff can't solve the problem over the phone, we'll ship you a replacement drive overnight and have your suspect drive picked up at our expense. Offer is subject to some limitations. Products being returned for credit and international orders do not apply.
• Toll-Free Technical Support • Toll Free Technical Support 9am to 7pm Monday thru Friday, Central Time. As often or for as long as you need.

• Prices and Specifications subject to change without notice.
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NEC SilentWriter Model 90 Laser Printer
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SIMM Sale
$49

Hewlett Packard DeskWriter
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Questronics
1.2 Gigabyte DAT Tape $1,599
2.0 Gigabyte DAT Tape $1,699

Radius Accelerators
Rocket 040 Accelerator $2,599
Accelerator 16 SE $449
Accelerator 23 SE $899

Pivot Ici, Ili Color Pivot Ici, Ili $899
$1,599

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That old Mac magic's got us in its spell, that old Mac magic Sculley weaves so well — but can we finally dump the old Mac design? Please?

When I saw John Sculley in the video press release for System 7 (Apple's new operating system for the Macintosh), I realized how much he's beginning to look and sound like the shuck-and-jive astronomer Carl Sagan.

A few months before System 7 was announced, Carl Sagan was predicting the end of the world from the oil fires in Kuwait. But then a couple of scientists who know the meaning of the word supercomputer told everyone that their atmospheric models didn't support Sagan.

In fact, their models indicated that Sagan was blowing more smoke than the wells, and that the fires would be a local — rather than a global — mess. I suspect that Sagan's publishers then quashed a proposal for another gloom-and-doom book to be authored by Dr. Sagan. How embarrassing.

I wonder if Sculley is using the same song-and-dance approach with the Mac Classic.

As a convincing salesman, Sculley is reminiscent of Sagan. (Judging by the way he's getting his hair cut nowadays, Sculley must be something of a fan of ol' Carl.) The Mac users who've fallen under Sculley's magic spell (a more formidable psychic force, I'll bet, than what Steve Jobs could ever conjure up) can't imagine where the truth ends and the BS begins.

Even I have finally succumbed. I can't figure out what's going on at Apple either. I feel, when Sculley beams with his benign tortoise-like demeanor, that it's impossible to ever think that he's full of bull. ("He can't be — he's a turtle!") But what I know is that there is a lot of discrepant information cropping up, especially concerning the surprisingly (surprising to me at least) popular Mac Classic.

Classic Plots

I heard the first odd rumor a few months back. It seems that someone roaming around the Apple offices stumbled upon a memo that said that Apple was having to scramble to fill orders for nearly 200,000 Mac Classics that hadn't yet been manufactured, much less shipped.

The story goes that Apple was going to try to get dealers to bait-and-switch people who wanted to buy a Mac Classic. The dealers were supposed to talk buyers into purchasing a higher-priced Mac LC or Mac IIsi. (Actually, I hate to use the term bait-and-switch here. As far as I'm concerned, people who are in the market for a low-end computer should be buying the Mac LC instead of a Classic anyway — even if they have to take out a loan. The LC is the first Mac I immediately liked. But I digress.)

Now I hear from computer suppliers that the Classic has filled the pipeline and is clogging it up. Apparently everyone who wanted a Mac Classic got one right away. So the thing will now languish on the shelves, soon to be discounted and dumped.

Apple may completely abandon the original Mac design and move to the LC look. I think the funky-looking original Mac, even with the more modern SE touches, looks as dated as a '56 Nash. It's time it was buried.

I've discussed this with old-timers who still cart this pathetic clunker around in one of those padded Apple Mac totes. They say it's the greatest design ever. Of course, they're nuts. If you want to roam around an airport looking like a real bozo, then load an old Mac into one of those padded bags and hit the concourse. The last time someone brought one into San Francisco International, it was announced over the PA system and everyone laughed and pointed.

To make matters worse for the old Mac-clunker, there's the issue of the Classic's belatedness. Years ago, while flying business class, I sat next to an oblivious young Apple executive who was listening to a Walkman. (It was so loud — through the headphones! — that I had to ask him twice to turn it down. He's probably dead by now.) Anyway, this guy was carefully reading and annotating a memo that outlined the Mac Classic strategy. There, before my eyes, were all the numbers and even a discussion of the Singapore manufacturing facility. (As I reclined in my seat to get a good look at the memo, I realized the irony of the situation: Because the memo was nicely printed in a PostScript font on a laser printer, I could effortlessly read it at a distance. Ah, technology!) Anyway, I wrote up the discovery for a couple of newspapers.

What mystifies me is why it took Apple so long to execute the plan. I wrote about the scheme in December 1987. Four years of dillydallying seems a bit much. As far as I can see, it's just too late. Now it's time to bury that old Mac — for good. It's dated. It's homely. It's too damn funky. Let's hope upon hope that Apple doesn't decide to introduce a Classic Plus!
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