Which video hardware and software works best?

Gigabytes Galore: Running on empty? We test nineteen 1,000-megabyte hard disks

System 7 Alert: Is your software compatible? 82 top packages compared

DTP for Pennies: Professional pages at bargain prices
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.”

Well, Betsy, get a load of this. We think new Microsoft Excel version 3.0 is the closest thing to perfection ever seen in a spreadsheet for the Mac. For one good reason.

Power made easy.

The new Toolbar®, for instance, reduces common, time-consuming tasks down to one step.

Highlight a row or column of numbers, hit the $\Sigma$ button (that’s Autosum$^\text{TM}$), and voilà – it all adds up.

Do quick, push-button formatting.

Use outlining features to collapse or expand worksheets without having to create multiple files.

As for charting, we took our cue from Paul Woods of St. Paul, Minnesota, who began his letter with the salutation, “Charts, charts, charts!” Hey, Paul – check out the picture for the full scoop.

Did we mention that you can consolidate up to 255 worksheets at a time, regardless of format?

Or the feature called Goal Seek? Put in the total you want, and Microsoft Excel works backwards from there to fill in the variable you need.
Yes, Paul, you can incorporate any of 68 chart types (24 of which are 3-D) right into your worksheet, along with text and data. And notice the outlining feature on the left? Go nuts.

Or the fact that this is the first System 7.0 application available? We did fall short in one area, however, with Ralph Levy’s cat. Here in Redmond, we’re not very well-versed in how to remove cranky, sharp-clawed felines from atop user manuals.

Let the cat have your old manual, Ralph. You’ll get a new one when you update your version of Microsoft Excel for $129 (or $50 if you acquired it on or after 12/7/90). Call (800) 541-1261, Dept. Q80, to find out more.

And by the way, Bryan Larson of Mission Viejo, California: we said hi to Bill for you. He sends his regards.
We'd like to respond to your suggestions on how to improve Microsoft Excel.
9 out of 10 Mac spreadsheet users use Microsoft Excel. What are we doing wrong?

"Add a sheet button doesn't work on Mac's. Is this a spreadsheet or a word processor? A "Save" button would be nice, too. A "Format Text" button would be nice. Also, the "Print" button needs to be fixed. I have had a spreadsheet on a Mac and it would be nice to see it on a Mac."

Sincerely,
Alan Dale

Microsoft

9 out of 10 Mac spreadsheet users use Microsoft Excel. What are we doing wrong?

Microsoft

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9 out of 10 Mac spreadsheet users use Microsoft Excel. What are we doing wrong?

Microsoft
Features

System 7.0 Update
System 7.0: Getting Down to Business
by Victoria Von Biel and Darryl Chan
Apple's System 7.0 is amazingly powerful — and amazingly confusing. Here's how to install it on your Mac (or network), get it to work with your favorite applications, and prepare for the deluge of System 7.0-compatible upgrades. .......................... 96

Operating Systems
With Apple's System 7.0 Group Upgrade Kit, you can use your network to convert every Mac you've got to System 7.0 — automatically. .............. 199

Power Techniques
You're just ten easy steps away from successful installation of the Mac's most powerful operating system ever: System 7.0. ............................ 208

Layouts for Less
by Gregory Wasson
You design newsletters, fliers, and reports, but do you need the complexity — and cost — of a high-end page-layout program? You'll save yourself both time and money with one of these five budget-priced desktop-publishing packages. ........................................... 110

The Mac/TV Connection: Desktop Video
by Paul Yi and the MacUser Labs Staff
Don't let the video revolution start without you! The seven video products we tested let you do it all: put full-motion video into a window on a Mac screen, store video images on a Mac, integrate graphics into video presentations, and use video images with your favorite graphics software. .................................................. 124

Gigadrives: The 1,000-Megabyte Solution
by H. B. J. Clifford, Stephen Satchell, and the MacUser Labs Staff
A megabyte here, a megabyte there . . . . Pretty soon you need a 1,000-megabyte hard drive — especially if you work with mammoth databases or do full-color desktop publishing. MacUser Labs torture-tested 19,000 megabytes of storage to find the best gigadrives. ............. 140

"Imagine using your Mac to manipulate video images as easily as you now write memos, crunch numbers, or record and edit sound.” .................................................. 124
Just out: Dynamac’s two portables based on the Mac LC, Resolve and MacWrite Pro (Claris’ new spreadsheet and word-processing programs), and more. ........................................... 51

Type
TrueType-based outline fonts banish jaggies on the screen and on the page, and fonts install automatically. Find out what a dozen vendors are doing with Apple’s TrueType today. ........................................... 181

Type
Adobe’s Multiple Master font technology lets you create a multitude of sharp, scaled fonts—from condensed to extended—from a single master design. ............... 187

Trouble Shots
You’ve installed the best network hardware and software, but you’ve gained nothing in the quality or quantity of people’s work. Why? Here’s how to make your LAN work smarter, not harder. ............... 205

Beating the System
Should you change your System software the instant System 7.0 comes out—or let others serve as Apple’s guinea pigs? ........................................... 213

The Expert’s Edge
For photos and color, you need a 24-bit display system—and these tips on how to handle it. ........................................... 217

Power Programming
You can run those applications you built with HyperCard 1.2 under HyperCard 2.0—if you follow HyperCard guru Danny Goodman’s eight hints. ........................................... 221

Tip Sheet
How to really use Word 4.0’s indexing feature, control spacing of repetitive elements in PageMaker, overhaul ImageWriter print heads yourself, and more ............... 229

Help Folder
How to download compressed files from Macintoshes to PCs, revive dead mice, power up all the equipment in your system in the right sequence, globally replace fonts and formats in Word 4.0, pick a surge suppressor, and more ........................................ 233

Reviews
Microsoft Excel 3.0
The leading spreadsheet program gets stronger and easier to use. ........................................... 56

FreeHand 3.0
Aldus applies some interface polish to this illustrator’s toolbox. ........................................... 58

Taste
An all-in-one word-processing, graphics, and database package that’s an all-you-can-eat feast ........................................... 70

Virtus WalkThrough
Create and explore computer-generated buildings, cities, and other virtual structures. ........................................... 72

MacFlow
Colorful charting software clarifies complex business plans. ........................................... 76

MacLinkPlus/Translators
The easiest way to move files to and from PCs ........................................... 78

Ultimage and IPLab Spectrum
A pair of scientific image-processing programs helps you visualize and interpret data ........................................... 82

Quick Clicks
ADDmotion: Add colorful animation to your HyperCard stacks. SampleCell: Music and sound-sampling software, a Mac II board, and a CD-ROM. SimEarth: How to build a planet in ten billion years or less. PickTure: A nifty visual file selector. ........................................... 89

Departments
Jon Zilber
The trials and tribulations of Apple at court ........................................... 23

Robert Wiggins
Do Macs throw a monkey wrench into the meticulous gears of MIS? ........................................... 29

Guy Kawasaki
Got a minute? Get the top tips from a dozen of Guy’s greatest gurus. ........................................... 41

Michael Swaine
Is it time to exterminate your mouse? ........................................... 45

John C. Dvorak
The arch-debunker strikes again ........................................... 292

Letters
Readers on what’s up, where’s the UPSes, and how to beat the USPS ........................................... 13

Advertiser Index ........................................... 240

Marketplace ........................................... 274
UNDISPUTED CHAMPION WAITLIFTER

Raymond Lau has been lifting weights since he was sixteen.

Now quicker and more powerful than ever, Stuffit Deluxe 2.0 remains not only the number-one ranked compression program for saving disk space, but time as well.

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Sheet-fed scanners are great until you have to scan a book, article, or scrap of paper. That's why Abaton built the TranScribe 300 with a flatbed design. So now you can store information on your computer directly from a book, magazine, note card — or even an article ripped from a newspaper. Making re-typing information obsolete, while reducing the amount of bulky hard-copy you need to keep. And with the optional document feeder, you can give a sheet, or 20. Freeing you from the tedious of hand-feeding large documents for use in a report, newsletter, database, or presentation.

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And if all that doesn't convince you that the TranScribe 300 will work harder for you — maybe the $1,095* price will. So whether you can give a sheet, or not, call Abaton at 1-800-444-5321 or (415) 689-2220 for the dealer nearest you.

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MACWORLD, MAY, 1991

-: 1 -

"If you want a full-page display, we recommend the Ehman; it's rare to find such high quality and low price ($499) in the same monitor."
MACWORLD, MAY, 1991

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About MacUser
I Want My Mac TV

No one has been able to define multimedia to everyone's satisfaction. But the lexicographers had better hurry up — because however you define it, the multimedia revolution is already upon us.

Back in February, MacUser brought you an overview of this revolution with a buyer's guide to more than 100 multimedia products. Now this issue offers MacUser Lab's first installment of a two-part report on the leading multimedia technology thus far: desktop video. Future issues of MacUser will provide ongoing coverage of video, audio, and other Mac-based multimedia products as they come on the scene.

And this is one revolution that will appear not on television but on Macs themselves. Sooner than you might think, video will be just another data source available to Mac users. Already you can put live video onto any Mac's display and digitize single or multiple frames of video to drop into page-layout or even database files. For those thirsting for new ways to communicate information, desktop video is a real solution.

Two of MacUser's prime multimedia mavens, associate editor Paul Yi and MacUser Labs project leader Steve Lipson, put together this first-ever MacUser Labs report on desktop video. Not coincidentally, they have also been instrumental in helping establish a special laboratory in our Foster City headquarters that is dedicated solely to multimedia-product testing.

The multimedia lab roosts in an 18th-floor aerie overlooking San Francisco Bay. Hawks soar outside the windows, patrolling surrounding fields. The view would be distracting if the work weren't so interesting.

The lab has its own attractions, even beyond the normal quota of Mac hardware: DAT drives; CD-ROM drives; laserdisc players; special Mac-controlled frame-accurate VCRs; MIDI-based music setups; and a NewTek Toaster with an integrated character generator, 24-bit paint system, solid modeling, rendering, animation, and scripting. Not to mention test equipment such as a Grass Valley Emphasis Encoder, a Tektronix VM700 waveform analyzer and vectorscope, and an RGB 650AX Scan Converter.

As if all that didn't give them enough to do, Paul and Steve are themselves multimedia creators. Paul is an aspiring filmmaker, and Steve is a MIDI-drumming musician and music-software developer. So they bring to their reportage the multiple perspectives of users, developers, and critics.

MacUser has shown — with Paul and Steve's help — that desktop video is real. The seven products they reviewed for this issue prove that working solutions exist for users' video needs. Now it's up to you to explore and push the limits of the new medium.
DoubleUp compresses any data, image, or application file—so fast you'll hardly notice it happening. You will notice your disk capacity expand, by 100% or even more. It's like doubling the number of hard drives in your system.

DoubleUp comes with DiskDoubler™ software for user-friendly operation, and a Macintosh NuBus card for unbeatable speed. So you can work with files the way you usually do, even after they're compressed. And data is never lost or altered.

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Love Apple

Marcy Poulos (Letters, April ’91, page 14) complained about Guy Kawasaki’s columns, saying she didn’t care about Apple, the company, and that she only wanted to read about Apple, the computer.

But many of us do care about Apple, the company. I love my Mazda, my Rockport shoes. But I don't care about either company, even though I spend a lot of time in my car and in my shoes. So why is it different with Apple?

Apple’s history is our own dream come true. Consider Apple’s origins: two bright fellows in a garage. I can picture the two Steves working on their first computers, looking much as we do when we’re putting around in our own garage.

That kinship is strengthened by the Mac’s personality. Nothing else I use has one. But the Mac is my friend: respectful, a little whimsical, unassuming, quietly powerful — the Robert Frost of machines. The thing even apologizes when it bombs.

But computers don’t really have personalities, do they? People do, and companies do. So I see in the Mac’s interface the company’s personality. Respectful, unassuming, whimsical: I like this company.

Ross T. Carter
Hallowell, ME

Whimsical? Unprepossessing? You may finally have hit on why Apple made the StyleWriter printer cute but slow. — JB

Cereal Port

Marcy Poulos states that she loves her Macintosh the same way she loves her breakfast cereal. Does that mean that she also reads magazines targeted at users of specific breakfast cereals — Fruit Loop Eaters Monthly, for instance?

Dave Kovacs
Allentown, PA
No, but maybe she reads Life. — JB

Before and After

Timothy Eustis is wrong to assert in his letter “Who is This Guy?” (March ’91, page 21) that Guy Kawasaki cannot write. Four months ago, I was still stuck in my “pre-Mac” days. Then I came upon The Macintosh Way. Now, not only did I get a Mac Classic for my home but I also have an SE on my desk at work and a full range of Macs in the department I run here in Hong Kong. My team and I are glad that I twisted a few arms — productivity is up, and we now know what the “Mac factor” is all about.

Ilyas T. Khan
Hong Kong

Dear Mr. Sculley . . .

Like a prizefighter who suddenly wakes up in the third round, Apple has belatedly come out swinging in the marketing battle of the GUI interfaces. The company recently published a report by Ingram Labs comparing Macs with PCs running Windows. The results showed that you get more for your money with a Mac (for another interpretation, see John C. Dvorak’s column this month).

Maybe Apple could have saved some money. Surely most of MacUser’s readers know at least one person who’s bought Windows. Why not let the Windows users try the real thing and see what they say?

Speak Up:

How do Windows users react when they try the Mac?

Send your thoughts to Dear Mr. Sculley, c/o MacUser, 950 Tower Lane, 16th Floor, Foster City, CA 94404.

In April, we asked whether Apple should license its operating system. Brian Hall, of San Francisco, California, thinks not. He bought a new LC — which he loves — at the price, he says, of “numerous problems, hassles, and frustrations ad infinitum with Apple Customer Support (!) / Technical Service (?)”. After getting everything straightened out, he feels great relief at being “freed from both the bonds of PC hell and Apple purgatory. Everything I need now I can get from non-Apple vendors.” But what has this got to do with Apple licensing its operating system? Simple: “Don’t license Apple ROMs. If you do, no one will ever need to buy from Apple, and thus no one ever will.”

Kyle K. Smith, of North Richland Hills, Texas, sees things differently. He doesn’t want to see a bunch of Mac clones on the market. Instead, he calls for Apple to license application-specific versions of its operating system to makers of consumer electronics. “With the addition of sophisticated and complicated features to televisions, VCRs, and other office and home appliances, it seems like the obvious place to implement the best human user interface system available.” He says that this would benefit users of everything from automated teller machines to microwave ovens. “Let’s get rid of all these ridiculous text-based menus, numeric keypads, and digital clocks that constantly flash 12:00.” Fine, but you’d better make sure there’s a programmer’s reset button on your microwave before your system bombs.
Clone Head

I’m a PC (clone) user. I decided long ago that I wasn’t willing to pay Apple’s prices for the benefit of a graphical user interface. But I occasionally buy Mac magazines to keep up with the Mac types, to find out what I’m missing (not a lot), and to see what troubles Mac users are having with their machines and software (about the same as IBM users have).

I bought a copy of your May ’91 issue and read it cover to cover (not including all the ads), and I’ve got to say that whatever your columnist Guy Kawasaki is smoking should be either banned or distributed freely. How he managed to go off on an anti-IBM tangent because of the Prodigy E-mail controversy is beyond me. Does he own substantial amounts of Apple stock?

James Colburn
Rockville, MD

As a matter of fact, as of this writing, Guy doesn’t own a single share of Apple stock, but he knows someone who does: See the next letter. — LT

Vote of Confidence

I enjoy reading Guy Kawasaki’s column each month in MacUser. And I totally appreciated The Macintosh Way. His insights have caught the spirit of the Mac and what Apple is striving to regain. I heartily recommend the book.

Although I hold only one share of Apple stock (I wanted to own a small piece of the rock), I would gladly use whatever voting power I have to help seat Guy on the board of directors. Just say the word.

Paul Rego
Jacksonville, FL

Shoulder of Fortune

Although I never write letters to the editor, I have to congratulate you on the May issue of MacUser. It’s the best issue I’ve seen, and I’ve been reading the magazine almost since it was founded. I particularly liked the color hardware Buyer’s Guide, the fax-modem tests, and the LaserJet-options article. All three answer Mac questions I’ve been wrestling with over the past three weeks.

Just curious: Was your editorial staff looking over my shoulder when they put together the issue?

Bill Wolk
Brooklyn, NY

No, that must have been the IRS. We rely on a rare pre-recall copy of Lotus Marketplace for that kind of information (see the next letter). — JZ

What’s in a Name?

Although Jon Zilber’s column “In Technology We Trust” (April ’91, page 25) appropriately salutes the innovative aspects of the withdrawn Lotus Marketplace CD-ROM, he missed the point behind the consumer outcry, which was, thankfully, supported by Computer Professionals for Social Responsibility and others.

Zilber’s argument that names and addresses may be available in phone books ignores the fact that the phone company offers its subscribers unlisted status ab initio. The basic objection to Marketplace and similar schemes is their “default” approach, in which they sell your name first and leave you to undo the resulting proliferation later.

Worse yet, Marketplace would have provided mailing lists selected by age, ZIP code, gender, and spending patterns. Let’s recognize the sale of names and addresses without prior permission for what it really is — appropriation of your private property without compensation.

Hats off to Apple and the other socially responsible companies who’ve abandoned the default sale of their customers’ names and addresses!

Robert Alan Solis
La Jolla, CA

To paraphrase, appropriating a million names is no problem — but it would be wrong. Unfortunately, it may have just become easier. The U.S. Supreme Court recently ruled that “creative works” that are little more than compilations of generally available data — such as the white pages of your phone book — are not protected by copyright laws. That could make it a lot easier for other software publishers to jump right in where Louis feared to tread. — JZ

Unlucky 13

I’d like to bring your attention to a flaw in Softsync/BLOC’s Accountant, Inc. 2.0 that you must have overlooked when selecting your 1990 Eddy honorable mentions for best financial-management package (March ’91, page 98): The program allows a company only 30 days after the end of the fiscal year to close out its books. This is a serious flaw in the foundation of the program. I discovered this fact after I had lost two months’ worth of data.

Robert Junk
New York, NY

Accountant, Inc. handles year-end closing with a “13th month” that can last as long as needed. Users should close within 30 days if they can, though, because subsequent transactions are reported as having occurred in the first month of the new year. This is fine for year-to-date reporting but not for first-month financial reports or certain kinds of project tracking. The moral of the story is that even Mac users must read manuals sometimes. — LT

FullWrite Faithful

I just read Daniel Rasmus’s review of FullWrite Professional (April ’91, page 83). Basically, it is another article designed to trash FullWrite, and honestly, I’m getting fed up with the misinformation campaign about this program.

FullWrite is a great program. Instead of pointing out the dozens of excellent features it contains, Mr. Rasmus Complaints about trivia. For instance, I don’t really care if the ability to convert Word files is contained in a side program. I don’t have Word, I don’t like Word. Obviously, I don’t need Word import/export functions.

He makes no mention of the slight overall speed improvement of the new version, yet several of your previous reviews complained about the program’s lack of speed. It is still not a speed demon, but it is no slower than other programs with similar abilities.

Yes, you need 2 megabytes to get the most out of FullWrite, but it runs just fine in a 1-megabyte environment. It is a big program, with many features. It handles complex graphics, text formatting, and outlining and contains a large convenience feature set.

Dwight Stewart
Surfside Beach, SC

You are entitled, of course, to disdain Microsoft Word, but it is a very popular word processor and it’s reasonable to expect that many people will want to be able to easily import and export its file formats. We did give FullWrite four mice, but whether it is a great program or not may soon be moot anyway. Ashton-Tate has never done a major new version of the program (which is more than three years old) and is unlikely to do so in the foreseeable future. At this point, the company doesn’t even know if it will do a new version for System 7.0. — JB

Grounded Flight

The continued sale of Microsoft’s Flight Simulator burns me up. The current version — 1.0 — has never been updated during the five years it has been on the
SORRY, CLARIS. BUT IT'S DEJA VU ALL OVER AGAIN.

Another new model year. And Canvas is still miles ahead. Lucky you. With brand new models of both the world's top-ranked drawing programs to choose from. Simultaneously. And MacDraw® Pro isn't a bad try. In fact, it reminds us of another drawing program we've always had the utmost respect for: Canvas 2.1.

Unfortunately for Claris, our new Canvas 3.0 includes enough major enhancements to leave their latest effort idling somewhere back in the dust. Again. Let's take a look under the hoods.

Canvas 3.0 gives you more high-end text handling features. Like binding to curves. 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. MacDraw Pro doesn't.

Canvas 3.0 gives you more technical drawing features. Like custom dynamic hatching. Custom parallel lines & curves. Custom dashed lines, curves & borders. Automatic dimension lines. Area & perimeter calculations. And a Smart Mouse™ drawing aide. MacDraw Pro doesn't.

Canvas 3.0 gives you more design illustration features. Including unparalleled Bézier curve editing power—from multi-point selection & editing to automatic object conversion, combining and blending. Magnetic guidelines. Center line auto tracing of scanned images. And full bitmap editing in 24-bit color. MacDraw Pro doesn't.

Canvas 3.0 also gives you new built-in translators for important multi-platform formats like CGM, IGES and DXF™. And Open Architecture technology — allowing new tools, effects and translators to be added with ease at any time.

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?

BUY VERSION 2.1 NOW AND SAVE!

Buy Canvas 2.1 between January 1, 1991 and August 31, 1991 and receive a free upgrade to Canvas 3.0!

International Users: Please contact your local authorized distributor for upgrade availability and pricing details.
Mac market. It does not run on any Mac II model or even on the SE/30.

Flight Simulator is, incredibly, still a top-selling entertainment program. Why Microsoft keeps selling that old horse is beyond me. It shows, once more, where the company's interests lie — Flight Simulator for the PC is at version 4.0.

Kevin Garrett
Woodland Hills, CA

You're right. Flight Simulator 1.0 won't get off the ground with any but 68000-based Macs — but don't throw away your copy just yet. Microsoft plans to release a major revision of Flight Simulator for the Mac sometime this year, complete with an upgrade path for owners of the "old horse" — and in all likelihood, long before the first Windows version shows up. — LT

Keep It Simple...

1 was intrigued by your "Extended Keyboard Secrets" article (March '91, page 224). I'm sure there are historic (and perverse) reasons for the assignment of accents to the keys of my more-than-$2-a-key Extended Keyboard, but perhaps there are people at Apple who would risk their career and assign accents in future releases to keys that make sense to users.

For example, what if Option-T generated a tilde over a letter, Option-C a circumflex, Option-A an acute accent, Option-E a grave accent, and so forth? Apple should remember the K.I.S.S. principle.

David J. Luéders
Bethesda, MD

Keys in Sensible Sequence: maybe?

Actually, if you think about it, Apple assigned the accent keys to the characters that are most commonly used with those accents. So Apple was sensible (not perverse) after all. — JB

The Magic Touch

I waited five months for the Mac Classic I ordered. It finally arrived, and I'm impressed with the quality, the speed of the 40-megabyte hard drive, its relative silence, and of course the price. It came with System 6.0.7 installed and the new version of HyperCard. So far so good.

However, I soon found that this version of HyperCard didn't provide any tools for stack development or for browsing. To make matters worse, with System 6.0.7, I couldn't run the original version of HyperCard with which I had developed my stacks. The conversion function did not work properly. Essentially, I was left with nothing. HyperCard was the mainstay of the educational programs I was using.

Robert Rupnow
Honolulu, HI

The version of the HyperCard application Apple provides with the latest Mac models is identical to the one that is sold separately. It does not, however, include most of the sample stacks that are found in the Claris product, and it has had the scripting level disabled.

To enable your version of HyperCard (assuming System 6.0.7 and HyperCard 2.0 have been correctly installed), type

set userlevel to 5 <Return>

into the message box while the first card of the Home stack is visible. Then go to the last card in the Home stack, and type

magic <Return> into the message box.

You're also correct that many earlier HyperCard stacks don't always run correctly under HyperCard 2.0, which has slightly stricter syntactical rules. For a complete discussion of how to make those stacks compatible, see Danny Goodman's Power Programming article in this month's issue: "Moving to HyperCard 2.0." — BM

The Suggestion of Power

I'd like to suggest that your MacUser Labs do one of its wonderfully thorough reports on uninterruptible power supplies that are appropriately sized for Mac systems. I'm extremely interested in purchasing one, but the multitude of features on the many different products has overwhelmed me.

Paul Kelly
Saint Clair Shores, MI

Your wish is our command. We've started testing for a report that's scheduled to run later this year. In the meantime, don't use the hair dryer, the microwave oven, and the Mac at the same time. — NG

Out of Tempo

Thank you for reviewing our new Tempo II Plus in your May issue (page 64). The released version of Tempo II Plus was 2.0.1, and we are currently at version 2.0.3. You reviewed an earlier version of Tempo II 1.2.4, to which you added our Tempo+ Tools. Tempo II 2.0.3 is a greatly updated integration of the earlier releases.

The review mentions the many incompatible applications listed in our About file, but most of them have truly minor incompatibilities. In including such minor tips, we recognized that a quick glance at the file might be misleading but that our users would nonetheless prefer that we provide the tips rather than gloss over the incompatibilities. Also, many of the items have since been addressed through updates, both in our software and in that of other publishers.

The MultiFinder external mentioned in the review is not present to "address deficiencies in Tempo II Plus itself" but to add an essential ability. Apple's Font/DA Mover cannot first check to see if your Mac is in Finder or MultiFinder mode before running, let alone toggle to the other mode, but Tempo can! Our 40-some externals are designed to make macros that can automate routines, and although they may not be obvious at first sight, they're beautiful when you need them.

The review says that Tempo II Plus and QuicKeys 2 are "two programs designed to keep your hands off the mouse." In fact, Tempo II Plus is designed to help your Mac perform many activities without your hand on the mouse, or the keyboard, a capability not offered by any other Mac macroutility and in fact unmatched on any other platform.

We have always regarded QuicKeys highly and even recommend it for some needs, but the two products are completely different in design and purpose. Even its publisher has never referred to QuicKeys as a program for creating macros, a word that is completely shunned in its manual. I don't believe that this detracts from its program, but it does emphasize the difference.

Rick Barron, President
Affinity Microsystems Ltd.
Boulder, CO

We commend you for being up front about incompatibilities — most publishers make you find out the hard way. Our reviewer actually did have version 2.0.1 of Tempo II Plus — the review's report card listed the wrong version number. — SJ

A SIMMple Misunderstanding

I appreciate the wide variety of articles in MacUser runs on subjects such as networking and routers that appeal to the corporate user.

In "SIMMple Pleasures" (April '91, page 194), Owen Linzmayer says that 2-megabyte SIMMs are supported only in the IIci. I have an article from the Apple Support Coordinators Newsletter that says the LC also supports them.

Peter R. Tittel
Garden City, NY

Two-megabyte SIMMs are supported...
LEAN, MEAN, POSTSCRIPT MACHINE.

THE NEW $1599 BLP ELITE.

Finally, the first affordable PostScript printer designed specifically for Macintosh users. It's from GCC Technologies and it's called the BLP Elite. A printer so advanced that it offers exactly the features you're looking for, at a price you've never seen before. Just $1599.

That's a full $1000 less than Apple's $2599 Personal LaserWriter NT. But that doesn't mean the BLP Elite has less to offer. In fact, the BLP Elite is packed with more features you want, like true Adobe PostScript and built-in AppleTalk for sharing over a network. There's also edge-to-edge printing for supersized spreadsheets and banners, and a straight-through paper path for printing wrinkle-free envelopes and labels.

The new BLP Elite is a faster printer, too. In fact, with its 16.67 MHz processor, it's one of the fastest 4 ppm (page-per-minute) PostScript printers you can buy. About 40% faster than Apple's Personal LaserWriter NT.

But what makes the BLP Elite a more sophisticated, more affordable printing machine is its breakthrough technology, engineered at GCC.

At the heart of the BLP Elite is the most compact, cost-effective PostScript controller board ever designed - half the size of the Apple Personal NTs, with one-third the number of chips.

A compact controller means two things: fewer components and lower manufacturing costs, which translates to exceptional product reliability and a significant cost savings for you.

800-422-7777 for the BLP Elite.

The new BLP Elite PostScript printer is available from your Authorized GCC Dealer or directly from GCC. Call 800-422-7777 for the name of the dealer nearest you or to place your order directly with us. Either way, you'll find it's painless to go lean and mean with the new BLP Elite.
Neither Rain nor DOS

Niles Carter (Letters, May '91, page 16) complained that the U.S. Postal Service discriminates against Mac users because the USPS' computerized mailing-list service can read only DOS-formatted database disks. (This mailing service adds ZIP+4 ZIP codes to the mailer's text files and allows mailers to save on postage.)

I have been able to use this service — with my Mac — to update street addresses and add ZIP+4 information to my 17,000-name mailing list.

To do this, I just used Apple's file-exchange program to format a DOS disk, after which I converted my Mac text file to an IBM text file. It all took less than five minutes. (The file-exchange program is included on all Apple system-utility diskettes.) When the USPS mailed me the ZIP+4 information, I used the same file-exchange program to convert the IBM text file to a Mac text file.

Make sure that your original text file contains all the key fields from your database. Then your database can use these fields to automatically import the updated information back into your database and also update each address and ZIP code. Without these fields, you must input all the new information by hand.

Robert Leahy
Tustin, CA

Under the Hood

Your article “Life Begins at 40 Megabytes: Small Hard Drives” (April '91, Buyer's Guide page 4) was informative and clearly written. The authors stated that Conner Peripherals makes the internal hard-disk drive for the Mac Classic. I decided to verify their assertion, so I used SCSI Probe to ascertain the manufacturer of my Mac Classic's internal hard-disk drive.

The program reported that the drive is a Quantum model LP40S. Who made the internal hard-disk drive?

Barry F. Wolf
Piscataway, NJ

The drive in your Classic was made by Quantum. To keep up with the heavy demand for Classics, Apple has turned to multiple OEM sources for internal hardisk drives. Although Conner is probably still the most common (being the least expensive), both Sony and Quantum drives are also being used. — JB

Boring . . .

John C. Dvorak claims in his commentary “Let’s Spell Mac B-o-r-i-n-g” (May '91, page 348) that the Mac's high-end-application direction is boring because he's not an animator, graphic artist, art director, ad-agency copywriter, typesetter, prepress technician, photographer, or professional artist. “How about the rest of us?” Mr. Dvorak asks. I ask who the “rest of us” are if they aren’t some of the above? Most of us probably are one of the above, and we’re thankful for the new high-end programs and hardware now available. They help us use our Macs to make money.

Suzanne Kimball
Irvine, CA

Boring . . .

Boring . . . boring? Maybe John C. Dvorak and I were at different Macworld Expos. Maybe he just went to the parties and was wined and dined by the big companies who were trying to impress him. Maybe he was, or is now, trying to impress them — and us. Boy, I'm sorry he was so bored! Maybe he should go back to his IBM PC (which is trying so hard to become as interesting as a Mac) and just forget about Mac Anything.

I spent all four days at the Expo — but I was never bored. I talked to the “big” people and the “little” people. I had fun, and I learned a lot! I cheered Guy Kawasaki along with all his other groupies. From top to bottom in most Mac-associated companies, you find enthusiasm and a thirst for knowledge. My kind of people!

Peggy Cartwright
San Francisco, CA

. . . Gone

I read in utter disbelief the things John C. Dvorak had to say about the Mac in the May '91 issue of MacUser. What he did was knock an entire industry — the computer itself and the software developers. I think it's a shame he has to single out the Mac for his frustrations.

The advances made on the personal computer and in its capabilities over the past seven years have been nothing less than amazing! Did Dvorak also think that desktop publishing was boring in 1984? What did he complain about then — spreadsheet programs weren't fast enough for him?

Is Dvorak serious about wanting to tell a computer to draw Donald Duck and then tell it to draw a fire hydrant? Get real!
Now you can have everything you ever wanted in a laser printer. Without paying the price.

Introducing the lowest priced laser printer in history: the $999 PLP" II from GCC Technologies. GCC developed the very first personal laser printer in 1987, and has over 30,000 satisfied users... more than everyone else combined.

Finally, a revolutionary printer at a revolutionary price. In fact, at $999, it's nothing short of a technological marvel.

Personal Desktop Printing.

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

Features such as a silent “sleep” mode, a very user-friendly LCD display and an envelope printing desk accessory have been carefully integrated. In the future, should your needs include PostScript®, there's even a user-installed upgrade, now available for the PLP II for just $799.

The Highest Quality Printing.

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

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

Even More Power: PLP IIS.

For those who demand even more power, there's also the PLP IIS.

With the PLP IIS, you get all the breakthrough technology of the PLP II, only now, you get it at a swift 8 pages per minute, making it the perfect solution for anyone printing a high volume of output.

You also get one megabyte of RAM, which can save you valuable time. For example, while PLP IIS is printing, your Macintosh can be processing the next page of your document.

And finally, with PLP IIS, you get a very powerful font library. In addition to the core set of 22 Bitstream® outline fonts, you also get a font package called Font Plus®, which means you'll have over 40 fonts to choose from.

Dealer or Direct: Your Choice.

GCC has made acquiring your new PLP II or IIS just as easy as using it. Simply call us toll-free, and we'll give you the name of your nearest GCC Technologies dealer. Or order direct from us, with a 30-day money-back guarantee and $9 overnight delivery. The award-winning PLP II and the powerful PLP IIS. Everything you ever wanted in a laser printer. For less.

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We gladly accept MasterCard, Visa, American Express, or your company's corporate purchase order.

PLP II $999, PLP IIS $1499.

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The SmartBundle is a collection of four easy-to-use, award-winning applications bundled together at an incredible price—the best value in Mac software today!

And because each application has won a MacUser Magazine Eddy Award recognizing it as the 'best' in its field, you know each part of the SmartBundle is extraordinarily capable—a claim other starting Macintosh® packages simply can't make.

The SmartBundle: Easy, powerful, and affordable... the smart choice in software for new Macintosh buyers!

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<th>Quick Comparison</th>
<th>Word Processing*</th>
<th>Database Management*</th>
<th>Spreadsheet &amp; Charting*</th>
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What could possibly be more boring than that?!
Fletcher Maffett
Sterling, VA

Running on Empty

I want to relate a personal example of "bending the rules" on daisy-chaining SCSI devices, which you discussed in the article on small hard drives (April '91, Buyer's Guide page 14). After buying a Jasmine DirectDrive 40 portable hard-disk drive, I was dismayed to discover that power was provided by means of the floppy port on my Mac Plus. I was reluctant to give up that port, as a second floppy drive on a Plus is as important as a mouse. But then a friend said I could just daisy-chain it. I replied that there's no port for daisy-chaining on the floppy drive. But when I checked the nether regions of my Apple 3.5 Drive, lo and behold, I found a cover for another floppy port! The manual said that the drive could be daisy-chained on an Apple IIs. So I figured that this should apply to my Mac Plus as well.

I connected the Jasmine drive's floppy input to the second port on the floppy drive, held my breath, and turned everything on. I've been running both the Jasmine drive and the external floppy from the Plus for about three months now and haven't had any problems. I am a bit concerned about the power supply, but it hasn't blown yet.

Michael A. Shelley
Houston, TX

You're pushing it. The Mac Plus lacks the Apple IIs' power reserve. Don't run anything important on your hard disk when you eject a floppy—thats when the power draw peaks. —JR

Clarifications

In "SIMMple Pleasures" (April '91, page 194), the Lsi was incorrectly referred to as needing a PMMU chip to run some programs being discussed. In fact, the Lsi's 68030 processor has PMMU functionality built in.

In the "On the Horizon" sidebar in the "EtherTalk-to-LocalTalk Routers" lab report (April '91, page 164), the estimated speed improvement of JDL's Excelsior multichannel EtherTalk-to-LocalTalk router was incorrectly stated. JDL believes that the router can make your network two to five times as fast as it does otherwise, depending on the configuration. Also, JDL's correct toll-free number is (800) 535-3969.
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WE'VE PUT MORE INTO IT SO
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Invoices. Labels. Custom forms. You name it, the WriteImpact™ can handle it, now with new version 2.0 software and CustomForm™ technology. Two little additions that make a big impact on the way you print your forms.

Form Flexibility.

Not only does WriteImpact print letters and envelopes with 24-pin letter quality, it prints just about every business form imaginable. And even ones you haven't imagined yet.

That's because, with CustomForm, you can create your own custom page sizes. When you need a new size, just define the dimensions in the Page Setup menu and print. Then simply save the format for next time. There's no need to re-create the wheel.

Now think of the time that'll save you when you have lots of labels or specialized checks to print.

CustomForm. It makes WriteImpact the only business printer you'll ever need.

Paper Versatility.

WriteImpact has more paper handling options than any dot matrix printer in the industry.

WriteImpact can print on assorted paper sizes and weights, which makes printing checks and multi-part forms hassle-free. It also has push and pull tractor-feed modes, and friction-feed for single sheets and envelopes. And, thanks to automatic paper loading and parking, you can print envelopes and single sheets without having to remove the tractor-feed paper. There's even a paper tear feature with automatic paper repositioning.

Letter Quality.

Compromise print quality for versatility? Never! The WriteImpact's 24-pin print head produces letter-quality output at 360 horizontal x 180 vertical dots per inch (dpi). Numbers those 9-pin printers just can't match.

With WriteImpact, you don't have to give up speed for quality, either. We've added two new print modes, giving you a total of four quality print options to choose from. There's new Text Draft, perfect for memos and invoices. And new Fast Text Draft, a real time-saver when you're doing large mailing lists.

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It's your choice. Call us toll-free and we'll give you the name of the GCC Technologies™ Authorized Dealer nearest you. Or order directly from us and you'll receive a 30-day money back guarantee and our overnight delivery option (only $9) for all in-stock orders.

The $699 WriteImpact. A workhorse of a printer with new horsepower.

WriteImpact. $699.
Asanté Designed Their 10BaseT Hub
Realizing There Are Times
When You Have To Be Flexible.

No one likes to be left out. And with the 10BaseT network hub from Asanté™, no one is.

The Asanté 10T Hub™ comes standard with all the right connections: twelve 10BaseT ports, plus one each for thick and thin Ethernet™. The media flexibility you need in any office.

Installation is easy, since the 10T Hub requires no special software. And it ships with interchangeable back panels, so you can make your 10BaseT connections two ways: with simple RJ-45 plugs, or a 50-pin connector for a telephone system punch-down block.

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 Macintoshes. 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.

Please circle 37 on reader service card.
The verdict is in: Apple is guilty — of failure to arm its customers with the information they need to buy, use, and cost-justify their Macs.

Hear ye! Hear ye! The Oh-So-Superior Court of Cupertino is now in session. All rise for Judge Hank M. Hye.

"Thank you, bailiff. Counsel will approach the bench."

"Your honor, as counsel for the prosecution, we represent the owners of Macintosh computer equipment, all of whom have collectively filed a class-action suit against the defendant, Apple Computer, for malpractice."

"Malpractice? Malpractice of what?"

"Specifically, the Claris conundrum, operating an operating system without a license, and failure to provide adequate ammunition for users. We will explain the details in a moment."

"And what does the defense have to say about these charges?"

"Your honor, we contend that Apple has more important lawsuits to deal with and should be given a break on general principle."

"I didn’t realize it had any general principles. Well, let’s get this show on the road. Mr. Prosecutor, call the first witness."

"Your honor, for reasons that will become apparent, our first witness has asked to be guaranteed anonymity under the Silicon Valley witness-protection program. He’s the gentleman over there with the dark glasses."

"Ah, yes, I see him. Very well, for security purposes, we’ll identify Mr. Bill Gates only as ‘Witness X.’ You may take the stand, Mr. X."

"Look, I’ve got to give a deposition in the courtroom next door about the look and feel of Windows versus the Mac before noon, when I’ve got an appointment with the antitrust hounds at the FTC who are trying to do a Microsoft what they did to the phone company. So if we don’t make this fast, you might end up having to dial every time you want to eject a floppy disk."

"We’ll try to accommodate your schedule, Mr. X. Now, you have some comments to make about Claris."

"Yes, your honor, I do. When Apple reneged on its plan to spin off Claris as a fully independent software company, it committed an egregious error. At Microsoft — er, at my company, we’re always looking for win-win opportunities, and I’m not just talking about Win3. Only a company with blinders on could miss out on all the win-win opportunities that are constantly presenting themselves to savvy computer companies. Like suing Apple, for example."

"Whenever we sue Apple, either we win — which is good — or we lose — which is also good, because it helps us convince the FTC that we’re not the all-powerful force in the microcomputer arena that they’re trying to make us out to be."

"Claris, on the other hand, seems to have turned into a lose-lose opportunity for Apple. If Claris loses in the marketplace — by losing market share to other application-software companies — Apple loses. And if Claris wins — by dominating the application-software market — Apple loses, because Claris’ domination will drive most of the independent software publishers out of the market. And if that happens, Apple’s sunk, because an open and competitive third-party-software market is the only thing that maintains the high level of innovation a computer company needs in order to thrive."

"I see — that must be why you graciously concede ten percent of the Mac spreadsheet market to other parties. That will be all, Mr. X. You may step down now. Just don’t leave town, OK?"

Justification of the Piece

"We’d like to call our next witness, an expert on how to cost-justify equipment purchases. Would Mr. Ty Mizmoney please take the stand? Now then, Mr. Mizmoney, you are the author of How to Use Statistics to Win Friends and Influence People?"

"That is correct."

"And you’re a computer consultant on the side?"

"That’s why I’m here today. Apple has provided users with incredibly powerful solutions to a wide range of computing problems. But it’s failed to give its customers and converts the ammunition they need to justify the cost of the Macintosh solution to the folks who monitor their budgets."

"Give us an example."

"I’ve got a client who’s been happy with his Mac Plus for several years. Suddenly there was all kinds of noise about the SE — and now the Classic. Is it worth upgrading CPUs and peripherals to keep up with the times? It is, but Apple’s never bothered to tell him."

"Could you give us a concrete example, Mr. Mizmoney? How would you rationalize the cost of a full-page display for a Mac SE owner?"

"Oh, that’s an easy one. Let’s say that you use your Mac six hours a day. Now, depending on what kind of work you do on your nine-inch Mac screen, let’s say you need to scroll beyond..."
the screen once every two minutes. Mou­
ing around might only take you, say, four
seconds. It probably also takes your Mac
another few seconds to refresh the screen,
so you may be idled for, say, eight seconds.
That adds up to two hundred forty seconds
every hour — or twenty-four minutes a
day. At two hundred fifty workdays a
year, that comes out to at least a hundred
hours of time wasted mousing around
every year.

As a rough rule of thumb, you should
value your time at at least twice your
hourly wage. That takes into account the
cost of office space, telephone usage,
furniture, paper clips — and, of course,
your Mac equipment. So even at the
minimum wage, your time is worth at least
about ten dollars an hour. Which means
that, using this kind of conservative
guesstimate, a large-screen monitor could
add one thousand dollars' worth of pro­
ductivity per year per employee.

“Naturally, your own numbers could
be significantly higher. But you’ll probably
find that it isn’t hard to justify the expense
of most of the basic types of performance­
oriented peripherals — accelerators, cache
cards, CPU upgrades, extra memory,
speedier printers, and so on — by finding
time-saving opportunities in everything
from eliminating scrolling delays to
speeding up painfully slow spreadsheet
recalculations. Just figure out which up­
grade will fix which bottleneck, and come
up with estimates for the following:

\[
B = \text{the number of times the bottleneck}
\]

\[
S = \text{the number of seconds the bottle­}
\]

\[
H = \text{the number of hours per day you}
\]

\[
D = \text{the number of days per year you}
\]

\[
W = \text{your hourly wage.}
\]

And here’s the formula for how much
you can justify spending to remove the
bottleneck:

\[
(8 \times S \times H \times D \times (2 \times W)) / 3,600 = S
\]

The result is how much you can pay
back in one year. Of course, all this is on
top of the real benefits of Mac ownership:
software integration that’s more than just
pretty icons; built-in connectivity instead
of built-in connectivity slots; audio and
video multimedia as a given, not as a
challenge. These benefits improve the
overall quality of computing life, but they
don’t always get you very far with the
Corporate comptroller.”

“Very interesting, Mr. Mizmonev. What
other information has Apple neglected to
provide to its customers?”

“Well, every PC owner I’ve ever met
knows more stats than even the most avid
baseball fan. But most Mac owners don’t
have a clue. How fast is an AI? Which
functions require a PPMU? Every PC
owner knows the relative clock speeds of
Your data is your data. And to keep it that way Kensington introduces PassProof™ — the first complete data protection system for the Macintosh®.

First, the hardware.
A rugged cylindrical lock keeps your disk drive safe from intruders. Two sturdy metal plates with tamper-proof screws block both rear-floppy and SCSI ports.

Next, the software.
As the master user you assign yourself a master password. From then on, you use the password as your key to unlock the system. You can add or delete additional users whenever you want. And PassProof's User Log keeps track of every attempt to use your Mac.

Want to "lock up" in a hurry? Quick Cover™ is PassProof's screen-locking program that lets you secure your Mac on command.

Best of all PassProof is user friendly. Unless, of course, the user is unauthorized.

Ask your dealer about other Kensington accessories including cable and lock systems for all Apple and Macintosh computers, including the Mac Portable and the LaserWriter® II. Or call for a free brochure at 800-535-4242. Outside the U.S., call 415-572-2700.
a 286 versus a 386 versus a 486—but how
many Mac owners know the basic stats for
an SE versus an si versus an fx?
“Yeah, I know—none of that matters.
All that matters is whether the machine
helps you get your job done, something
the Mac excels at. But that’s like trying to
argue with a baseball fan that a player’s
stats don’t matter, that all that matters is
whether or not he hits the next ball out of
the park. If the bean counters want to talk
stats, Apple should make sure all its
customers have a cheat sheet memorized.
Instead, Apple’s advertising and market­ing
seems intent on merely giving cus­
tomers enough warm fuzzies to make the
Greenhouse Effect look like a tea party.”

Defense Cuts
“Does the defense have any witnesses, coun­selor?”
“The defense calls the Apple CEO, Mr.
John Sculley, to the stand.”
“Mr. Sculley, do you solemnly swear to
tell the truth, the whole truth, and nothing
but the truth?
“How did Gates answer that?”
“We’ll take that as a ‘yes.’ Now, Mr.
Sculley, perhaps you’d like to tell the court
about your new operating system.”
“Ah, yes, well, System 7 is about
to change the future of personal computing,
and —
“And how do you know that?”
“Well, because that’s what it said on the
System 7 rollout T-shirt. But what I really
wanted to say was that —
“Mr. Sculley, isn’t it true that you
really only have to speak less than four megabytes
to get anywhere with System ??
“Well, I suppose, but what I —
“And, Mr. Sculley, isn’t it the case
that this business about applications talking
to each other can work only if competing
software companies get together and tell
each other about their upcoming software
releases, a situation even less likely than
Mr. Macy telling Mr. Gimbrel what he’s
putting on sale next week?”
“Well, but we — hey, wait a second.
You’re supposed to be the counselor for the
defense!”
“Yes, but I also bought an SE for two
thousand dollars just one week before
the Classic came out for half the price. Now
then, Mr. Sculley, perhaps you’d like to
tell the court about the Mac Portable?”
“Ah, yes, now there’s —
“Excuse me, Mr. Sculley; the jury
is about to deliver the verdict.”
“But, your honor, I still haven’t said
a word about all the good things Apple
and the Macintosh can do for you.”
“That’s exactly the point, Mr. Sculley.
That’s exactly why we seem to have a
hang jury.”
“Don’t you mean a ‘hung jury,’ your
honor?”
“Nope. I meant what I said. Noose
fittings are next door. And now, will the
bailiff call the next case? Uh-oh—it looks
like you’re going to be a bit late for that
next appointment, Mr. Gates.”

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26 July 1991 MacUser
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Please circle 89 on reader service card.
Lowered Standards

As long as there have been computers, there have been attempts to settle on standards. Since the early days of mainframes, people in data processing have tried to get everyone to pull their oars together (often to the beat of the MIS drum).

When computers left MIS clean rooms and moved into other corporate departments, the search for standards became almost frenzied. And as more options became available, companies and managers tried all the harder to curtail those options.

Now it's beginning to look as though the Mac — a revolutionary computer in many respects — may have started a standards revolution that the confederates of conformity have overlooked. And this revolution threatens the very foundations of the standards movement.

Considering the way computers evolved, it's easy to sympathize with the quest for standards. When computers were new, they were hard to use. The first machines required their operators to talk to them directly in binary, or at best, in octal (base 8). These machines were idiosyncratic too. Some didn't even have keyboards — you programmed them with front-panel switches.

Consequently, knowledge about one kind of computer was worthless when you faced another kind. Even different machines from the same vendor might require operators to learn different machine languages.

As mainframes grew up, programmers developed operating systems that made computers easier to work with. But different manufacturers still used different operating systems. And some computers could run several operating systems. Despite rapid improvements, users still faced a computational Tower of Babel.

From Chaos to COBOL

This problem persisted throughout the era of mainframes. Technological improvements continued to make computers easier to use, yet at the same time these changes increased the confusion. Soon there were not only operating-system issues but also database issues, telecommunications issues, and application-program issues. The number of possible combinations of hardware and software became so huge that no one could learn all the languages and interfaces. Out of this morass of confusion, the standards movement began.

One of the first major standards in the world of computing was COBOL (Common Business Oriented Language), a programming language. The standard was developed by CODASYL, the Committee on Data Systems Languages, and was given the imprimatur of ANSI, the American National Standards Institute (home of ASCII).

Few people hold COBOL in high regard today, but no one can argue with the fact that COBOL gave impetus to a trend toward programming languages that were compatible across operating environments (usually with only minor dialect differences). This was a big step forward, even if it was made by a committee-designed programming language.

Not all attempts at establishing industry-wide standards were so successful. CODASYL's attempt at establishing a standard database-description language flopped, but industry standards continue to be set by organizations such as CCITT (Comité Consultatif International Télégraphique et Téléphonique, an international committee that sets standards for international telecommunications).

With the advent of the minicomputer, the situation became even more chaotic. Now decisions about hardware and software were taken away from MIS and relegated to individual departments. The MIS group was reduced from selecting standards to publishing standards (and trying to get corporate headquarters to give it the muscle to enforce them).

This environment was responsible for the rise of UNIX as an operating-system standard. It ran on almost any machine, and its programmers' and users' knowledge was applicable in different operating environments.

How PCs Became Walls

Then came the microcomputer, and all bets were off. The purchasing-decision level was now extended down to individual managers in many cases, so even within the same department, different hardware and software configurations could be at work.

Company managers began to fear that they were creating a generation of employees dependent on specific technologies — employees who wouldn't be able to move from department to department. So when IBM entered the microcomputer market and acquired a large market share, the decision to standardize on the PC was a no-brainer for many companies. Edicts came down from on high (often just rubber-stamp approval of MIS plans), and standardization became the rule.

Many people ran into the PC-standard wall when they tried to bring Macs into their
companies. Considering the number of companies with such standards (some even with approved software lists), it was often a tribute to the persistence (and sometimes sneakiness) of the early Mac devotees that they were able to get Macs into many businesses at all.

But there were success stories, and the Mac beachheads that were established in many companies finally became accepted as a second standard — albeit a less-acceptable one.

Microcomputer software, on the other hand, posed a considerable problem. When companies had to worry only about the IBM PC, it was easy to standardize on Lotus 1-2-3 as the spreadsheet program and WordPerfect as the word processor. As a result, these two programs dominated their respective DOS markets, but neither of them existed on the Mac in the early days. Even now, seven years later, we’re still waiting for a Mac version of 1-2-3.

What did exist on the Mac was a word processor, MacWrite, that was bundled with every Mac. Naturally, it became a standard, although that success proved somewhat fleeting. And P&d quickly became the standard Mac spreadsheet program. It remains to this day one of the few true standards on the Mac — at least in the way PC people think of standards.

Formats, Not Applications

What happened on the Mac over time was subtle — so subtle that it went unnoticed by the standards bearers. Rather than programs becoming standardized, file formats became standardized. No longer was it a program issue; it was a data-sharing issue.

The seeds of this minor revolution were sown by Apple when it chose to distribute MacWrite and MacPaint — and, later on, HyperCard — for free. Because these applications were given to everyone who bought a Mac, everyone used them. But because they were free, Apple had little incentive to improve on them. Consequently, a generation of software sprang up that had to be able to read and write the WORD/MACA and PNTG/MPNT file formats (yes, the MacWrite file format's technical name is WORDQ: Word's format is called WDBN/MSWD. MACA was short for MacAuthor, which was originally going to be MacWrite's name). The PNTG file format remains the bit-mapped graphics format for the Mac, although most drawing programs have moved on to bigger and better formats.

These aren’t the only two file formats Apple introduced. Apple created the PICT format as a standard interchange format for object-oriented drawings (such as MacDraw output) and later a color PICT format. Other file-format standards came along that Mac programs adopted, including EPS (Encapsulated PostScript) and TIFF (Tagged Image File Format). Internally, Apple standardized types of software artifacts called resources, which all Mac programs used. Standardized resources helped applications provide apparently seamless cutting and pasting.

Users as Hammers

In addition to the standardization of file formats, Apple’s gifts of MacWrite and MacPaint had a second result: The proclamation of what is now commonly accepted as the Mac interface. Apple worked very hard with all its third-party developers to ensure the consistency of all Mac-program interfaces. Apple wanted to be sure that users wouldn’t be confused when they moved from program to program.

Because everyone received several programs free with their computer, going against the consistent interface would stand out. The Japanese have a saying: “The nail that sticks up gets pounded down.”

Users were the hammers. They demanded — and got — changes in non-standard interfaces. For example, the original ThinkTank’s “hot borders” were replaced with standard scroll bars in later versions of the program.

The consistent user interface across programs meant that users were no longer being forced to learn a new user interface with each application, so that switching from MacWrite to Word on the Mac was nowhere near the challenge of switching from WordPerfect to Word on the PC.

The result of all the changes introduced by the Mac is that software packages themselves aren’t the standards that they are on the PC. The standards on the Mac are the consistent user interface and the file formats.

These two not-so-minor revolutionary developments have freed the business users from the shackles of “approved” software and let departments, groups, managers, and users choose the package that is right for them — as long as it can share files with the other programs already in use at the company.
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#3772 Full Write 1.5.....$145
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In House Software

In-House Accountant

In-House Accountant is the first accounting program for the Macintosh that's powerful enough for any small business, but easy enough for just balancing the checkbook at home. In-House Accountant was developed from scratch to take full advantage of Macintosh's power, point-and-click operations, all of your financial information, anytime you want. Entries made in the transaction list immediately update all related items in other lists, so there's never a need for "posting." Prints professional-looking reports.

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WriteNow 2.2 with Grammatik Mac

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#2082 WriteNow 2.2 with Grammatik

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#3909 Publisher ...............$498
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One picture is worth a thousand words. If you’re a typical Macintosh user, you’d love to create your own custom software quickly and easily, but couldn’t because you’re not a programmer. Now you can! Built around Serius Programmer’s revolutionary Information Control System, Object Interaction Protocol (OIP), Programmer’s tools offer a variety of advantages over conventional development systems. Every custom application can use the full array of Macintosh graphic controls including windows, menus, buttons, lists and others. You’ll have complete control over the look and feel of your new application. When you finish designing it on screen, Programmer will compile and save your work as a stand-alone application which can be used by anyone. You can even draw your own icon to display in the Macintosh Finder.

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Dollars and Sense has been a leading Macintosh program since 1984 because it eliminates drudgery. Your computer can generate checks, automatically record income and expenses, help balance your checkbook, and produce great-looking financial statements. At tax time your data will automatically be ready to prepare a return or to export to a tax program like Macintax.

#3464 Dollars & Sense 5.0.....$62

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**Mindscape Inc.**

#3971 Streamline 2.0

Streamline is a free-standing autotracing application derived from Illustrator 88. If you don’t need a complete PostScript drawing application, but simply need a good autotracing tool, Streamline is for you. It works in either Outline or Centerline mode, or a combination of both. The Centerline mode traces lines down the center, not around the edges. Streamline goes one step further than the Illustrator 88 autotracer, because it can read TIFF files form scanners, along with PICT and MacPaint files. When you have finished the trace, Streamline can output to an EPS file for either Macintosh or PC compatibles.

#3971 Streamline 2.0.....$118

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Completely rewritten, V 3.2 is the most versatile financial software in its class! You’ll NEVER PAY A LATE FEE AGAIN! because Check Writer II automatically reminds you of bills that are due. Tear a check out of your checkbook and begin...NO WAITING FOR SPECIAL CHECKS. Any business or personal check can be used and checks can be printed on plain paper. V 3.2 offers complete budgeting, graphing, over budget warning, an address database with envelope/mailing label printing, tax summaries, cash projections, income vs. expense reports, and importing/exporting of text files. Links with Adams Payroll for complete accounting.

#0192 Check Writer II V 3.2

#1875 Ultimate Payroll 4.5

#1871 Payroll 4.0

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#0055 SuperMouse  $89
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#0161 Macciday Card Reader .................. $295
#328 FileGuard 2.5 ............................. $138
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Voice Link sound system includes everything you need to integrate voice and sound with your Macintosh applications. You'll find the Voice Link digitizer, sound editing software, voice messaging and other tools that make it easy for you to integrate sound. Advanced audio technology dramatically increases the quality of sound input on the Macintosh. Delivers unsurpassed audio quality to voice annotation, voice messaging, narration and sound effects. Voice Link is interrupt-driven with a RAM buffer.

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BackMatic automatically backs up your files each time you shut down your Mac. Install this handy INIT in your system folder and you'll never need to remember to make a backup again. Configure it to back up only files changed or all your most important files.

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Magic Software, Inc.
AutoSave II
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#1244 AutoSave II .......... $26

Individual Software
ResumeMaker
ResumeMaker helps you quickly get on the right track for the job you want. It's easy to use: simply fill in on-screen information forms with your experience, education and skills. It then automatically transforms this into a winning, professional-looking resume. Includes varied resume formats, guided letters, a full word processor, target company database and much more.

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Add a friendly, polite assistant to your Macintosh, with real-life motion and digitized sound. Phil will notify you of important meetings, prompt you when phone calls need to be made and remind you when deadlines approach. He'll alert you when E-mail arrives, provide a report on your computer's memory usage and system monitor keyboard and mouse activity to suggest when you need a break.

#0415 At Your Service .......... $30

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Microtek’s ScanMaker 1850S is a revolutionary new 35mm slide scanner that’s perfect for desktop publishing, presentation graphics and multi-media applications. You can scan 24-bit color and 256 shades of gray at up to 1850 dpi resolution. With a scanning area of 35mm x 35mm, ScanMaker 1850S is versatile enough to scan slides in portrait and landscape mode. Also includes Photoshop.

#0370 ScanMaker 1850S ................................Call

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#0438 Encyclopedia ............................ $67

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Premier Macintosh Case is perfect for the Mac SE and Classic. Features a padded compartment for your Mac, external hard drive and removable padded case (for the extended keyboard). Portfolio section provides Velcro-secured disk pockets, mouse and cable pockets and pen and business card holders. “Silicone” treated Oxford nylon outer shell is water repellent & stuff resistant.

#2630 Premier Case ...................... $68

Shiva Corp
NetModem V.32
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#0144 Clipper ....................... $428

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Fonts not included in program.
When a Macintosh evangelist needs advice, he goes straight to the top: Twelve Mac gurus share their best tips ever.

I hate computer conferences. The panels are stuffed with sales-and-marketing bozos who only brag about their products and companies or expound on their visions for the future.

You seldom learn anything at computer conferences. You can, however, either kvetch or kick butt (where have I heard that before?). I prefer to kick butt, so the folks at the University of California at Santa Barbara and I created a Macintosh conference for the rest of us.

And for the benefit of MacUser readers, I asked the instructors to bring a little bit of the conference to you. Also, I thought that it would be a refreshing change to learn something useful by reading my column.

Power-User Voodoo. Bob LeVitus explains Mac power-user voodoo. He writes the Help Folder column (MacUser’s “Dear Abby” for propellerheads). He also wrote Stupid Mac Tricks. Obviously, the instructors named their sessions by themselves.

Tip: To dismount disks (that is, eject them and make their grayed-out icon go away), hold down the Option key when you select Eject from the File menu or type Command-Option-E after you’ve selected the disk.

Top Drawer. George Rorick runs the Knight-Ridder/Chicago Tribune Graphics Network, the company that creates the graphics for your newspapers. He says he can teach anyone to render in-depth, full-color graphics in less than one lifetime.

Tip: To obtain greater precision with MacDraw’s cursors, use ResEdit to open the CURS resource. Then select CURSOR IDS = 256 and 259, and redesign the cursor tools—typically, you’ll make them smaller and simpler. Be sure to do this to a backup copy of MacDraw.


Tip: To create a new menu bar in HyperCard 2.0, you don’t have to access the Authoring-menu items or their keyboard command equivalents. Instead, make a Home-stack handler that builds a menu of the most common Authoring-menu items and assign a two-character handler name to it.

All the Mac’s a Stage. Marney Morris produced the Guided Tour that ships with each Mac. Her forte is real-world (that is, cost-effective, interesting, and timely) multimedia projects.

Tip: To line up a comma in a label layout after the city field so that it prints correctly after the fields slide together (to eliminate spaces between the city name and comma), create a calculated field: CITY comma = CITY & "", • Then use the CITY comma field in the label layout instead of CITY.

Picture That. Russell Brown is the senior art director at Adobe Systems. He knows all about getting images into a Mac — and what to do with them once they’re there.

Tip: To use the tools in the Adobe Photoshop palette with greater accuracy and precision, turn on the Caps Lock key. This converts the standard tools into cross-hair tools. Now you have no excuse for ugly Photoshop documents.

Baudy Language. Tom Evslin presides over Solutions, the company that produces SuperGlue, BackFAX, FAXGATE, SmartScrap, and The Clipper. He thinks he can help people use telecommunications services without getting divorced.

Tip: To minimize E-mail charges, pick your services carefully. MCI Mail, for example, has a small monthly service fee and charges only for mail you send. It doesn’t charge for receiving mail or the connect time to check if you have mail or to look up someone’s address.

DTP for the Best of Us. Someday Aldus is going to figure out that it should send Olav Kvern instead of the “yellow ties” to work in its booth at Macworld expos. Olav has produced more PageMaker pages than just about anyone.

Tip: To crop imported graphics in FreeHand, paste them inside a path. Pan by selecting...
The Mancini Brothers gives you total control over your SCSI world. By replacing the original installer with sophisticated tools, you can perform true low-level formatting, add impenetrable password protection, and customize block size for increased capacity. Includes a comprehensive guide to the world of SCSI. To learn more call us at 415/474-8055 or 415/775-2125 Fax.

Don't leave the Chooser open — it creates packet traffic on AppleTalk networks.

The path as points by dragging a selection rectangle over the path and then moving the path. If you select the whole path, the image will move as you move the path. But if you select points in the path, you can move the path without moving the image.

*Easy Hardware.* Charlie McConathy, the president of MicroNet Technology, has the art of buying, maintaining, and configuring Mac hardware down pat. He explains mysterious topics such as external-hard-disk data errors caused by the RFI (radio-frequency interference) of fluorescent lights.

*Tip:* To eliminate RFI problems, use double-shielded, twisted-pair SCSI cables. Make sure that all the cables have a separate drain line running the entire length of the cable and that the shielding connects directly to the metal shell of the connectors at both ends of the cable.

*Drawing Conclusions.* Ron Chan is the designer who created the illustration on the MacroMind Director box — the one with the guy in the white shirt holding a megaphone. His stuff is so beautiful that he makes Illustrator owners wonder if they are using the same software he is.

*Tip:* To make joining the endpoints of an open path easier, Option-select anywhere along the path and then use the Join command. This way, you don’t have to go through the trouble of selecting both endpoints of the path.

*Bulleproof.* Robin Williams knows document design. Her sh*tick is to forever change the way you visualize and produce a printed page. She should know — she wrote *The Mac Is Not a Typewriter,* *The Little Mac Book,* and *PageMaker 4: An Easy Desk Reference."

*Tip:* To get rid of those boring Option-8 bullets, use Zapf Dingbat characters such as a tiny triangle, ▼ (press T), or a diamond, ● (press U). To make these bullets subtler, raise their placement above the baseline by superscripting them.

*Great Expectations* I hope you find these tips helpful, because even if you can’t be there, there’s no reason to be square. And I hope I’ve raised your level of expectation for the other computer conferences you attend.
Introducing the PostScript-compatible LaserScript LX.

Forget about having to beg or borrow a printer, because at $1,995 the LaserScript LX™ is a steal. It's up to 60% faster than a LaserWriter II NTX, with some features the NTX doesn't have. Like four active ports, so you can connect both Macs and PCs to the same printer—with or without a network. And automatic emulation switching, so you can switch between PCL4 and PostScript-compatible languages without using the front panel.

But the most attractive feature of the LaserScript LX is that all this performance won't break the bank—which is important in these economic times. For the dealer nearest you, call Abaton toll-free at (800) 444-5321 or (415) 683-2226. At $1,995, it would be a crime to spend any more.

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Everyone knows that in order to do a job right, you need the right tool. For precision drawing and drafting, you need a powerful, easy-to-use program well-suited to the project at hand. Like MacDraft or Dreams. Each a serious, no-nonsense tool for architectural and engineering design & drafting, as well as technical illustration. Designed to respond quickly and accurately to the way you think and work.

If your job requires a versatile program offering a full complement of drawing tools including arcs, polygons, and Bezier and spline curves, choose MacDraft. You can create multi-layered scaled drawings in both English or metric, while MacDraft's auto dimension lines and area calculations are displayed in the units of your drawing. You can also rotate text and objects by less than 1°, create custom line styles, and store commonly used graphic elements in user-created symbol libraries. All this and much, much more.

When you need higher levels of power and more advanced features, choose Dreams. Dreams expands on MacDraft’s drawing and editing capabilities and provides these extras: A parallel line tool to create walls and intersections, keyboard editing for precise resizing or placement of objects, and tools to extend and trim lines and create fillets (arcs tangent to lines). With Dreams, you can merge objects together or subtract one from another, glue lines and curves together to create objects, or unglue complex shapes into their component edges. Dreams also provides associative dimensioning that will automatically update when an object is resized or moved. The list goes on and on...

So before you start your next project, choose the right tool for the job. MacDraft or Dreams. Two powerful programs offering different levels of sophistication and features at prices you can afford.
Of Mice and Pens

Is the mouse holding back the Mac? Apple may be making some tough choices soon.

There are moments when the technological winds gather with ambiguous force, like a leopard crouching either to spring or to slink away.

The pressures to slink are understandable. Without minimizing the travails of the coal seller in New cas tle or the refrigerator drummer on the Nome beat, it is sometimes simpler to sell the already sold (preach to the converted, run as the incumbent, make a computer sale to a computer owner) than to explore new territory.

But sometimes the leopard does spring. Pen-based computing looks like the leopard of the moment. Here's what the spring may bring.

Wait Your Turn

Every successful input device knows that you don't get ahead by making the boss look stupid. The winning input device is bandwidth-savvy: It presents data to its processor as fast as the processor can handle it, and no faster.

Consider the typewriter keyboard. Laid out one way, it would've allowed expert typists to transcribe text faster than the machine could move its type bars, resulting in embarrassing jams. Laid out another way, it would slow down the typist enough to keep the typewriter mechanism from looking stupid.

It was the second layout that succeeded, and it was so successful that it has survived long after the problem it was designed to dodge was solved.

Consider the mouse. Like the typewriter keyboard, the mouse limits the user. Rather than providing the precise fingertip control of, say, a pen, the mouse has to be controlled by the wrist. Rather than providing direct feedback to the user about its current position, the mouse hides its $x,y$ positioning device under its body, which is hidden in turn under the user's own hand.

There were reasons for these limitations. The mouse has to talk fast, keeping the processor informed almost continuously of its changing position. This gobbles up processor bandwidth, so trade-offs were necessary in the design.

The mouse's inventor, Doug Engelbart, has explained more than once how he and his colleagues tested the mouse against various other devices and concluded that the mouse was the best pointing device they could find.

Not the best drawing, writing, or graphical-input device, but the best pointing device.

Engelbart was a pioneer in viewing the computer as a tool for augmentation of the human intellect, so it may seem odd that of the various faculties of the human mind, the one his group sought to enhance was pointing.

But it was the right thing to do, because it solved the problem at hand. It's good to reflect on what that problem was, because it's not the problem pen-based computing addresses. Engelbart and company were constructing an abstract space of simple objects, displayed on a screen, envisioning what today is called a graphical user interface. All the present-day computer GUIs, including the Mac desktop and Microsoft Windows, owe their existence to Engelbart's imagination.

This abstract environment created a need that did not exist before: the need for a way of pointing physically at nonphysical, abstract entities. This is the highly artificial problem the mouse solved. Because it was designed for pointing in this abstract space, direct feedback on the mouse's absolute position was irrelevant. You don't look at the mouse or the desk surface it's touching; you look at the screen for your positional feedback.

Perhaps the graphical application program bundled with the original Mac should have been called MacPoint.

Cursors Foiled

Pen-based computing is a different model, with a different level of abstraction, different demands on the processor, and a different "feel." One small clue that this model will produce a different sense of interaction lies in the fact that pen-based computing does away with the need for a cursor.

The basic idea is not new. Take Alan Kay's Dynabook and other models for a notebook-sized computer you use like a notebook, walking around with it under your arm, writing on it with a penlike input device — the idea has been around longer than the mouse.

Some pieces of the necessary technology have been around for a long time too, and some are just now arriving. It's clear to a lot of people who are investing a lot of money in pen-based hardware and software that enough of the pieces are now in place. The moment is upon us.

The Pen Is Mightier...

If it's not the same thing as mouse-based computing, then what is pen-based computing? Probably we will learn what pen-based
computing is only after people begin using it. This much is clear. When you use a stylus or a pen device to write or draw or point directly on the display, your expectations change. You begin to use the device as though it were a pen, and you expect to be able to do with it anything you can do with a pen (and more).

You expect to be able to scribble notes in margins, cross things out, annotate, doodle, and especially write. Handwriting recognition is accepted by the developers of these machines as a required feature. It's a fundamental part of the spec, as it were.

Who will use the machines? One observer, software developer Ray Valdes, identified three categories of users of these systems in the first issue of Pen-Based Computing (Stylus Publishing, P.O. Box 876, Sandpoint, ID 83864; [208] 265-5286).

One category is people who need to do data entry at remote sites, such as those who issue parking tickets or warehouse workers who enter information on a loading dock. Then there are those needing to access data remotely, such as an architect on a building site or field engineers troubleshooting at a customer site. Finally, there are people who need to interact with data from a remote site — such as Realtors and paramedics — perhaps entering and retrieving data remotely, perhaps performing data analysis remotely. All of Valdes' categories involve remote use. I think there may initially be other, non-connected users: doctors on rounds, downloading patient data from a minicomputer before and uploading it after their rounds, for example. But a wireless link to other computers is also part of the spec.

And other kinds of users will take to pen-based computing as it improves. It really is too bad that the words paint and draw have been squandered on computers and software that can't do either. Until you use a pen-based machine, you don't realize how inappropriate a mouse is as a graphical-input device. Pen-based computing has the potential to provide decent sketch pads for artists as well as notebooks for the rest of us.

Claw Marks

We’ve got the hardware to make the machines work, and we’ve got a choice of software implementations. Some spring, some sink.

One approach is to start from scratch. GO Corp. is the most visible company taking this approach. GO has developed PenPoint, a new 32-bit, multitasking, object-oriented operating system specifically developed for pen-based systems, intended to be processor-independent, with handwriting recognition wired in, and employing the visual metaphor of a notebook with tabs.

The idea is that hardware vendors will license PenPoint for their notebook computers and that software developers will write or port applications to PenPoint.

Another approach is to build on entrenched technology. Here the idea is to let software vendors modify existing software to work with pen-based input or develop new applications that can work with either conventional or pen-based systems.

Microsoft is pursuing this approach with PenWindows, a version of Windows that will support handwriting recognition and other pen-based features.

Which strategy will succeed? Microsoft certainly has the quick-start edge. PenWindows turns pen gestures into keyboard or mouse messages, which Windows already knows how to deal with. This makes it easier to make an application pen-friendly, but it doesn’t provide much opportunity to exploit any features that make pen-based computing a revolutionary step forward. And of course it isn’t very interesting to Mac users.

In the long run, I think the GO strategy will succeed. Microsoft’s approach seems too much like the QWERTY typewriter-keyboard layout, deliberately hobbled to fit within the constraints of present-day technology. But the present-day technology Microsoft can’t escape is the installed base of DOS machines, which hobbles Windows and now threatens to hobble pen-based computing.

“Hobble” may be too harsh. If pen-based computing is an incremental step, then Microsoft’s approach is probably the right one. I can’t prove that it’s a revolutionary step, that it requires a leap of faith or nerve or imagination. But my sympathies are with the leopard that takes that leap into the unknown, like Hemingway’s in The Snows of Kilimanjaro:

“Kilimanjaro is a snow-covered mountain 19,710 feet high, and is said to be the highest mountain in Africa. Its western summit is called by the Masai ‘Ngai’ the House of God. Close to the western summit there is the dried and frozen carcass of a leopard. No one can explain what the leopard was seeking at that altitude.”
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If you need high quality scans of 35mm slides, take a look at the revolutionary ScanMaker 1850. The first affordable slide scanner for the serious publishing professional. It offers 24 bit color and 8 bit gray-scale capabilities. And it's also easy to use. Just drop in a slide and you're ready to start scanning. At resolutions up to 1850 dpi. And best of all, it costs thousands less than other comparably equipped slide scanners. Which explains why the ScanMaker 1850 is the logical choice for 35mm slide scanning.

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Insecurity software: With all the concern about data security, it had to happen. New Visions (405) 523-1639 has started shipping MasterKey—the first commercial antipassword program. Designed to "recover" passwords from Excel, WingZ, and WordPerfect files, MasterKey is intended to unlock protected data. New Visions says it has found a market with the IRS and drug-enforcement agencies. We won't speculate about how many tax cheats and drug dealers use Excel.

By Russell Ito

Two faces of 7.0: By now you've probably heard enough about System 7.0 to bite the bullet and try the darn thing, but there's more to System 7.0 than meets the eye. Publish-and-subscribe lets you link data from various documents, but because subscribing files can themselves be subscribers to other files, keeping things straight can be a chore. Claris (408) 987-7000 has come up with a solution, a technology it's calling Pipeline. With Pipeline, users can open schematic-like drawings of linked documents that clearly depict all the interdependencies. In addition to seeing all the various file locations, sizes, and types, users can launch any part of a document by double-clicking on the appropriate icon and then updating all or part of the composite file by "running" the Pipeline window, which automatically launches each of the applications involved. Claris expects to turn Pipeline into a product sometime in early 1992.

And then there are Apple events. ASI (Articulate Systems, Inc. — [617] 876-5236) is already demonstrating what's possible. If you've ever tried to trash a file on a desktop full of windows, you know how much easier it would be just to say "Trash it" rather than dig through all your windows trying to get at the Trash icon. Likewise, if you've ever tried adding borders to a Word 4.0 table, you know that it involves two dialog boxes, a button, several mouse clicks to pick your borders, and finally two OK buttons. Imagine how much easier it'd be just to say "Borders" and go to the appropriate dialog box. Until now ASI's Voice Navigators have been limited to mouse clicks and cursor locations, but Apple events make direct commands possible (ASI is already demonstrating the Finder functions; Word is still a gleam in its eye). Whether you can see the differences or not, you can bet that System 7.0 will change the way you work.

Up to Date . . .

FileMaker Pro 2.0 fixes several bugs, including printing problems with the HP DeskWriter and GCC PLP printers and problems converting FileMaker II files to FileMaker Pro. $299. (408) 727-8227. MacMoney, Survivor Software's personal-finance package, is now in version 3.52 and imports SYLK files and data from CheckFree, Dollars & Sense, Quicken, and the WristMac. (213) 410-9527. $119.95. DynoDex, Portfolio Systems' personal-info manager, has been bumped up to version 2.0. Enhancements include mailing-label and envelope printing and more formatting options. (914) 876-7744. $125.
Dynamac's Back

If you've ever held a Mac Portable in one hand and an LC in the other, you've probably thought that the LC would make a great portable. Apparently Dynamac, the creator of the first portable Mac, thought the same thing, because it has used the LC motherboard as the basis for a new portable and a line of accessories.

The Dynamac llsf is a leather-cased portable with an LC motherboard and a 640-x-480-pixel, 16-gray, backlit, flat-panel display. It includes a touch pad, has a battery life of three hours, and comes with 2 megabytes of RAM and a 40-megabyte hard disk drive. The llsf can drive Apple's 12-inch RGB and monochrome displays. Unfortunately, the llsf is only about four pounds lighter than the Apple Portable.

Dynamac also packages the llsf in a 16-megahertz 68030 configuration (the llsf/30) that includes a 68882 math coprocessor, a 2,400-bps data modem, a 9,600-bps send/receive fax modem, and 4 megabytes of RAM. Its battery life is double that of the llsf.

Dynamac's LC accessories include the LCDisplay, a backlit, 16-gray, 640-x-480-pixel, flat-panel display; the LPCorepower, a 16-megahertz 68030 enhancement card with a 68882 math coprocessor; and the LPCore, which turns the LC into a battery-operated 16-megahertz 68030 portable equipped with a 68882 math coprocessor.

Dynamac Computer Products, Inc., 555 17th Street, Suite 1450, Denver, CO 80202; (800) 234-2349 or (303) 296-0909. llsf, $4,995; llsf/30, $6,995; LCDisplay, $1,299; LPCorepower, $399; LPCore, $1,999.

HP Enhances the IIP

Keeping in step with the trend toward higher-quality, lower-cost printers, Hewlett-Packard has announced the LaserJet IIP, an improved version of the LaserJet IIP.

The LaserJet IIP adds the same resolution-enhancement features as are found on HP's LaserJet III and IID printers plus a faster processor than that of the IIP (16 megahertz instead of 10). The IIP also includes twice as much memory as the IIP (1 megabyte versus 512K). PostScript is still available through a cartridge. Users configuring the IIP for the Mac have to add another megabyte of RAM plus an AppleTalk interface.

For those on a budget, HP will continue to sell and support the LaserJet IIP.

Hewlett-Packard Co., 19310 Pruneridge Avenue, Cupertino, CA 95014; (800) 752-0900. $2,795 (includes PostScript cartridge, additional RAM, and AppleTalk interface).

Most businesspeople divide their days between two tasks: attending meetings and setting them up. With this in mind, Microsoft has introduced its first add-on to Mail 3.0: Schedule+, a multuser scheduling package.

With Schedule+ you can maintain personal calendars, alarms, and reminders; share your calendar with your coworkers; and easily schedule meetings. Using shared calendars, you can see when people and facilities are available and then propose a meeting. When the recipients book the meeting into their calendars, Schedule+ sends a confirmation back to you and books the meeting in your calendar.

Because Schedule+ is closely integrated with Mail 3.0, all the functions you'd expect to have in your E-mail system are still available. For example, when you propose a meeting, you can enclose an agenda or other files, just as you would in a normal mail message, and all your meeting messages arrive as part of your usual E-mail. Plus, as far as the network administrator is concerned, Schedule+ is just another Mail 3.0 form—not another application—so it doesn't increase the administrator's work load.

Schedule+ uses the same database as Microsoft Mail 3.0 does, so all the gateways, directories, and groups you can access through your Mail server are available in Schedule+. At your local station, you have a variety of personal calendar tools, including searching; notes; and the ability to print your schedule in different formats, even as a daytimer.

Microsoft, One Microsoft Way, Redmond, WA 98052; (206) 882-8080. 5-user pack, $195; 20-user pack, $775.
Claris' New Line

With Claris back inside the Apple fold, it was predictable that the company would be the first on the market with a full suite of System 7.0-friendly applications. Claris took the opportunity of the System 7.0 rollout to introduce upgraded versions of MacProject II and HyperCard plus two major new releases: Resolve, a spreadsheet program based on technology Claris purchased from Informix (WingZ), and MacWrite Pro.

Resolve, which was designed specifically for use under System 7.0, can produce spreadsheets containing more than 1 billion cells. It supports publish-and-subscribe as well as standard and custom Apple events.

As you'd expect from a WingZ relative, Resolve includes strong graphics and scripting features. Its programming language lets you create custom applications that include menus, dialog boxes, and buttons, and its charting option lets you choose from 25 kinds of charts, including various 3-D types. The program also includes a MacDraw-like drawing environment for adding graphics to spreadsheets and charts. Expect to see Resolve this summer.

MacWrite Pro is virtually a rewrite of MacWrite II. It includes more than 130 new features. Among the most important changes is the adoption of a plug-in architecture that lets users add abilities just by dragging an ADDit file into a folder. MacWrite Pro will ship with two ADDits, one for creating tables and another for adding "Post-it" notes (either text or sound) to a document. MacWrite Pro includes style sheets for characters and paragraphs, and you can even assign a foreign language as a style, which lets you check the spelling of an entire document without switching dictionaries. Expect to see MacWrite Pro this summer.

Claris' parent company, named Daniel Eilers, has adopted plug-in tools it calls ADDits as a way to extend functionality, such as the ability to create the table at the top of the screen.

Claris Gets a CEO

SANTA CLARA, CA — Six weeks after Bill Campbell left Claris to become president and CEO of GO Corp., Apple, Claris' parent company, named Daniel Eilers, Apple's Vice President for Strategic Planning and Corporate Development, as president and CEO of Claris. The 35-year-old Eilers was with Apple for nine years, having joined the company as software manager for the Lisa.

MacWrite Pro is virtually a rewrite of MacWrite II. Claris has adopted plug-in tools it calls ADDits as a way to extend functionality, such as the ability to create the table at the top of the screen.

FTC Widens Microsoft Probe

REDMOND, WA — Confirming a rumored Federal Trade Commission investigation, Microsoft has acknowledged that the FTC is investigating the software giant's competitive practices relating to its three operating systems (DOS, Windows, and OS/2) and the Microsoft Mouse. The probe focuses on whether or not Microsoft monopolized—or sought to monopolize—the market for these products.

Sierra Merger Off

SAN RAFAEL, CA — Barely three weeks after Sierra On-Line announced its intention to acquire Broderbund Software, Sierra and Broderbund canceled the deal. The reason given for the merger's collapse was disagreement between the principals over the management structure of the combined venture.

Pixar Not Animated

RICHMOND, CA — Two months after attempting to spin off its software operations, Pixar has laid off roughly half of its employees and the future of the software venture seems grim. Pixar had hoped to attract venture capital to fund the software operation, but the funding hasn't been forthcoming and the company has now decided to cancel the release of Showplace, its 3-D composition package. Pixar is currently negotiating with several software companies about licensing Showplace for distribution.

Lotus Gets Mail

MOUNTAIN VIEW, CA — Lotus Development has announced plans to buy cc:Mail, the maker of the popular E-mail package of the same name for the IBM PC. Although the Mac version of cc:Mail hasn't been a big success, cc:Mail is the leading E-mail package overall, holding some 30 percent of the market. Although the financial terms were not disclosed, analysts estimated that Lotus Development probably paid less than $25 million for the company.
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Microsoft Excel 3.0

The latest version of Microsoft's popular spreadsheet program delivers new and improved features for novices as well as power users.

Excel 3.0 is more than just an upgrade of the most popular spreadsheet program for the Mac. Innovative new tools boost Excel's data-analysis power, and the program's presentation-quality output gains more polish. But best of all, these considerable enhancements haven't decreased the program's accessibility. In fact, the new version of Excel is easier to use than its predecessors.

One-Stop Tool Bar

The first readily apparent change to Excel is the new tool bar, which extends beneath the main menu headings. The tool bar provides handy, one-stop shopping for commonly used spreadsheet functions. For example, rather than requiring several steps to sum a row or column of numbers, Excel 3.0 lets you click once on the AutoSum button. Autosum is smart enough to analyze your data and select the numbers either above or to the left of the active cell for summation. With tool-bar functions, you can also set cell formatting and alignment, position a chart, add a text block, or use a marquee to select graphics objects in a worksheet.

An innovative addition is Excel 3.0's outlining capability, which lets you outline your data much as you outline text with a word processor. If you have many levels of information on a worksheet, for example, you can organize it hierarchically so that detail data is subordinated to the corresponding summary rows. You can organize your data outline manually, or you can let Excel automatically create the appropriate categories and subcategories of a selected range for you—which it does very well. The program supports eight levels of outline in all.

Once you've created an outline, you can expand and collapse it to show the various levels of detail, using the outline icons. This provides a terrific method for quickly and easily creating a variety of summary reports.

A host of other improvements to version 3.0 make Excel more accessible to novices and more convenient for power users. If you've ever fussed with sizing column widths for a worksheet, for example, you'll welcome the way version 3.0 handles sizing. You double-click on a column border, and Excel then finds the widest element in the column and sets the width accordingly. You can even highlight multiple columns that require different widths, and Excel will set them all to the correct size automatically.

If you've ever miscalculated the number of rows or columns needed to accommodate the data before pasting it in to your worksheet, you'll appreciate a new option that creates the appropriate number of cells automatically.

Another handy feature is the Add button in the Define Names dialog box, which lets you define range names more quickly than you could in earlier versions. However, although you can drag the dialog box around within the worksheet to get a better view of the ranges you're looking for, you can't actually select ranges from within the worksheet while you're accessing the dialog box. This means that most range names created by use of the Add button are likely to refer to simple ranges or constants.

Excel 3.0 no longer makes you plod back and forth from Print Preview to your worksheets in order to fine-tune the final appearance of your worksheets. In earlier versions of Excel, Print Preview let you view documents but wouldn't let you make any changes to them. The new Print Preview lets you change column widths and set margins without returning to your worksheet.

3-D Charts

Excel was the first spreadsheet program to incorporate a solid charting tool, and the new version continues to build on this strength. There are 24 new 3-D chart options in version 3.0, including area, column, line, and pie charts.

With version 3.0, you can at last combine text, worksheets, and charts on a single page, as well as place more than one chart on a page, to create truly informative reports.

The program also provides drawing tools for creating lines, arrows, rectangles,
Excel 3.0 lets you outline your data and then collapse and expand it to create various summary reports. Here, data for all regions except the East Coast is collapsed. Version 3.0 also lets you combine numbers and charts on the same page.

Excel 3.0's formatting controls are powerful. New style sheets let you format your worksheets much as you do documents in Microsoft Word.

The Bottom Line
With the addition of the tool bar and numerous other interface enhancements, Excel 3.0 succeeds in being more accessible to novices and more convenient for experienced Excel users.

Moreover, unique features such as the Solver and the outline provide functionality that no other Mac spreadsheet program offers. The long wait for significant Microsoft Excel upgrades can often be frustrating — version 3.0 was in the works for almost two years — but the result is well worth the wait. Each new version of Excel has included impressive, innovative features. Excel 3.0 is no exception.

— Louis E. Benjamin, Jr.

Get Info

Microsoft Excel 3.0

Published by: Microsoft Corp.,
One Microsoft Way, Redmond,
WA 98052; (206) 882-8080.
Version: 3.0.
List Price: $495.
FreeHand 3.0

A streamlined interface and snappier response mark the new version of Aldus' powerful illustration package.

Choosing between FreeHand and Adobe Illustrator has never been easy, and FreeHand 3.0 makes the choice even more difficult. Faster screen redraws make the new version more responsive than previous versions. And although FreeHand may not offer as many extra features as Illustrator does, the new version's streamlined interface makes it easier to use than Illustrator in all areas except text editing.

More Palette-able
FreeHand 3.0 builds on the powerful base of version 2.0, which offered auto-tracing, freehand drawing, and multiple undo and redos (up to 99 previous steps) (see Quick Clicks, June '89, page 45). But rather than add a slew of new features to version 3.0, Aldus has wisely concentrated on making it easier to use FreeHand's existing features, by improving the program's interface. Three new palettes — Layers, Colors, and Styles — play a key role in this effort.

Perhaps more than any other enhancement, the new Layers palette improves FreeHand's functionality and ease of use. The program's layering functions were already renowned, but Aldus has made them more accessible and easier to use by letting you control them with an on-screen palette. Once image elements have been attached to layers, you use the Layers palette to control their visibility as well as whether they print or not.

One decided advantage FreeHand 3.0 has over Adobe Illustrator is that FreeHand 3.0 lets you edit your drawing in Preview mode. The Layers palette is especially useful here. If you want to edit a drawing element that is partially obscured by other layers, you can make the other layers invisible simply by clicking on the check marks next to their names in the Layers palette. You can also click through objects to select underlying layers by holding down the Option key when you click.

The new Styles palette provides a fast and easy way to name and edit selected line and fill styles without numerous trips to the menu bar. You apply the styles simply by selecting objects and then clicking on the appropriate style name on the Styles palette. The convenience of this approach is obvious when you consider how complex styles can be. For example, a style called My Arrow could be a 3.5-point line with a red fill and an arrowhead pointing right (predefined arrowheads are also new). Editing this style is as easy as double-clicking on its name on the palette and adjusting the settings in the resulting pop-up dialog box.

Version 2.0 forced users to plow through multiple menu commands to create and apply colors to elements, but FreeHand 3.0 uses an on-screen palette of colors that's always accessible. The palette displays a swatch of each color for reference. Version 2.0 supported all standard color systems—Pantone, spot, and process — and the addition of the Colors palette makes it easier to assign, edit, and name colors.

Too Easy
At times, you may find that the palettes make it too easy to assign styles or layers to objects. The manual wisely advises users to get into the habit of pressing Tab (which deselects all objects) before switching layers, to avoid accidentally moving selections to new layers. Another problem is that it's too easy to click on the check mark (which makes a layer invisible) rather than the layer name (which makes the layer active).

Also new in version 3.0 is the ability to display, separate, and print 32-bit TIFF images. For high-end color processing, you can now create color EPS files that are compatible with the OPI (Open Prepress Interface) system, which includes systems made by Linotype-Hell and Crosfield.

Unfortunately, the new version offers no improvement in FreeHand's text editing. You must still use a dialog box to enter and edit text. Illustrator 3.0, on the other hand, no longer uses this cumbersome method.

Several new text enhancements are worth mentioning, however. You can now convert Adobe Type 1 and Fontographer Type 3 fonts to fully editable outlines, as long as the downloadable font file is in
your System Folder. Another improvement is that you can display PostScript text effects such as zoom and shadow. Most programs make you wait until you print to see these effects. The new version also lets you improve screen-redraw performance by specifying "greek" text. Still lacking, however, are sophisticated text-handling features such as Illustrator's text-block linking.

Get With the Group

FreeHand 3.0 makes it easy to deal with grouped objects. For example, you can apply styles, fills, lines, colors, and type attributes to a group. Even better, you can use Option-click to select a member of a group without first ungrouping. For some users, this feature alone is worth the upgrade price.

Aldus has also improved the program's performance by eliminating the annoying flicker that occurred in previous versions whenever you dragged objects across the screen. In addition, the program also delivers more precision: You can now specify object placement in increments as small as 1/10,000 of a point.

The user guide and tutorial manual are excellent. The documentation includes a 70-page booklet on using FreeHand for commercial printing and an 8-page card on color trapping. New context-sensitive on-line help is another welcome addition to FreeHand 3.0.

There is a small price to pay for the improvements in FreeHand 3.0: The program no longer runs on 1-megabyte machines. The minimum configuration is 2 megabytes of RAM, although Aldus recommends 4 megabytes.

The Bottom Line

It's a refreshing change to see a software developer avoid the features war and concentrate instead on maximizing the functionality of existing tools. FreeHand 3.0's time-saving palettes are a welcome addition that sharpen the effectiveness of the program's layering, color, and style functions. In addition, version 3.0 offers improved performance and precision that place it on a par with the Mac's other premier illustration package, Adobe Illustrator. Although Illustrator's text-handling features continue to surpass those of FreeHand, only FreeHand offers designers and illustrators the convenience of editing in Preview mode. Illustrator, on the other hand, still requires separate windows for drawing and previewing.

All in all, no FreeHand user should be without version 3.0. And Illustrator users should give Aldus' package a long, hard look to see what they're missing.

— Dave Valiulis
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Our new packing

SuperMac Tech. ... 60 day MBG
5625 PixelPaint Professional 2.0-Multiple/larger documents, 8-bit masking, image merging, color correction, pressure sensitive brushes, PixelPaper, and more .......... $459.
3380 PixelPaint 2.1 ........ 149.

★ DeltaPoint ... 60 day MBG
6095 DeltaGraph 1.5 ... 125.
★ Deneba Software ... 30 day MBG
6365 UltraPaint 1.03 ... 125.
1769 Curves 2.1.1 (Free upgrade to 3.0) 189.
★ Dream Maker ... 30 day MBG
7684 Ciphers: Business 1 or 2 ea. 68.
8056 Studio 82.0 ... 199.
★ Eltis Softwares
4315 Studio/8 2.0 ... 199.
5806 Studio/32 1.1 .... 449.
★ Foundation Publishing ... 60 day MBG
6729 Comic People or 6646 Kid Stuff ea. 20.
6728 Comic Strip Factory 1.6 36.
9438 Comic Strip/People & Kid Bundle 71.
★ Generic Software
7454 Generic CADD 5.0 ... 369.
★ Image Club Graphics ... 30 day MBG
7523 EVolution 1.02 49.
Innovative Data Design
2417 MaxReport 2.1-Full power precision drawing and drafting software for the Mac. Features include advanced text handling, on-line symbol libraries, layers, Bezier and spline curves, dimensioning and more $279.

★ Paracom S ... 30 day MBG
7728 SwivelArt 1.0 ... $81.
7441 Swivel 3D Professional 1.0 435.
8957 Swivel Pro/MacRenderMan Bundle 899.
5028 ModelShop 2.0 (May 91) 559.
Quark
7612 QuarkXPress 3.0 ... 519.
★ Springboard ... 30 day MBG
3550 Certificate Maker 2.02 22.
7773 StratiVision 3D 1.5.5 349.
7772 StratiVision 3D SRX/Renderman 999.
Strategic Mapping
6518 ATLAS• MapMaster 4.5 ... 369.
★ SuperMac Tech. ... 60 day MBG
3380 PixelPaint 2.1 ... 149.
5625 PixelPaint Pro 2.0 (May 91) 459.
★ Tactical Software ... 30 day MBG
8251 Icon II 2.1 44.
8252 Magic Typist or 8249 Art Fonts ea. 49.
8253 Art Clips 1 ... 49. 8261 Art Clips 2 ... 64.
8248 Font Share 2.2 64.
3G Graphics
3942 Images with Impact: Graphics 1 ... 49.
4583 Images with Impact: Business 1 ... 64.
6379 Accents & Borders 1 ... 64.

★ Affinity Microsystems ... 60 day MBG
7835 Tempo II Plus 2.0 3 ... $105.
★ Aladdin Systems
6169 Shortcut 1.5 (May '91) 45.
6740 Stuff! Deluxe 2.0 ... 62.
★ Aldus/Silicon Beach ... 30 day MBG
5100 SuperCard 1.5 ... 199.
★ ALSoft ... 30 day MBG
9807 DiskExpress II 2.07 53.
9808 MasterArt 1.0 53.
9886 MultiDisk 1.27 53.
★ ASD Software ... 30 day MBG
9440 MaccessCard Reader (req. FileGuard) 299.
9439 MaccessCard/FileGuard (1) Bundle 399.
7085 FileGuard Extended 2.5 (1 user) 139.
7422 (5 user) 489. 7423 (10 user) 799.
★ Baseline Publishing ... 30 day MBG
6656 Personality 1.0 ... 28.
7783 INIT Manager 1.0 34.
4780 Database 1.51 72.
★ Berkeley Systems ... 30 day MBG
5737 After Dark 2.0T 21.
1541 Stepping Out II 2.02 49.
★ Casady & Greene ... 60 day MBG
2269 QuickDex 1.1 ... 34.
7443 A.M.E. 1.1.3 (Single) 159.
7444 A.M.E. (5 user) 509. 7831 (10 user) 849.
★ CE Software ... 60 day MBG
4689 MockPack Plus Utilities 4.4 ... 31.
1727 CalendarMaker 3.0 31.
6278 DiskTop 4.0 ... 63.
7518 Alarming Events 1.0 ... 84.
8024 QuickKeys2 2.0.1 94.
★ Central Point ... 30 day MBG
5040 Copy II Mac 7.2 ... 24.
5041 Mac Tools Deluxe 1.1 79.
Claris
8734 HyperCard Development Kit 2.0 149.
★ ClarisCard ... 30 day MBG
7830 Maxima 1.09 45.
6123 Virtual 2.04 (for SE/30, IIX, IIE, & IIc) 113.
6647 HandOff 1.1.3 56.
★ Dantz Development ... 30 day MBG
5255 Retrospect 1.2 ... 147.
7945 Remote (10 Pack of Inits) 264.
1727 Remote (10 Pack of Inits) 147.
★ Design Science ... 30 day MBG
7887 MathType 2.11 88.

★ Timeworks ... 30 day MBG
7115 Publish It! Easy 2.01 ... 139.
★ T/Maker ... 30 day MBG
1477 Ventura Publisher 3.0 ... 499.
★ Ventura Software
8692 Ventura Publisher 3.0 ... 499.
Ventura Works Arts
9867 GraphMaster 1.1 ... 189.
★ Wildflower ... 30 day MBG
6512 Snap jot 3.0 ... 31.
★ Zoocor ... 60 day MBG
3986 DeskPaint & DeskDraw 5.03 113.

Innovative Data Design
2417 MaxReport 2.1-Full power precision drawing and drafting software for the Mac. Features include advanced text handling, on-line symbol libraries, layers, Bezier and spline curves, dimensioning and more $279.

PROGRAMMING

UTILITIES, HYPERCARD

★ Abbott Systems ... 30 day MBG
5236 CanOpenner 1.1 Multi/Ad Articles 62.
★ Advanced Software ... 30 day MBG
8051 Intouch 1.1 ... 39.
9986 Intouch Server (3 Pack) ... 112.

Advanced Software ... 30 day MBG
8051 Intouch 1.1-DA stores names, addresses, notes, prints envelopes and labels, dials phone numbers and more Best name-and-address DA', MacUser, 9/91. (4.5 Mouse rating) $29.
9986 Intouch Server (3 Pack) ... 112.
has a high rating.

ASD Software ... 30 day MBG
7085 FileGuard Extended 2.5.2—Protect your hard drives, applications, folders and system files from unauthorized access, deletion, or illegal copying. Now with system usage audit trail. $5 & 10 user also available... $199.

Digitalk ... 60 day MBG
5166 SmallTalk/V Mac 1.1 ... 123.

Duble-Click Software

ClickChange 1.04 ... 56.
1824 Calculator Construction Set 2.09 ... 62.

Fifth Generation ... 30 day MBG
4287 Pyriol 4.0 ... 25.
2955 Suitcase II 1.2.9 ... 49.
8284 SuperSPOOL 5.0 ... 62.
8286 SuperLASERspool 2.02 ... 93.
5178 FastBack II 2.5 ... 118.
5725 DiskLock 2.0 ... 118.

Hyperpress ... 30 day MBG
4233 Icon Factory 2.0 ... 56.
4084 On Cue 1.3 ... 35.

Insight Development ... 30 day MBG
6171 MacPrint 1.23 ... 93.

JAM Software USA ... 30 day MBG
6089 Smart Alarms 3.03 w/ Appt. Diary 3.1 ... $63.
6088 Smart Alarms 3.03 (1-4 users) ... 125.

Kent Marsh Ltd. ... 30 day MBG
5457 QuickLock 2.0 ... 34.
9513 FolderBolt 1.01 ... 73.
2591 The NightWatch 1.03 ... 84.
9510 FolderBolt/The NightWatch Bundle ... 120.
634 MacSafe II ... 106.

Kiwi Software ... 60 day MBG
6267 KiwiEnvelope! 3.1 ... 32.
7445 KiwiFinder Extender 1.02 ... 63.

Loop Software ... 30 day MBG
5442 PictureBook 3.2A ... 39.

Microcom ... 30 day MBG
8562 Complete Undelte 1.1 ... 48.
4803 Virex 3.1 ... 57.
8561 911 Utilities 1.0 ... 89.

Microseed's Pub ... 60 day MBG
7068 INFIPicker 2.01 ... 34.
2913 Redux 2.0 ... 49.
7116 Rivit 1.1 ... 49.

Microsoft ... 30 day MBG

QuickBasic 1.0 ... 64.

Multi-Ad Services
8850 Multi-Ad Search 1.0 ... 125.

Nine to Five Software ... 30 day MBG
9767 Reports ... 94.

Now Software ... 30 day MBG
6925 Now Utilities 2.0 ... 75.
6739 Prototyper 3.0 ... 184.

Olduva
4503 MultiClip 2.1 ... 69.

OCTanic Software

On Location 1 ... 75.
9801 Meeting Maker (5 user) ... 289.
9800 Meeting Maker (10 user) ... 549.

Palomar Software ... 30 day MBG
3410 PLOTtergeist 2.0 (June '91) ... 199.

Pelomar Software ... 30 day MBG
7404 DiscDoubler 3.7 (June '91) ... 44.

Qsoftstream ... 30 day MBG
5440 HyperHi 3.0 ... 119.

Solutions, Inc. ... 60 day MBG
3448 SmartScrap & The Clipper 2.1 ... 56.
3449 SuperGlue II 2.01 ... 75.

SuperMac Tech. ... 60 day MBG
3377 DiskFit 2.0 ... 58.

Symantec ... 30 day MBG
5176 Symantec AntiVirus for Mac (SAM) ... 65.
5724 Symantec Utilities for Mac (SUM II) ... 96.
6748 Norton Utilities for the Mac 1.01 ... 83.
3421 THINK Pascal or THINK C 165.

Syntex ... 30 day MBG
6665 PortaDrive Bundle ... 659.

SYMTEC Software

SuperTEC II ... 30 day MBG
3448 SuperTEC II ... 2.0.

Tactic Software ... 30 day MBG
7872 Software Bridge 1.0 ... 79.

Teletyping ... 30 day MBG
8601 TScript Basic 1.4 ... 54.
8058 TScript 1.4 ... 91.

The CLIPPER 2.1 ... 56.

† Systems Compatibility ... 30 day MBG
† Symantec ... 30 day MBG
† Microsecond Pub ... 60 day MBG
† Microsoft ... 30 day MBG
† Olduva ... 30 day MBG
† On Location 1.0 ... 75.
† SelfMade ... 30 day MBG
† Multiple Scrape & The Clipper 2.1 ... 56.
† SuperGlue II 2.01 ... 75.
† SuperMac Tech ... 60 day MBG
† Dynamic Studio 2.0 ... 58.
† Symantec AntiVirus for Mac (SAM) ... 65.
† Symantec Utilities for Mac (SUM II) ... 96.
† Norton Utilities for the Mac 1.01 ... 83.
† THINK Pascal or THINK C 165.
† CLIPPER II ... 60 day MBG
† PortaDrive Bundle ... 659.

CD-ROM

Activision
8125 Cosmic Osmo 1.0 (CD-ROM) ... 46.
Adobe Systems
8794 Adobe Type On Call CD/ATM ... 47.
9443 Adobe TOC & Porta Drive Bundle ... 659.

Porta Drive Bundle ... 659.

SuperMac Tech ... 60 day MBG
3377 DiskFit 2.0—Makes file location and recovery fast and foolproof because it backs up file in Finder readable format. Allows for unattended backup, subfolders, enhanced folder selection and more... $58.

On Technology ... 1 year MBG
9801 MeetingMaker (5 user)—Plan, schedule & confirm meetings via network. Schedule a time & date, select required guests, & prepare agendas. Personal calendar to block out activities... $289.
9800 MeetingMaker (10 user) ... 549.
from the waste stream

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Includes one black toner cartridge

| Hewlett-Packard | 6754 | 1 year |
| HP LaserJet III - Exclusive Resolution | 6754 | 1 year |
| Enhancement technology with 500 dpi sets a new standard. Prints up to 8 pages per minute as well as holding up to 5 meg of memory. Scalable typefaces and more built in | 1.699 |

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| (French, Italian, Spanish, German, Russian, Hebrew, & Japanese) ea. 35 |
| Personal Training Sys. | 6749 | 60 day MBG |
| We carry over 60 learning levels from beginner to advanced for Quark XPress, Excel, Persuasion, FileMaker II/Pro, PageMaker, Illustrator, FreeHand, Word, HyperCard, and the Mac. ea. 50 |
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| Sierra On-line | 3397 | leisure suit larry 23 |
| Space Quest III (color reqs. 2 Mb) | 7367 | 35 |
| Sir-Tech Software | 8228 | Wizardry II: Knight of Diamonds (CP) 28 |
| Bane of the Cosmic Forge | 8229 | 35 |

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| EARTHQUEST 2.0 | 8050 | $48 |
| includes one black toner cartridge |

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| MacUser | 7306 | $185. |
| Editors' Choice | 7306 | $185. |
| Computer Product | 7306 | $185. |
| TeleFAX 8000 | 8945 | $139. |
| MacUser | 8945 | $139. |
| Editors' Choice | 8945 | $139. |
| Computer Product | 8945 | $139. |
| TeleFAX 8000 | 8945 | $139. |

| Software Tools & | 4995 | $26 |
| Abaton | 4995 | $26 |
| Cribbage Tutor | 4995 | $26 |
| Colour Billards | 4073 | 38 |
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| Spectrum Holobyte | 4364 | 30 day MBG |
| Tetris 1.1, 6112 Wiffits 1.1 or 8180 Faces 1.0 | 3459 | ea. 22 |
| Falcon 2.2.1 or 8180 Vette 1.0 | 3459 | ea. 33 |
| Spinlaker | 2228 | 30 day MBG |
| Sargon IV 1.03 (CP) (cheese) | 2286 | 30 day MBG |
| Strategic Studies | 2228 | 30 day MBG |
| ACT, GMAT, GRE, or SAT Prep. ea. 29 |
| LSAT Prep for the Mac | 8098 | 35 |
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| Mum's The Word 1.0 (gardening) | 8192 | 79 |
| Mum's The Word Plus (color) | 9970 | 107 |

| Global Village | 7624 | 30 day MBG |
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| Nemesis Go Master Deluxe 4.7 | 7623 | 85 |
| Voyager | 8061 | 30 day MBG |
| Amanda Stories (vol. 1, 2 or 3) ea. 18 |
| XOR | 8061 | 30 day MBG |
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| MacGolf Classic 1.0 (CP) | 6040 | 52 |
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| Abaton | 6266 | 30 day MBG |
| InterFax 24/96 Modern | 6266 | 349 |
| Applied Engineering | 8356 | 175 |
| DataLink Express | 8364 | 209 |
| DataLink/Mac | 8364 | 209 |
| DataLink/Mac Portable | 8363 | 209 |
| DataLink/LC | 8938 | 265 |
| QuadraLink | 8362 | 205 |

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**Baseline Publishing** ... 30 day MBG
8943 DoubleTalk (1 Pak) 79. 8942 (2 Pak) $129.
**Beagle Bros.** ... 30 day MBG
7691 Flash 1.1 ................ 125.
**CE Software** ... 60 day MBG
5174 QuickMail (5 Pak) ... 215.
5173 QuickMail (10 Pak) ... 315.
**CompuServe** ... 60 day MBG
1676 Macintosh Membership Kit 1.03 ... 22.
1673 CompuServe Navigator 3.0 ... 49.
1674 Membership Kit/Navigator Bundle ... 68.
**DataViz** ... 60 day MBG
1823 MacLink Plus/Translator 5.0 ... 129.
4842 MacLink Plus/Translator 5.0 ... 109.
**Dayna** ... 60 day MBG
DaynaTALK (5 Pak) ... 379, (10 Pak) ... 689.
8719 EtherPrint ... 349.
9888 EtherPrint/10 Base T ... 349.
9887 EtherPrint Plus ... 629.
9889 EtherPrint Plus/10 Base T ... 629.
**Dove Computer** ... 60 day MBG
6758 DoveFax Desktop 1.1 ... 295.
9634 DoveFax+ ... 359.
**Affinity Microsystems** ... 60 day MBG
7835 Tempo II Plus 2.0.3—"Tempo II Plus can do almost anything. By far the most powerful, intelligent, and limited macro program," (Macworld, 4/91). Get maximum macro power to automate your everyday work ... $105.
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5295 News/Retrieval Membership Package ... 24.
1786 Market Manager Plus 2.03 ... 189.
**EveryWare**
8077 AllShare 1.1, 4 ... 139.
9805 Timbuktu 4.0 (May '91) ... 135.
4865 Timbuktu/Remote 2.0.1 ... 135.
6371 Timbuktu/Remote Access Pack ... 899.
6778 Remote/Wakeup Cable ... 35.
8707 Iliason 3.0 ... 279.
PhoneNET Card (SE/30 or II) ca ... 425.
5664 StarConnector ... 17.
6273 PhoneNET Star Connector 10-Pack ... 129.
8230 StarConnector/EN ... 129.
2202 PhoneNET to LocalTalk Adaptor (6 ft.) ... 8.
2203 PhoneNET Plus Connector (DIN-8) ... 31.
4869 PhoneNET Connector 10-Pk (DIN-8) ... 198.
2206 PhoneNET Star Controller 300 ... 899.
6669 PhoneNET Star Controller/EN ... 179.
**Freesoft** ... 60 day MBG
6115 White Knight 11 ... 85.
**Global Village** ... 30 day MBG
8946 TelePort A300 ... 139.
8945 TelePort/FAX ... 185.
**Nuvotech** ... 60 day MBG
3000 TurboNet ST (DIN-8) ... 30. 6751 (12) ... 279.
6272 NuvoLink SC ... 389.
**Practical Peripherals** ... 30 day MBG
3102 2400 Baud External Modem ... 179.
8994 2400 V.42 bis Modem ... 209.
7934 PM9600SA Modem 1.28 ... 489.
3069 Mac Communications Pack ... 225.
**PROMETHEUS** ... 30 day MBG
8350 2400 Mini for Mac ... 124.
8348 Maxfax ... 289.
8709 2400M Plus ... 219.
8738 9600M Plus ... 599.
9990 ProModem Ultimate ... 689.
**Shiva** ... 30 day MBG
3444 NetServer 3.3 ... 275.
NetBridge or TelBridge ca ... 409.
3443 NetModem V2400 3.3 ... 339.
6917 NetModem V32 (V.42 & V.42 bis) ... 1169.
6519 EtherGate ... 1299.
6189 FastPath IV ... 1869.
**Sitka/TOPS**
4188 TOPS TeleConnector (DINB) ... 3.
3720 TOPS Flashcard ... 155.
6264 TOPS Networking Bundle 3.0 ... 187.
**Software Ventures** ... 30 day MBG
3465 MicroPhone II 3.0 ... 215.
**Solutions, Inc.** ... 60 day MBG
6720 FOXGATE Plus 3.0 (May '91) ... 239.
**Symmetry** ... 30 day MBG
9969 EasyShare 1.2 ... 69.
**Synergy** ... 30 day MBG
6618 VersaTerm 4.5 ... 87.
6619 VersaTerm-PRO 3.5 ... 173.
**Traveling Software** ... 60 day MBG
3729 Lap.Link Mac III Connectivity Pac ... 93.
**INPUT/OUTPUT**
**Abaton** ... 30 day MBG
7432 Scan 3000GS (req. Scan Kit) ... 999. Includes free ProPoint ($79 value).
**Advanced Gravis** ... 30 day MBG
9963 Gravis Mouse Stick ... 59.
9964 Gravis Super Mouse ... 84.
**DayStar Digital**
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**DeltaGraph**
6095 DeltaGraph 1.5—1989 Mac User Editors' Choice Award for Best Presentation Product. A charting package with the flexibility and power to create captivating charts and dramatic graphics, all in one program ... $125.

Hayes
2300 Smartcom II 3.2 ... 84.
2307 Smartmodem 2400 ... 349.
7391 Ultra 9600 Modem ... 799.
**Insignia Solutions**
7557 Access PC 1.1 ... 62.
7058 SoftPC/AT & MAC Module 1.4 ... 124.
4099 SoftPC 1.3 ... 245.
**Intel Corporation**
5119 2400EX Modem ... 179.
6420 2400EX MNP Modem ... 229.
8193 9600EX Modem (w/QuickLink II) ... 549.
**Int'l Business Software** ... 30 day MBG
9949 DataClub 1.1 (1 user) ... 118.
9851 (3 user) ... 539.
**KenneTech** ... 30 day MBG
5631 Rapport 1.3 ... 195.
7588 Drive 360 (5'1/4") ... 249.
7590 Drive 1200 (5'1/4") ... 249.
5632 Drive 2.4 (3'/4") (incl. FastBack II) ... 325.
**Microcom** ... 30 day MBG
7485 CarbonCopy Mac (Twin Pak) special 139.
8027 MacModem V.32 ... 689.
**Microsoft** ... 30 day MBG
9444 Microsoft Mail 3.0 (1-5 user) ... 269.

**Microcom** ... 30 day MBG
8027 MacModem V.32—Bringing 9600 Baud MNP Class 9, 38,400 BPS, error-free transmission, auto-dial/dialer/answer. Includes CarbonCopy Twin Pak, QuickLink II and Wake-Up Cable ... $689.

**Software Ventures** ... 30 day MBG
3465 MicroPhone II 3.0 ... 215.
**Solutions, Inc.** ... 60 day MBG
6720 FOXGATE Plus 3.0 (May '91) ... 239.
**Symmetry** ... 30 day MBG
9969 EasyShare 1.2 ... 69.
**Synergy** ... 30 day MBG
6618 VersaTerm 4.5 ... 87.
6619 VersaTerm-PRO 3.5 ... 173.
**Traveling Software** ... 60 day MBG
3729 Lap.Link Mac III Connectivity Pac ... 93.
Dear MacConnection,

Months ago we ordered a product from one of your competitors. We commented that it sure would be nice if they didn’t send us all those peanuts with our order. They reassured us that their peanuts had been sprayed with a special decomposing agent that would cause them to biodegrade. We placed their peanuts in a cup with some water, set them in sunlight, and made certain they got lots of air. It’s been five months and these peanuts have shown no indication of going away. We told ourselves we would order all our software from you until their decomposition was complete. It seems you have a customer for life, in a world where even a half-life can be an eternity.

Byron Bauermester
ElseWare Corporation
Seattle, WA

“Even a half-life can be an eternity.”

MacConnection

MacConnection, 14 Mill Street, Marlow, NH 03456  603/446-7711  FAX 603/446-7791

Just for the record, all the ads in this series feature photographs of real live MacConnection customers and the real live letters they wrote us. Really!
that's eco-modating.

American Power
5895 UPS 110SE ........................................ $209.
6666 UPS 370ci ............................................ 339.

Apple Computer
9771 LaserWriter II ........................................ 559.

Applied Engineering
9799 Cache-In ............................................. 199.

Caere
9812 Typist ................................................. 479.
4476 OmniPage 2.12 ........................................ 495.

Chinon
9833 DS-3000 Color Scanner ............................ 769.
8814 DS-3000 Scanner w/Dig. Darkroom .......... 699.
8815 DS-3000 Scanner w/OmniPage .................. 1069.

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3899 800K External Disk Drive—Low cost, reliable
800K external floppy drive. Reads both 400K
and 800K disks; includes eject button and easy
light. A great drive at a great price! ....... $119.

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1816 HyperDialer .......................................... 32.
9830 MAC101E ............................................. 129.
6815 Switchboard Function Key Modular .......... 39.
6813 Switchboard Modular Trackball ............... 98.
6901 Switchboard (modular keyboard) ............. 159.

Dove Computer ... 60 day MBG
Marathon Racer 030 Plus or SE ea. .......... 599.
9789 Marathon Racer 030 II ............................. 1073.

GDT Softworks
6256 PrintLink Collection 4.0 ......................... 59.
7687 Mac Daisy Link 1.1.1 ............................. 59.
6151 JetLink Express 2.1 ............................... 89.
9660 Paralink Express ................................. 299.

Hitachi
5514 HP DeskWriter Printer ............................. 739.
6586 HP DeskWriter Cartridge (Black) ......... 19.
6754 HP LaserJet III (with toner) ................. 1699.

Kodak
9492 14" Color Monitor (includes 15 pin
adapter for Mac II) ................................. 599.

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Turbo Mouse 3.0 (Plus or ADB) ea. 107.

Logitech ... 30 day MBG
5082 ScanMan Model 32 G-Scale Scan. .......... $299.

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7841 16" 24-bit Color System for Mac II. 4895.
19" 15-bit System for SE/30 or II ea. 4295.
7840 16" 24-bit Color System for Mac II. 6395.
19" G/S System for SE/30 or II ea. 1895.

MicroSpeed ... 30 day MBG
6620 MacTRAC (for 512, 512E & Plus) ........... 59.
6621 MacTRAC ADB (for SE & II family) ........ 69.

Mouse Systems ... 30 day MBG
7560 Trackball ADB ................................. 68.
Little Mouse or Little Mouse Plus ea. 74.
9471 A3 Mouse ........................................... 85.

OmniGet Systems ... 30 day MBG
3036 Grappler 2.0 (9 pin) ......................... 92.
6229 Grappler LX ....................................... 134.

Pacific Data Products
7412 Pacific Page PE 4.0 for the Mac ............. 529.
2000 PowerKey 64. 8000 Wake-Up Cable . . . 32.

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Taste

If you're looking for an affordable, capable word processor, DeltaPoint's new package may suit your taste.

Every once in a while, a new product delivers such exceptional value that it merits special mention. Taste is such a product. It's a word processor, drawing package, and database manager all rolled into one package that's street-priced at less than $100.

Beyond the Basics

Taste's primary focus is word processing. It's a midrange package that falls into roughly the same category as the more expensive MacWrite II and WriteNow, yet its talents exceed those of both competing packages. Taste provides autohyphenation, footnotes, stationery documents, column layouts, odd/even headers/footers, kerning, a spelling checker, and a thesaurus, all of which take it well beyond what you expect from a low-cost word processor. Taste also lets you open multiple documents or multiple windows within a single document simultaneously. A capable find-and-replace function operates on any attribute, including font, style, size, and color.

Although these are all impressive features for such a low-priced package, what's most distinctive about Taste is that its high-end features are so easy to use. This is most apparent in three specific areas: style sheets, graphics, and mailmerge.

Taste's style sheets combine much of Microsoft Word's functionality with MacWrite II's ease of use. There are options for both text styles and paragraph styles. You can define text styles based on combinations of font, size, style, and even color and then apply them to selected text. If you modify the style, your change will be applied to all previously entered text that uses that style.

Taste gives you lots of flexibility for formatting documents with style sheets. For defining paragraph styles, you can use all the ruler settings — including tabs, justification, and line spacing — as well as all text-style settings. Once you've defined a paragraph style, you can specify whether it affects only paragraphs that you've selected or all existing paragraphs defined by the current ruler. This approach lets you modify an entire document in a single step, so you never have to resort to Select All or Copy Ruler commands.

The program imports and exports most popular word-processing formats, using Claris' XTND technology.

Tasteful Drawing

Taste does an outstanding job of handling graphics. The package provides an integrated object-oriented drawing layer, complete with Bezier curves and color gradient fills. What sets Taste's drawing layer apart, even from those of more expensive word processors such as FullWrite and WordPerfect 2.0, is the way it overlays the document layer transparently. The advantage of this approach is that you have the feeling of unrestricted interaction between text and graphics. Graphics created in the drawing layer are automatically inserted in the underlying document layer, which is visible at all times. With FullWrite and WordPerfect, you must create and edit graphics in a separate window.

Taste's special graphics effects include text wrap around the contours of a graphic as well as within graphic borders. You can even attach graphics to paragraphs so they flow with the paragraph as you edit the document. And since text can be entered into graphics frames, you can combine the frames with columns to create complex page-layout designs.

The third of Taste's impressive features is its mail-merge capability. The program includes a basic but effective built-in address-book database. You can add or delete fields or change their size (you can rename fields, however), and you can do only simple sorts. But for setting up mailmerges, it's far simpler and more flexible to work with Taste's address book than to work with tab-delimited files exported from a database application or created by a word processor.

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actual merge operations. You enter the merge fields, complete with delimiters, into documents with just a click of the mouse. This simplicity is combined with powerful selection functions. Selections can be based on field and record criteria. An additional option allows merges from multiple records to print on the same page, which provides a convenient method for making sets of labels or a phone list. Special stationery documents included with Taste make use of this label-making feature.

As a bonus, Taste links with DeltaPoint’s graphing package, DeltaGraph, to create charts from tab-delimited data in Taste documents. DeltaGraph reads the data, creates the chart, and automatically pastes it into the current Taste document. Taste includes all the commands necessary to accomplish this task.

While the original version of Taste was plagued by agonizingly slow screen updates, particularly when graphics were involved, the performance of the new version is vastly improved. We found it quite adequate, even on a Macintosh SE. The program remains a bit sluggish for some operations, however, and its overall performance is still not on a par with that of MacWrite II.

Version 1.0 also suffered from bugs too numerous to mention. Many of them have been fixed with the new version, but enough remain to mar an otherwise outstanding program. One of the most annoying occurs when you’re entering text within an existing paragraph. The word wrap sometimes works incorrectly, causing an apparent loss of text. You can usually correct this problem by scrolling to refresh the screen. Still, this problem and others like it can begin to erode your confidence in the reliability of an otherwise outstanding program.

The Bottom Line

Despite its breadth of features, Taste won’t suit your needs if you require advanced word-processing functionality such as outlining, table-of-contents generation, indexing, or special table-making features.

Nevertheless, Taste is a superior mid-range word processor that delivers the bonus of a quite serviceable drawing program, a database manager, and page-layout tools. These functions, teamed with Taste’s impressive style-definition features, make Taste a better value than the more expensive MacWrite II and WriteNow packages. And most important of all, Taste superbly balances sophisticated features with exceptional ease of use.

— Ted Landau

Virtus WalkThrough

This year’s MacUser Eddy award winner for breakthrough product of the year brings virtual reality to the Mac.

Virtus WalkThrough is a powerful modeling and visualization package that takes the concept of virtual reality from esoteric experiment to practical tool. Virtual reality makes it possible to explore worlds and interiors that exist only in the mind of their creators and, with Virtus WalkThrough, in the bits and bytes of Mac software.

Spatial Experience

Virtus WalkThrough lets architects and interior designers create conceptual designs of buildings and interiors and then move through and around them on-screen. It’s an ideal tool for the pre-CAD, visualization phase of spatial design.

WalkThrough is the only program currently available that provides a completely interactive spatial presentation. Several modeling programs for the Mac let you animate fly-throughs, but you’re restricted to a fixed path through the design. Only WalkThrough lets you move about freely, viewing the design from many different perspectives, in real time. And it doesn’t limit you to wire frames. The program renders scenes, and it renders them with astounding speed, so you can move through a suite of rooms in seconds. It does all this with files no bigger than word-processing documents. By comparison, 8-bit PIC animation files of a two-bedroom house can easily grow to 150 megabytes. A similar WalkThrough file, on the other hand, is 15K, or one ten-thousandth the size of the animation file.

The program uses two types of viewing windows for navigating through models: a 2-D Design View, which is also used to create designs, and a 3-D Walk View, which creates the rendered perspectives as you move through the model. Although Walk View rendering is not
After 20 Million Pages Of PostScript Color Output, The Last One Looks As Great As The First.

MacWorld World Class Award September 1990
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recipient's tendency to act upon the information. So, in today's competitive business environment, the key question becomes, "Can we afford not to have the power of color?"

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photo-realistic, it does have advanced features such as translucent surfaces for glass or water; 24-bit color; and, as mentioned previously, impressive speed.

You maneuver through a model by using a mouse or a trackball. We found the trackball superior for navigation, but either method is simple and intuitive. If you’re using a mouse, you hold down the mouse button and move the cursor up to move forward, down to go back, and right and left to rotate. The farther the cursor is from the center cross hairs, the faster you go. You can also move up and down or just look around in all directions without changing position. The focal-length tool adds a wide-angle or telephoto lens to your view.

Observations
As you move around in Walk View, a round object called the Observer also moves in Top View, one of the 2-D Design View perspectives. The Observer represents your position and the direction you’re facing in the model. If you want to view another room without moving through the model to get there, you can activate the Top View window, grab the Observer, and move it to your destination.

A third way to change your position is to rotate the Orientation Cube on the Tool palette. Each surface of the cube is labeled with a direction: front, back, left, right, top, and bottom. Like the Observer, the Orientation Cube moves as you navigate in Walk View. You can change your orientation in 3-D space by using the cursor to rotate the cube.

You can also record the path you take through a model by clicking on the record-path tool on the Tool palette before walking through your design. This is handy if you plan to use WalkThrough in a presentation.

Creating and editing models in Virtus WalkThrough is almost as quick and easy as moving around in them. Top View, the default 2-D Design View, is where you do most of your drawing. You can also open windows for the Front, Back, Left, Right and Bottom Views. An object drawn in Design View immediately appears in Walk View as a rendered 3-D object.

Each time you create a room, you create a 3-D box by drawing rectangles in any of the 2-D Design Views (Front, Back, and so on) and use an extrusion marker on a ruler to set the room height. The interiors of boxes are rendered. Then you can place objects such as furniture inside the rooms. Boxes can overlap, and you can make unwanted walls invisible.

On the Surface
To create doors and windows, you cut holes in the walls, using the surface tool, which we found to be one of the most versatile and useful tools we’ve encountered in 3-D modeling. It ingeniously isolates wall surfaces from the rest of the floor plan. To use the tool, you click on a wall in the Top View and a separate window opens to display the elevation of your wall. You can then draw shapes on the wall using one of WalkThrough’s opacity modifiers. If you choose the transparent modifier, the rectangles you draw will be doors. Translucent gives you windows and screens, and solid gives you rugs, molding trim, and colored walls.

Virtus WalkThrough has all the basic tools for creating the 2-D and 3-D shapes you expect to find in a modeling package. It also includes a unique tool for inserting or deleting the handles needed to stretch existing shapes. This tool comes in handy for tasks such as adding a bay window to a square room.

WalkThrough implements layers usefully by listing them on the Tool palette. You can rearrange the list by clicking and dragging the names. When you click and hold on a layer name, a pop-up menu gives you choices of how to display and color a layer. For example, you can display objects in inactive layers with dotted lines.

Virtus WalkThrough comes with small libraries of 3-D furniture, and you can create your own objects and add them to the libraries. You can walk around a 3-D library object and view it from any angle, just as you do in Walk View.

WalkThrough’s Lighting Editor lets you set the color, intensity, and direction of interior lighting. Each object (or room) has its own lighting model. The default allows three sources of light for each room, but you can add more. Light sources can be ambient or directional, and you can change lighting direction with a simple
Before we developed the QMS-PS® 410 four page-per-minute laser printer, we performed one very important task. We listened to what you wanted. Then we engineered a printer light years ahead of the rest with features that aren't available on other printers at any price.

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- **Front Panel Display on QMS-PS 815 & 825** (16-digit multilingual LCD array conveys printer status, allows user to quickly configure printer)
- **Resident HP LaserJet Series IIP & PostScript emulations** (prints PostScript & HP applications, HP-GL emulation cards available)
- **QMS ASAP III Technology and 68020 Microprocessor** (exclusive technology means fast first-page-out performance)
- **PS Executive Series™ Utilities Software** (to easily set printer parameters)

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click and drag of the mouse or trackball.

To its credit, Virtus WalkThrough avoids most problems common to early versions of new software. Still, there is room for improvement. One annoying quirk occurs with doors that are cut through the walls of two adjoining rooms. If you move one of the rooms so that it is not exactly aligned with the wall of the other room, any doors cut through both rooms disappear. We got around this by zooming all the way out in Top View and moving the wall.

WalkThrough's biggest deficiency is in its import and export capabilities. The program exports files only in standard DXF format. This feature is handy for exporting models to CAD programs, but it would also be nice to export files in PICT, TIFF, or EPS formats so WalkThrough designs could be used in presentations. We would like to see DXF import as well, for visualizing existing floor plans created in various CAD packages. The current version has no import capabilities whatsoever. Other missing features are the ability to create text in a model and to set wall thicknesses. Virtus is considering all of these features for future releases.

The Bottom Line

Virtual reality is an exciting concept that has generated little in terms of concrete products. Virtus WalkThrough changes that. For less than $1,000, the program lets you experience on your Mac what not even the most expensive graphics workstation can reproduce. Virtus WalkThrough is truly amazing in several ways. Its ease of model navigation and creation, speed, and minute file size (so it can run on any 2-megabyte Mac, including a Plus) are most impressive. It's not a drafting tool by any measure, but it is an outstanding conceptualization tool. For those who need to look at a design from all angles, Virtus WalkThrough is indeed a breakthrough product.

— John Rizzo

### MacFlow

**MacFlow 3.5 excels at charting complex business plans as well as software designs.**

MacFlow began life as a flowchart tool for programmers, but the latest version is so versatile, it can be used to create a wide variety of more general business diagrams, including decision trees and project-schedule charts.

In the computer world, flowcharts are diagrams that represent the complex internal logic of large software systems. Early versions of MacFlow used only specialized flowchart symbols that had meaning to programmers but not to average users. However, the latest version of MacFlow lets you create custom symbols, making it a good choice for creating graphic representations of business plans and strategies as well as flowcharts.

You create a MacFlow diagram by selecting a symbol from the Symbol palette and dragging it to the document work space. After you've labeled the symbol, you drag in another symbol and connect the two with an arrow. What distinguishes MacFlow from all-purpose drawing programs is its ability to remember which objects arrows are attached to — they remain attached even when you change their position in the diagram.

MacFlow charts can represent complex interrelationships among objects, because the charts are hierarchical. Such charts can collapse and expand to show various levels of detail, so the program is well suited to the creation of hypertext-like documents. Top-level chart objects work like buttons in HyperCard: Double-clicking on them reveals the underlying detail. You can also link external programs to symbols and run them by clicking on the symbols.

MacFlow's background text and graphics are also similar to HyperCard's. You can paste icons into a chart and create two free-standing text fields per chart — an excellent way to incorporate logos, names of document authors, or sensitivity labels such as CONFIDENTIAL.

### Symbolic Building Blocks

Symbols are the building blocks of MacFlow charts and diagrams, and the program has expanded capabilities that go far beyond the original ANSI (American National Standards Institute) flowchart

### MacFlow Add-ons

Synergetic Applications, the developer of MacFlow, sells three excellent add-on products for the program. A $59 translator lets MORE 3.0 users open MacFlow documents as outlines. Although most of the logic gets lost in the translation, the hierarchies remain intact. This provides a good way to create software documentation or presentations that don't require you to replicate the information you've already entered into MacFlow.

μMacFlow is a $99 run-time version of MacFlow that you can use to distribute your flowcharts and other documents. The $79 MacFlow Symbol Sampler offers more than 300 customized symbols designed for various programming and management tasks.

MacFlow Symbol Sampler, μMacFlow, and MORE 3.0 Translator

Published by Synergetic Applications, Inc., 127 Newport Drive, Oak Ridge, TN 37830; (615) 482-6049.

It took QMS® to engineer a 22 page-per-minute PostScript® laser printer that stretches beyond the capabilities of other printers and still costs less! The QMS-PS® 2210 reaches beyond many others by giving you all popular paper sizes up to 11" x 17"/A3-size printing capability. And it surpasses others in print quality as well with laser-sharp fine line detail and rich saturated black fill areas. No more pale cut-and-paste newsletters, no more mismatched spreadsheets, no more engineering and design projects held together with staples and tape! And the 2210 beats the competition price-wise, too, by delivering all this and more for just $9995.

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variety of diamonds and quadrangles. You can create custom icons with MacFlow's symbol editor, which lets you paste any paint or PICT image into a diagram. You can further customize your symbols from within MacFlow by resizing them and setting the default size and the number of connections per side.

MacFlow includes a full complement of tools for making complex charts attractive and easy to understand. In addition to color support, it provides a Bezir tool for creating curved lines, shadow differentiation for objects that include underlying notes, and varied line widths and arrowhead selections. Reduced and enlarged views, grid/snap commands, and differentiation for objects that include tools for making complex charts at chart, you can attach comments to any symbol. You can further customize your variety of diamonds and quadrangles.

In the flood of file-translation software unleashed by AFE (Apple File Exchange) and the Mac SuperDrive, the new version of DataViz's MacLinkPlus/Translators stands out as the most complete and easy-to-use solution for exchanging a wide variety of file formats between Macs and PCs.

**Translation, Please?**

The new version of MacLinkPlus/Translators adds 50 new file translators, including some for graphics and Windows 3.0 formats, to its already impressive collection. In addition, the new package includes Dayna Communications' DOS Mounter software, which makes DOS floppy disks loaded in the Mac SuperDrive visible from the Mac desktop and from within Mac applications. The versatile MacLinkPlus/Translators supports several methods of exchanging files between Macs and PCs. The package comprises three elements: the MacLinkPlus translators, the MacLinkPlus/Desktop utility, and DOS Mounter. The translators work with AFE or Claris' XTND technology, both of which execute the actual conversion process between PC and Mac formats.

You can use the MacLinkPlus/Desktop utility (the original MacLinkPlus software) to handle the conversion process, as an alternative to using AFE or the Claris solution. DOS Mounter 2.0 is an INIT that lets Mac users with Mac SuperDrives mount DOS-formatted 3.5-inch floppy disks on the Mac desktop.

To use the MacLinkPlus translators with AFE, you drag the MacLinkPlus translator file to the AFE folder. From that point on, the AFE utility finds and uses the appropriate MacLinkPlus translators automatically. This means that all you have to do is launch AFE, pop a DOS-formatted floppy into your drive, and begin translating and transferring files. The only drawbacks are that AFE loads very slowly when the MacLinkPlus translator file is in its folder and that AFE forces you to access the list of translators through a sluggish, seemingly impermeable pull-down menu. Creating customized settings for only the specific translators you want to use is a workaround to this problem, but that process can be slow and clumsy.

The MacLinkPlus/Desktop utility, on the other hand, is fast about its conversion business. What's more, you can select the translators or build custom settings via a speedy scrollable list. Unlike AFE, however, the DataViz utility can't mount DOS floppies on the Mac desktop. You must first transfer the files to your Mac via modem or AFE. Or if you have a Mac equipped with a Mac SuperDrive, you can take advantage of the package's DOS Mounter 2.0.

**DOS Mounter**

Most users who have a SuperDrive will find that using MacLinkPlus/Desktop combined with the DOS Mounter is the

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**Get Info**

**MacFlow**

Published by: Mainstay, 5311-B Derry Avenue, Agoura Hills, CA 91301; (818) 991-6540.

Version: 3.5.

List Price: $295.

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**Utilities**

**MacLinkPlus/Translators**

The latest translation package from DataViz provides a complete solution for transferring files between Macs and PCs.
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The easiest way to transfer and translate PC files. With the DOS Mounter installed, you open the MacLinkPlus/Desktop software, choose the appropriate file translators (unfortunately, MacLinkPlus/Desktop isn't smart enough to select them for you), and slip a DOS-formatted floppy into your SuperDrive. You then select the files on that floppy that you want translated (only files that can be translated with the selected translator appear in the selection list), choose a destination for the file on your Mac, and click the Convert button. A log file tracks any problems that might arise during the conversion.

Keep in mind that DOS Mounter works so well that if you try to use AFE while the DOS Mounter INIT is active, AFE will think the inserted DOS floppy disk is a Mac floppy disk and will display only the Mac-to-Mac translation menu. You can work around this by holding down the Option key as you insert the DOS disk, which temporarily disables DOS Mounter.

If you need to import PC files primarily into Claris' MacWrite II, you can use the supplied bridge software in the MacLinkPlus/Translators package. It allows MacWrite II to import DOS files via Claris' XTND technology.

Whatever approach you finally adopt with MacLinkPlus/Translators, you'll generally find the results to your liking.

We successfully worked with a variety of DOS word-processing documents, including Word for Windows, Word 5.5, WordPerfect 5.0 and 5.1, and WordStar. We translated them into Word 4.0, MacWrite II, MacWrite, and WriteNow file formats.

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

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The March '91 review (page 68) compared the accuracy of MacLinkPlus' conversions of WordPerfect 5.0/5.1 (PC) documents to Word 4.0 (Mac) unfavorably with the accuracy of other conversion packages, but MacLinkPlus/Translators offers a vast improvement in this area. Its new WordPerfect 5.1-to-Word 4.0 translators, in particular, offer far-more-accurate translations than its previous version. Footnotes, headers, footers, and point sizes are all more faithfully rendered.

Overall, the success of MacLinkPlus/Translators' document-formatting translation depends on the original DOS application. In general, we found that the package successfully translated indents, boldface, headers, footers, and even footnotes from other character-based DOS word processors as well as it did from WordPerfect. It also correctly translated more-advanced formatting elements (fonts, point sizes, and tables) supported by word processors with graphical user interfaces, such as Word for Windows. The single document-formatting element that DataViz software still couldn't cope with was multiple columns.

In addition to support for word-processing files, MacLinkPlus/Translators provides substantial support for graphics-, database-, and spreadsheet-file formats on the Mac and PC. Lotus 1-2-3 worksheets translated to Excel 2.2 Mac format without incident and with functional Excel formulas in place. The DataViz filters also make translating PC graphics-file formats (specifically Paintbrush PCX, TIFF, and Windows BMP) to Mac PICT files a snap.

The Bottom Line
If your file-translation needs are limited to word-processing documents, specific word-processing-file translators, such as Word for Word or Software Bridge, are probably a better choice than DataViz's package. The DataViz translators have been improved since the last version, but they still don't handle newspaper or snaking columns well.

Overall, however, the MacLinkPlus/Translators package overwhelms the competition with the sheer number of translator pairs it provides (more than 350) and the wide variety of file types it translates (spreadsheet, database, graphics, and word processing). What's more, with DOS Mounter 2.0 bundled with the new version, the DataViz package becomes an excellent overall solution for moving files between PCs and Macintoshes equipped with Mac SuperDrives.

— Gregory Wasson

MacLinkPlus/Translators

Published by: DataViz, Inc.,
35 Corporate Drive, Trumbull,
CT 06611; (203) 268-0030.
Version: 5.0.
List Price: $169.

Got it made in the shades.
Ultimage and IPLab Spectrum

Two image processors reveal hidden scientific data in photographs.

Ultimage and IPLab Spectrum are image-processing packages that take different approaches to extracting scientific data from photographs. Ultimage is the more fully functional of the two, but at less than $1,000, IPLab Spectrum is a good value if you don't need morphology and quantitative analysis.

Pixel Data

If you've ever wished you could alter a blurry, dark photograph so you could identify that woman standing next to Uncle George, you've wished for the capabilities of scientific image-processing software. Team Ultimage or IPLab Spectrum with a Mac, and not only can you identify Uncle George's friend but you can also get her shoe size.

Of course, scientists are less interested in shoe sizes than in data gleaned from satellite, X-ray, or microscope photographs. Although Ultimage and IPLab Spectrum have their strong points when it comes to revealing the data hidden within a digitized photo's pixels, neither measures up to the power, sophistication, and extensibility of a third image-processing package, Automatix's Image Analyst (see review, July '90, page 55), which was nominated last year for a MacUser Eddy award.

Ultimage and IPLab handle photographic-quality color images, support video capture, and come with scripting languages. The two differ in the level of functionality they provide in the three basic image-processing areas: strictimage processing/analysis, which alters pixel intensities to reveal hidden information; morphology, which alters the shapes of objects; and quantitative analysis, which is the measurement of objects in an image. Ultimage provides functions in all three areas, whereas IPLab lacks the latter two. Ultimage also builds most functions directly to the program, whereas IPLab Spectrum relies heavily on scripting.

Ultimage

The Ultimage package comes in two versions: the $2,990 Ultimage/X (the subject of this review) and the $2,090 Ultimage/S, which doesn't provide the X version's automatic particle detection feature and Analyze menu. Although Ultimage/X is not as intuitive or elegant as Automatix's Image Analyst, its interface is superior to that of IPLab Spectrum, because it follows standard Mac-interface.
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Ultimage is a powerful scientific image processor that lets you extract data, such as the location and size of objects or particles, from satellite or microscope photographs.

Ultimage's 3-D View command plots a perspective graph based on light intensity, so bright areas show up as mountains and dark areas as valleys. A 2-D function does the same thing along a line you draw, making it a handy tool for defining boundaries. Ultimage's versatile histogram can have either a linear or a logarithmic vertical scale.

Ultimage's image-processing functions include eight predefined lookup-table transformations, which alter pixel values with respect to overall intensity. Unfortunately, you can't display a gamma chart, which graphs gray values by using input versus output, as you can with IPLab.

Ultimage provides 28 arithmetic and logical operations that are useful for masking and averaging sections of images, removing noise, and making comparisons. It also has 13 spatial filters, which alter pixels according to local intensity. These include high-pass filters for contrast and outlines.

There are also several frequency-processing filters (high- and low-pass) based on the powerful FFT (Fast Fourier Transform). The FFT result is displayed in a window, which switches among the real, imaginary, magnitude, and phase components of the FFT image.

Ultimage's morphological transformations, which are useful for sharpening and defining objects or removing artifacts such as an isthmus, include thresholding, eroding, and dilating and advanced transformations such as hole filling.

The program's quantitative analysis consists of 42 measurements, including area, perimeter, center of mass, and object guidelines more closely. As a result, most tasks in Ultimage require fewer steps than do tasks in IPLab. Ultimage also lets you access its most useful tools directly from its Tool palette, whereas IPLab Spectrum hides some tools in a submenu.

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count. You can even measure the angle formed by two lines or three points. It can calibrate measurements in units from an angstrom to a nautical mile.

Bundled with Ulimage are the Auto-Mac III macro program and the Developer’s Toolkit. The latter includes instructions and libraries for writing your own functions in C, Pascal, and FORTRAN. These external routines become extension modules that show up in Ulimage’s User menu.

For high-end expansion into data acquisition, you can get Grafit’s Concept VI libraries (which include Ulimage/X) for use with the Eddy-award-winning LabVIEW 2 (see review, May ’91, page 58). Concept VI comprises LabVIEW 2 files designed for image-processing and control functions such as those used by robotic vision systems. The functionality of the combined solution of Concept VI and LabVIEW 2 rivals that of the team of Image Analyst and MacRAIL from Automatix, and the Concept VI solution is less expensive and easier to program. The cost of the Concept VI family ranges from $1,200 to $3,200 (not including LabVIEW).

**IPLab Spectrum**

For a fraction of Ulimage’s cost, IPLab Spectrum delivers many of the same image-processing functions but without morphology and quantitative analysis. Signal Analytics has two versions of IPLab Spectrum: the $749 color version we reviewed and a $499 gray-scale version.

IPLab Spectrum’s chief strength is its scripting language. As with Apple’s MacroMaker, you record commands by executing them. IPLab’s major drawback, however, is that it forces you to do too many basic operations manually. Because of this design, many tasks that should involve a single menu command and one
dialog box require half a dozen steps. IPLab offers a way around these inconveniences by letting you create scripts to automate certain tasks.

IPLab's interface is neither predictable nor intuitive. For example, most Macintosh applications automatically display the Tool palette. IPLab requires you to access its Tool palette from a menu. Furthermore, selecting a tool from the IPLab's Tool palette doesn't change the icon to show you that it's activated. These are small details, but they extend throughout the program and become cumulatively annoying.

On the other hand, some IPLab features are true gems. In addition to some of the basic image-processing functions such as filters and FFTs found in Ultimage, IPLab has a powerful Point Function command. There are 16 mathematical expressions that alter single pixels, based only on the original value, and 3 user-configurable parameters. Another plus is IPLab's Movie command, which rapidly cycles through all open windows, sequentially displaying the various processing steps.

You can store pixels as one of four data types: 1 byte (256 gray levels, as in Ultimage), 2 bytes (16-bit), 4 bytes (32-bit), and 4 floating-point bytes.

The Bottom Line

For those who are about to enter the fascinating world of scientific image processing, we recommend a shareware program from the National Institutes of Health called Image. It's available from MacUser's Zipmac as well as other on-line services. It doesn't have the power of the packages reviewed here, but it will give you a feeling for image processing.

When it comes to choosing a package, we recommend IPLab Spectrum if you don't require morphology and measurement. At $749, it packs a lot of functionality for the price, despite its flawed interface. Ultimage is better compared to Automatix's Image Analyst. Ultimage's interface is not as elegantly implemented as that of Image Analyst, and it costs $1,000 more. However, for machine-vision projects, Graftek's Concept VI libraries for LabVIEW 2 (which includes Ultimage) are worth considering.

— John Rizzo

Get Info

IPLab Spectrum

***
Published by: Signal Analytics Corp., 374 Maple Avenue E., Suite 200, Vienna, VA 22180; (703) 281-3277.
Version: 1.0.
List Price: $749.

Ultimage/X

****
Published by: Graftek-France GTFS, Inc., 2455 Bennett Valley Road, #100C, Santa Rosa, CA 94404; (707) 579-1733.
Version: 1.4.1.
List Price: $2,990.

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ADDMotion

Are you looking for a way to create fast, colorful animations in your HyperCard stacks? Until now, you had to rely on button tricks and XCMD workarounds. No more. ADDMotion, a new product from Motion Works, is an extension to the HyperCard development environment that provides a powerful set of animation tools.

ADDMotion, which requires HyperCard 2.0, is a stack that functions as an adjunct to your Home stack. It provides two new menu options, New Animation and Open Animation, that are appended to the standard HyperCard File menu. Once you’ve chosen either of these options, you enter ADDMotion’s world of color graphics and animation.

Now comes the hard part. Animation is a lot of work no matter how good the software is — ask all those who have pulled their hair out trying to learn Macromind Director. ADDMotion attempts to leapfrog many of the complexities of other animation software, but you still have to read and reread the manual.

ADDMotion comes with a full bag of tricks: props (stationary objects), actors (moving objects), cels (instances of a moving object), paths (sequences of locations), TimeLines (an editing window), and a Media Controller (a palette that looks and works like a VCR). It also has a basic color painting program you must master and a set of sound tools that’s compatible with the Isi and LC sound-input plug and microphone as well as with Farallon’s MacRecorder.

You can plot your animations manually on-screen and then smooth and scale them numerically, using dialog boxes. When you have all that under your hat, you can start learning cues. Cues are the messaging system that allows your animations to be controlled from HyperTalk.

ADDMotion’s performance and color will impress anyone who has watched HyperCard flip through cards or drag button icons. Moreover, you’ll find that ADDMotion distinguishes itself from the field of often-shabby HyperCard add-ons. It’s a sharp, professional product.

And there are more animation goodies on the way. Motion Works has announced future upgrades that’ll provide complete access to ADDMotion tools from HyperTalk. (Actually, if Claris was smart, it would license this little company and build ADDMotion into HyperCard.)

ADDMotion isn’t a product for the browsing novice or the faint of heart, but it’s far simpler and less expensive solution than stand-alone animation products. Here’s another important consideration: ADDMotion offers run-time XCMDs that allow you to distribute your animations royalty-free.

Motion Works, Inc., 1334 W. Sixth Avenue, Suite 300, Vancouver, British Columbia V6H 1A6, Canada; (604) 732-0289. Version 1.0. $295.

— Scott Kronick

SampleCell

SampleCell is a sample-playing Mac II board that significantly cuts the cost of high-quality sampling by harnessing the Mac’s power. Although the SampleCell package provides excellent software tools for editing and modifying the prerecorded samples it includes on a CD-ROM, it doesn’t supply any recording facilities for users who want to create their own custom samples.

SampleCell offers a less expensive alternative to a sampling instrument by relying on the Mac to do the sound processing. SampleCell hardware comprises a SIMMless NuBus card socketed for 8 megabytes of RAM, which can store about 100 seconds of sound at the standard sampling rate of 44.1 kilohertz. Digidesign, SampleCell’s maker, also supplies a “stuffed” board with the 8 megabytes of RAM already loaded, for $1,000 more. However, the card uses standard 1-megabyte SIMMs, so you can add the SIMMS to the board yourself for about half the price. Because it is a NuBus card, SampleCell hardware requires a Macintosh II-class machine (Isi owners need a NuBus adapter).

The package provides the following software: the SampleCell Editor for loading samples onto the card; the Sound Designer SC, a special version of Digidesign’s well-respected sample-editing program; and a CD-ROM, stuffed with 630 megabytes of superbly sampled instruments and sound effects.

The SampleCell system can play 8 stereo or 16 mono instrument sounds or 32 sound effects at a time. You can play sounds from a MIDI keyboard connected to the Mac or trigger them from a sequencer or other MIDI program running under MIDI Manager, Apple’s system software for musical multitasking.

SampleCell responds on all 16 MIDI channels, with different sounds on each channel and with each sound sent to any of four pairs of stereo audio outputs. You can use as many SampleCell cards as you have slots, meaning that with a full-sized Mac II or a compatible expansion chassis, you can put together a monster sampling system that is far more complex than anything else on the market.

Editing and organizing the huge amount of data in samples is a tough job when you use the little LCD screen most sampler instruments give you. But the same task with the Mac’s display is a breeze. The main screen of the Editor program looks like a mixing console, with faders and buttons for each sound. SampleCell provides a wide variety of functions for manipulating the samples in real time over MIDI, and setting them up is an easy and intuitive process.

Unlike a sampler instrument, SampleCell has no facilities for recording samples. But the CD-ROM that comes with the package can keep you busy for a long time. For custom sounds, you need a hard-disk recording system such as Sound Tools or Audiomedia, both from Digidesign. SampleCell is completely file-compatible with both. Sound Designer SC lets those who already have an external sampler download sounds from it onto the SampleCell card.

SampleCell hardware is based on technology developed by Dynacord, a European maker of high-end samplers that are no longer available in this country. As a result, SampleCell sounds as good as the most expensive samplers made by American and Japanese manufacturers.

In practice, SampleCell kills several birds with one stone. Compared with sampling instruments, it’s inexpensive — assuming that you already own a Mac II-class machine. It’s also highly flexible and expandable in ways sampling instruments can only dream about. Most importantly, SampleCell encourages the use of high-quality sound in applications and presentations in which external hardware just isn’t practical.

Digidesign, 1360 Willow Road, #101, Menlo Park, CA 94025; (415) 688-0600. Version 1.1. $1,995.

— Paul D. Lehman
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In the beginning there was SimCity, and it was good. But creator Will Wright refused to rest. "Bigger and better," he mused. SimCounty? SimCongressional-District? SimTimeZone? Small thinking. SimUniverse? Too big to fit on a disk. SimEarth? Perfect!

SimEarth is Will Wright's follow-up to his award-winning SimCity, from Maxis. In SimEarth, you are the Supreme Being who engineers the birth of an Earth-like planet, complete with atmosphere and oceans. You guide your planet from evolution to civilization and finally on to the point of Exodus, where intelligent life becomes advanced enough to spread its seed throughout the universe. SimEarth gives you ten billion years to accomplish this task before your sun becomes a red giant and gives all life a terminal tan.

Once you've formed your world, you have the power to change many of the planet's ecosystems. You can control monumental forces such as continental drift, solar input, and population reproduction and mutation rates. As the planet's Supreme Being, you can also trigger natural disasters such as earthquakes.

Once life on your planet has begun with the humble prokaryote (a single-cell microbe), you can choose from 14 different life forms — ranging from microscopic cooties to mammals — to inhabit your planet. If you judiciously control these elements, it's possible, and even likely, that man will not emerge as the dominant species. In fact, your orb may be ruled by amphibians or cockroaches.

More than a mere game, SimEarth risks being classified as educational. Because it's based on James Lovelock's Gaia hypothesis, SimEarth views the earth's varied systems as a self-regulating whole. For example, if you throw enough carbon dioxide into the atmosphere by burning fossil fuels, you're likely to see a change in air temperature and quality that will adversely affect your life forms.

The creators of SimEarth have provided enough gimmicks and graphics to transform what could be a dry enterprise into something fascinating and entertaining. Do you secretly fear insects? Fine — wield the extinction tool, and wipe 'em out! Tired of the confines of Earth? Fire up the Mars or Venus scenario, and inhabit hostile worlds. Even Michael Bremer's manual is brilliant. A lot of heart and effort went into SimEarth, and it shows.

However, there are some caveats. Bugs in version 1.0 make the game a bit frustrating at times. Some tools, for example, may suddenly stop working or give erroneous information. Maxis is working on a bug fix that should be available by the time you read this. And be forewarned: SimEarth requires several hours of learning time. The flip side of its brilliance is a complexity that's a bit daunting at first. But take the plunge. It's well worth it.

Maxis, Two Theater Square, Suite 230, Orinda, CA 94563; (415) 254-9700. Version 1.0. $69.95.
— Christopher Breen

Imagine Losing Everything In Your Mac.
When I heard “balance sheet,” I broke into a sweat. I knew type, advertising, printing. Now I was forced to do our books. No choice.

We were on our third part-time bookkeeper in eleven months, and she was called away suddenly. Sound familiar?

But I’m the boss and the buck stops with me. We had bills to pay, payroll checks to write, invoices to send, taxes to set aside.

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

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

I found atOnce! The manual looked orderly. I dug in...

The familiar with the unfamiliar atOnce! starts you off with a tutorial that uses HyperCard, one of my old favorites. I was at home.

Numbers are my nemesis, but the tutorial was actually fun and got me comfortable. It takes you step by step through the program, and gives you some easy-to-swallow accounting basics so you’re not reading a foreign language. There’s context-sensitive help, just in case.

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

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

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

What I didn’t know was costing my company I discovered a key client who hadn’t paid in two months. I called and collected and now he wants to know about atOnce! I wrote payroll checks for the staff, and sent our bank a balance sheet I printed out myself—no sweat.

From fear and loathing to passion. Now I even study the management reports atOnce! generates.

I’m still an art director. But atOnce! helped me become a better businessman!

A hidden bonus that made my day

When our bookkeeper returned, I showed her atOnce! Now she’s back doing the books, even makes sure my plants are green, and I can supervise like a boss should. Putting the books on the Mac gives me the numbers I need when I want them. It lets me take control of income and expenses.

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

What peachtree needs is a registered trademark of peachtree software inc. maintain this typed. cimageware and atOnce! are registered trademarks of apple computer inc. others is a registered trademark of sun microsystems, inc. Please circle 139 on reader service card.
QUICK CLICKS

Picture this. You want to edit a picture file you created ages ago in MacPaint but you've forgotten what you named it. Using the Open dialog box, you wander around in your hard-disk labyrinth, searching for a name that rings a bell. Ten minutes later, you still haven't found it.

Enter PickTure. Billed as a visual file selector, PickTure is a startup/Control Panel device (INJT/cdev) that radically alters the look and use of the Open dialog box. PickTure adds rows of miniature screen shots of all the files a selected application can open. You open the files by double-clicking on the miniatures. PickTure also adds a cluster of radio buttons that you can use as shortcuts to navigate between scattered folders, even those that reside on different hard disks. You set up the predefined path between two folders for PickTure to follow, assign the path a radio button, and click on the button to jump directly from one folder to another.

The radio buttons work in all applications that have an Open command, but you must designate which programs will use the miniature “picktures.” Once a program has been marked for miniatures, PickTure takes a snapshot of what a file looks like, as it is closed or saved, and then saves the snapshot as a resource in the file. Consequently, when you first run PickTure, there won't be any miniatures on display. You can either accumulate them as you work or ask PickTure to automatically create them for all the files a selected application can open.

PickTure can create miniatures of both graphic and text files. It actually takes several snapshots so that it can display in color as well as black-and-white. To store the picktures, the PickTure resource adds about 1 K to each file on monochrome Macs and about 6K on color systems.

To better manage pickture files, the software lets you rename and delete files from the Open dialog box. It also has a handy search button that swiftly moves among nested folders, locating all the files a selected application can open.

PickTure works amazingly well, but on slower machines you may notice a lag between closing a file and having it go away while PickTure updates the miniature. Another annoyance is that the selected miniature isn't always shown with its corresponding filename, which gets confusing. Noticeably missing is a button that creates a new folder.

Predictably, PickTure doesn't work with other utilities or INITs that modify the Open dialog box (such as Super Boomerang and Directory Assistance). The program provides a workaround to this by letting you mark the conflicting software on the Control Panel, so that PickTure will know to leave that application alone.

Overall, PickTure qualifies as a good Mac utility. It's easy to use, graphical, and incredibly convenient.

Right Answers, Box 3699, Torrance, CA 90510; (213) 325-1311. Version 1.0. $89.95.

—Dave Valiulis

You'll get your data back fast with SUM II. New SUM II recovers crashed hard disks and accidentally thrown away files so effectively, MacWEEK magazine calls it “the best set of utilities available for file and disk recovery.”

SUM II protects data, speeds up hard disks, and even includes a complete backup program. It's the best-selling, highest-rated data protection and recovery program for the Macintosh. Imagine what it can do for you.

Get SUM II today! See Your Dealer Or Call (800) 228-4122 Ext. 688F for information.
What would everybody used

More compatible

MacDraw Pro is part of the Claris® family. Which means it shares dictionaries, file translators and a common look and feel with other Claris software. You also benefit from Claris support.

More presentable

Show your work on-screen, on overheads, or even on 35mm slides. Move slides from one file to another, and print handouts with multiple slides on each page.

More publishable

MacWrite-style text handling gives you full formatting power in every paragraph of every text block. Composing text, scanned images and graphics is simple.

More sharing

Claris' XTND turns MacDraw Pro into a "graphics hub" for all your applications. You can import virtually all clip art files using the formats above and output your finished work in an EPSF file for precision publishing.

More colorful

Create custom palettes, choosing from millions of colors— including standard PANTONE® colors. You can also custom-name colors for faster, easier reference.
Could your job use some exciting changes?

Well, here's our best idea yet: the new MacDraw® Pro.

We've taken the graphics tool you know and love – MacDraw II – and stuffed it with power and new features. More than 100 new features in all. Yet for all its graphic power, MacDraw Pro remains one of the most comfortable and accessible tools since the T-square.

It's the ideal, all-around graphics software for presenting, publishing, designing and illustrating!

Allow us to illustrate.

Curves. A hassle with most drawing programs; no big deal with MacDraw Pro. Just use your mouse to click out the general shape you want, and presto. If you need more precision, you can use standard Bézier handles to fine-tune what you've drawn.

Colors. With MacDraw Pro you create your own custom palettes, and keep as many open as you wish. You can even name each color, so your "logo blue" is never confused with your "sky blue."

Text. It's the Achilles' heel of most graphics software – but not this one. You'll work with the same powerful formatting tools that our MacWrite® II software is famous for. The result: instead of inventing unheard of tools that do new things, we let you use familiar tools to do unheard of things. In other words, simply powerful software.

But why read about it? Just visit your nearest Claris dealer. And draw your own conclusions.

Upgrade for $99. Call 1-800-628-2100, ext. 94

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Now that it's finally shipped, here's how to get your hands on System 7.0, what it'll cost you, and how the programs you use most fare under the new System.

At long last, System 7.0 has made it out Apple's doors and onto the shelves of your local dealer. Apple hasn't been shy about letting us know what goodies we can expect with the new System, but it kept a tight lid on the details of pricing, availability, and technical support until the day System 7.0 actually shipped. Now, however, the full story can be told. (If you'd like a tour of System 7.0's features, see "70 Things You Need to Know About System 7.0," June '91, page 96, or check out Apple's on-line tour of System 7.0, available on many bulletin-board services.)
First things first: Where can you get your hands on a copy of the software that Apple promises will give you "practically a new Mac"? The obvious place to start is at your dealer, where, depending on your needs, you can get the Personal Upgrade Kit or the Group Upgrade Kit.

**The Personal Upgrade Kit**

This option is designed for individual users and was tentatively priced at $99 at press time. Here’s what you get:
- Eight disks of software, including the Installer, System files, printer drivers, core TrueType fonts, AppleShare client software, and the usual extras such as TeachText and Disk First Aid.
- Two orientation disks, Before You Install and Macintosh Networking Basics. Before You Install includes the Compatibility Checker (a HyperCard stack that scans your system for hardware and software incompatibilities) and a tour of System 7.0’s new features (see Figure 1, above, and “Converting to System 7.0,” elsewhere in this issue). The Macintosh Networking Basics disk includes an introduction to networking concepts such as the Chooser and file sharing.
- A scaled-down HyperCard package consisting of two disks. One contains HyperCard 2.1, the System 7.0-friendly version; the other holds basic HyperCard stacks. (More-full-featured HyperCard upgrade packages are available from Claris.)
- Four manuals: What’s New in Macintosh System Software, Version 7.0; Installing System Software, Version 7.0; the Macintosh Reference Guide; and the System 7.0 Group Upgrade Guide, which describes how to upgrade an organization to System 7.0. You can also get additional copies of the manuals.
- An Installer that upgrades printer-driver files of Macs that continue to run under System 6.x.
- A System 6.x folder that contains versions 6.0.7, 6.0.5, 6.0.4, and 6.0.3 of System software for those who need to reinstall earlier versions.
- Disk images of the 800K and 1.4-megabyte floppy versions of System 7.0 so that you can make a floppy-disk copy of the System software for each user.
- Miscellaneous utilities such as the Namer (for naming printers).
- Electronic versions of all the documentation and the licensing agreement.

You receive four manuals with the Group Upgrade Kit: What’s New in Macintosh System Software, Version 7.0; Installing System Software, Version 7.0; the Macintosh Reference Guide; and the System 7.0 Group Upgrade Guide, which describes how to upgrade an organization to System 7.0. You can also get additional copies of the manuals. Dealers will be selling $249 “five packs,” each containing five copies of What’s New in Macintosh System Software, Version 7.0; the Macintosh Reference Guide; and the Macintosh Networking Reference Guide.

**Software by Subscription**

If you want to install System 7.0 right away but don’t like the idea of having to buy any upgrades that are released later this year, check out Apple’s new System Software Update Program. Available through dealers, this $160 program buys you the current System software as well as any upgrades released during a one-year period. The program is currently available for the Personal Upgrade Kit only, although Apple may institute a similar program for the Group Upgrade Kit.
System 7.0 will also be available from user groups (probably for less than what you would pay a dealer) and also from on-line services such as CompuServe and America Online. (The only cost you have if you take the on-line approach is the download charge, but that can add up to the purchase price of a Personal Upgrade Kit.) Buying your own shrink-wrapped copy has additional advantages: Not only do you get all the documentation but you also get free phone support — 90 days with the Personal Upgrade Kit and 180 days with the Group Upgrade Kit. Given that System 7.0 is a major upgrade that may cause both you and your system more than a few problems, phone support is a valuable feature for which it's worth paying extra.

You won't be completely without help, however, if you download a copy of the software or get a copy from a user group; Apple has set up a 24-hour phone line with a recorded message that answers the top 20 questions about System 7.0. Phone Apple Customer Support at (800) 776-2333 for the number.

**Becoming Seven-Savvy**

System 7.0 offers a slew of new features, and most users are waiting for the day their applications can take advantage of them. The important question, however, is whether the programs you use now can work with System 7.0 and let you maintain the productivity you had under System 6.x. To help you find the answer, Apple has defined three degrees of 7.0 compatibility for programs: 7.0-compatible, 7.0-friendly, and 7.0-dependent. Here's what those labels mean:

- **7.0-compatible programs** do not take advantage of any new features, but they run under version 7.0 without significant problems.
- **7.0-friendly programs** can run under earlier versions of the System software, but they also take advantage of some of System 7.0's new features such as balloon help and publish-and-subscribe.
- **7.0-dependent programs** won't work correctly unless they're run under System 7.0.

If you're curious about how your programs will function under System 7.0 and whether there's a 7.0-friendly upgrade in the works, see Table 1. This table looks at some popular Macintosh software and reports whether it is 7.0-compatible, whether 7.0-friendly versions are planned, and what features future upgrades may have. Note that all the information in the table is subject to change — shipping dates and product features may be altered as the dust settles from the System 7.0 introduction.

Remember too that it's not just software that can have compatibility problems — some hardware (such as video-display and Ethernet cards) might not make the switch to System 7.0 successfully. If you suspect hardware-compatibility problems, call the product's manufacturer.

**Leaders of the Pack**

A handful of manufacturers have already released System 7.0-friendly upgrades (many were released concurrently with System 7.0), and some firms have introduced brand-new applications that take advantage of System 7.0. Most support System 7.0 features such as balloon help, TrueType, and virtual memory, but a few go a step further. Here are the highlights of a few programs that are leading the way in utilizing the strengths of System 7.0:

**Accountant, Inc. 2.2.** This small-business-accounting system from Softsync/BLOC takes advantage of System 7.0's Publish feature to let you send accounting data to other applications, such as spreadsheet programs and word processors. Within Accountant, Inc., you can add custom graphics to reports by subscribing to graphics created in spreadsheet or charting programs.

**Canvas 3.0.** The latest version of Deneba Software's drawing program is a publisher, so individual objects within Canvas documents can be shared across networks. It also lets you manipulate TrueType just as you would any other object — you can resize a block of text by selecting...
System 7.0

Figure 3: Canvas 3.0 lets you manipulate TrueType as you would other objects. The original type (in gray) was selected with the pointer and then stretched to a larger size without loss in quality.

it with the pointer tool and pulling the corners of the box to make it smaller or larger (see Figure 3).

DiskFit 2.7. This data-backup utility from SuperMac automatically creates an alias of your backed-up files or hard disk and places it on the desktop. When you double-click on this alias, you see a mirror image of your backup. Double-click on an individual file, and you will be prompted to insert the floppy disk, tape, or removable cartridge on which the backed-up file is stored. Because DiskFit backs up files in a Finder-readable format, you don't have to restore the files before accessing them. When backing up, DiskFit retains the access privileges for shared files and folders, and it includes the original document or application (where possible) when backing up folders that contain aliases.

DiskPaper 1.0. This new print-to-disk utility from Farallon lets you share a document electronically with other users, even if they don't have the application with which you created it. Viewers don't even need a copy of DiskPaper, because the viewing software can be embedded within the document. DiskPaper supports TrueType, but it also creates a bit-mapped version of the fonts, so that documents created with TrueType fonts can be viewed by all users, even those without the original fonts — and even if their system lacks TrueType capabilities.

Excel 3.0. A major upgrade to Microsoft's popular spreadsheet program, version 3.0 supports publish-and-subscribe (see Figure 2), so you can easily update information across many documents as well as add Excel charts and tables to other applications. Its template feature (also known in System 7.0 lingo as a stationery pad) lets you create documents with common elements; for example, you can save an expense-report worksheet as a template so it can be reused.

RagTime 3.1 with System 7.0 Extensions. RagTime (from RagTime) — an integrated program that includes page-layout, word-processing, spreadsheet, and graphing capabilities — already has its own internal version of publish-and-subscribe called hot linking, which lets you share and automatically update information among RagTime documents. You can expand this capability with System 7.0 Extensions, a two-disk update to RagTime 3.1 that adds support for publish-and-subscribe. System 7.0 Extensions lets you publish RagTime documents on a frame-by-frame basis (RagTime documents comprise a series of frames containing text, graphics, and spreadsheets). You can also subscribe to documents published from other applications, such as Excel.

Resolve 1.0. This is Claris' new spreadsheet program, specifically designed to take advantage of System 7.0. It supports publish-and-subscribe, so you can easily update and distribute Resolve data, and its IAC capabilities let you use it to analyze and chart data from other applications.

SAM 3.0. SAM (Symantec Anti-Virus for the Macintosh) is the first antiviral utility developed to work with System 7.0 (it also works with earlier System versions). When running under System 7.0, SAM 3.0 can scan applications for viruses as they launch; you can also have applications scanned just by dragging them over to the SAM Virus Clinic icon.

These are not the only programs that are jumping on the System 7.0 bandwagon, but they're a sample of what's being developed. As more users switch to System 7.0, the demand for applications that take advantage of it will grow. You — and your Macintosh — will be seeing some innovative and exciting software developments in the year to come.

Victoria von Bield is an associate editor at MacUser; Barry Chan is MacUser's research assistant.

Table 1 Criteria

<table>
<thead>
<tr>
<th>Product (Manufacturer)</th>
<th>The current shipping version of the product (the manufacturer's name is in parentheses).</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0-compatible?</td>
<td>Does the current shipping version work under (without taking advantage of) System 7.0? (Most compatible programs support TrueType.) Special cases are noted with an asterisk.</td>
</tr>
<tr>
<td>7.0-friendly version due?</td>
<td>Does the manufacturer plan to market a version of the product that takes advantage of new System 7.0 features such as balloon help and publish-and-subscribe?</td>
</tr>
<tr>
<td>When?</td>
<td>The approximate date that the System 7.0-friendly upgrade will ship (these dates are subject to change). 20 '91 means the second quarter of 1991.</td>
</tr>
<tr>
<td>System 7.0 features</td>
<td>Will the product take advantage of the following three features:</td>
</tr>
<tr>
<td>• Balloon help</td>
<td>On-screen help that pops up in a comic-book-style balloon when an item is pointed to.</td>
</tr>
<tr>
<td>• Publish-and-subscribe</td>
<td>The ability to pass text or graphics among applications while retaining a dynamic link to the original file.</td>
</tr>
<tr>
<td>• TrueType support</td>
<td>Apple's new outline-font technology. TrueType fonts use a single font-outline file to scale fonts to any size, and no separate bit-mapped-font file is required for output.</td>
</tr>
</tbody>
</table>
You could be missing the best parts of System 7.0

If you have a Mac II, IIx, IIcx or SE/30, make sure you get 32-bit mode and virtual memory

MODE32 is the 32-bit solution

Unless you have MODE32, your Mac II, IIx, IIcx or SE/30 won’t run 32-bit mode or even display it as an option in the memory control panel. To make your Mac work like the new generation of machines, just copy MODE32 into your system folder.

Here’s the best part: MODE32 gives you full 32-bit mode operation under System 7.0 for only $169.

For the original Mac II, there’s another catch

If you have an original Mac II, there is something else you need to know: virtual memory is completely missing, and won’t even appear in your control panel. Virtual memory (VM) lets you increase your Mac’s memory without having to install additional SIMMs.

Your Mac II needs a Motorola PMMU coprocessor to run virtual memory. Connectix sells the current Mask 73 version of the PMMU, the only version that is known to be fully compatible with the Macintosh. When you upgrade to System 7.0, add a Connectix MC73™ PMMU for only $179 to get virtual memory on your Mac II.

Upgrade to all of System 7.0’s benefits

If you have a Mac II, IIx, IIcx or SE/30, get MODE32 and discover the power of 32-bit operation.

And, if you have an original Mac II, you need the MC73 to enjoy the advantages of virtual memory.

To order MODE32 or an MC73 PMMU, call your supplier or Connectix direct at (800) 950-5880 or (415) 324-0727.

More memory for more productivity

MODE32 breaks through the 8megabyte memory barrier to access up to one full gigabyte of virtual memory, or as much physical RAM as you can put in your Mac.

With increased memory, applications will run faster and more programs can run concurrently. This increases productivity, especially in memory-intensive applications such as desktop publishing, multimedia and image processing.

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Please circle 63 on reader service card.
### Table 1: Seven-Savvy Programs

<table>
<thead>
<tr>
<th>Product name (Manufacturer)</th>
<th>7.0-compatible?</th>
<th>7.0-friendly version due?</th>
<th>When?</th>
<th>Balloon help</th>
<th>Publish-and-subscribe</th>
<th>TrueType support</th>
<th>Comments on 7.0-friendly version</th>
</tr>
</thead>
<tbody>
<tr>
<td>4th Dimension 2.1.1 (ACIUS)</td>
<td>○</td>
<td>7.0</td>
<td>July '91</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>Uses Apple events to create links with forms-design programs.</td>
</tr>
<tr>
<td>Accountant, Inc. 2.1 (Softsync/BLOC)</td>
<td>○</td>
<td>7.0</td>
<td>TBD</td>
<td>TBD</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Adobe Type Manager 2.0 (Adobe)</td>
<td>●</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Canvas 3.0 (Deneba)</td>
<td>●</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Claris CAD 2.0 (Claris)</td>
<td>●</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>Uses custom Apple events to interact with Voice Navigator II.</td>
</tr>
<tr>
<td>Color MacCheese 2.87 (Delta Tao)</td>
<td>●</td>
<td>May '91</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>ColorStudio 1.5 (Latiarset)</td>
<td>○</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>DeltaGraph 1.5 (DeltaPoint)</td>
<td>●</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>*Released as DeltaGraph Professional.</td>
</tr>
<tr>
<td>DesignStudio 2.0 (Latiarset)</td>
<td>●</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>DeskPaint and DeskDraw (Zedcor)</td>
<td>●</td>
<td>Aug. '91</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Digital Darkroom 2.0 (Silicon Beach)</td>
<td>●</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>Uses custom Apple events to enable any program to access it for file compression.</td>
</tr>
<tr>
<td>DiskDoubler 3.1 (Salient)</td>
<td>○</td>
<td>June '91</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>DiskExpress II 2.04 (ASLsoft)</td>
<td>○ ○</td>
<td>NA</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>*Version 2.07 (May '91) is 7.0-compatible only.</td>
</tr>
<tr>
<td>DiskTop 4.0.1 (CE Software)</td>
<td>○</td>
<td>3Q '91</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Double Helix 3.5 (Oetesta)</td>
<td>●</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>*Problem choosing Revert command.</td>
</tr>
<tr>
<td>Dreams 1.1 (idd)</td>
<td>○</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Excel 3.0 (Microsoft)</td>
<td>○ ○</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>*Previous version (2.2) is 7.0-compatible.</td>
</tr>
<tr>
<td>FileForce 1.1 (ACIUS)</td>
<td>●</td>
<td>summer '91</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>FileMaker Pro 1.0 v.2 (Claris)</td>
<td>●</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Fontographer 3.3 (Altsys)</td>
<td>○ ○</td>
<td>NA</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>*Current version can create TrueType fonts.</td>
</tr>
<tr>
<td>FrameMaker 3.0 (Frame)</td>
<td>●</td>
<td>Sept. '91</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>FreeHand 3.0 (Aldus)</td>
<td>●</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>FullImpact 2.0S (Ashston-Tate)</td>
<td>○</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>No plans to make future releases 32-bit clean.</td>
</tr>
<tr>
<td>FullWrite 1.5S (Ashston-Tate)</td>
<td>●</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>HyperCard 2.0 (Claris)</td>
<td>●</td>
<td>May '91</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>Uses custom Apple events to launch other applications.</td>
</tr>
<tr>
<td>Illustrator 3.0 (Adobe)</td>
<td>○</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>*Current version does not support TrueType.</td>
</tr>
<tr>
<td>M.Y.O.B. 2.0 (Teleware)</td>
<td>●</td>
<td>June '91</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>MacDraft 2.1 (idd)</td>
<td>●</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>MacDraw II 1.1 (Claris)</td>
<td>○ ○</td>
<td>NA</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>*Released as MacDraw Pro (June '91). Future releases of MacDraw Pro will support balloon help and publish-and-subscribe.</td>
</tr>
<tr>
<td>MacInTax 1990 (SoftView)</td>
<td>●</td>
<td>4Q '91</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>MacPaint 2.0 (Claris)</td>
<td>●</td>
<td>TBD</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
</tbody>
</table>

Legend

- **●** = yes
- **○** = no
- **TBD** = to be decided
- **NA** = not applicable

---

102 July 1991 MacUser
Introducing the first computer in history that's easier to use and more powerful than a Macintosh.
<table>
<thead>
<tr>
<th>Product name (Manufacturer)</th>
<th>7.0-compatible?</th>
<th>7.0-friendly version due?</th>
<th>When?</th>
<th>Balloon help</th>
<th>Publish-and-subscribe</th>
<th>TrueType support</th>
<th>Comments on 7.0-friendly version</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacProject II 2.1 (Claris)</td>
<td>O</td>
<td>June '91</td>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Uses custom Apple events to launch other applications.</td>
</tr>
<tr>
<td>MacroMind Director 2.0 (MacroMind)</td>
<td>O</td>
<td>summer '91</td>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Supports Alias Manager over a network.</td>
</tr>
<tr>
<td>MacTOPS 3.0 (Silka)</td>
<td>O</td>
<td>3Q '91</td>
<td></td>
<td>O</td>
<td>NA</td>
<td>NA</td>
<td>Released as MacWrite Pro.</td>
</tr>
<tr>
<td>MacWrite II 1.1 (Claris)</td>
<td>O</td>
<td>summer '91</td>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Will be System 7.0-compatible or new product.</td>
</tr>
<tr>
<td>MasterJuggler 1.53 (ALSoft)</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>Supports the Communications Toolbox.</td>
</tr>
<tr>
<td>Metamorphosis Professional 2.0 (Altysys)</td>
<td>O</td>
<td>NA</td>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>MicroPhone II 3.0 (Software Ventures)</td>
<td>O</td>
<td>June '91</td>
<td></td>
<td>O</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>Microsoft Mail 3.0 (Microsoft)</td>
<td>O</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
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<tr>
<td>Microsoft Word 4.0.0 (Microsoft)</td>
<td>O</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<td>Microsoft Works 2.0 (Microsoft)</td>
<td>O</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>MindWrite 2.1 (DellaPoint)</td>
<td>O</td>
<td>NA</td>
<td></td>
<td>O</td>
<td>NA</td>
<td>NA</td>
<td>Product replaced with Taste 1.0.</td>
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<tr>
<td>MORE 3.0 (Symantec)</td>
<td>O</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>*Instead of a new version, will be an upgrade module. A 7.0-compatible-only upgrade will be available free from on-line services and Paragon Concepts.</td>
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<tr>
<td>Nisus 3.05 (Paragon Concepts)</td>
<td>O</td>
<td>Aug. '91</td>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
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<td>Norton Utilities for the Macintosh 1.0 (Symantec)</td>
<td>O</td>
<td>summer '91</td>
<td></td>
<td>O</td>
<td>NA</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>Oasis 1.0 (Time Arts)</td>
<td>O</td>
<td>3Q '91</td>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
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<tr>
<td>PageMaker 4.01 (Adobe)</td>
<td>O</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>Personal Press 1.0 (Silicon Beach)</td>
<td>O</td>
<td>May '91</td>
<td></td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<td>Persuasion 2.0 (Aldus)</td>
<td>O</td>
<td>TBD</td>
<td>TBD</td>
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<td>TBD</td>
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<td>TBD</td>
<td>TBD</td>
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<td>TBD</td>
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<tr>
<td>PixelPaint 2.1 (SuperMac)</td>
<td>O</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>PixelPaint Professional 2.0 (SuperMac)</td>
<td>O</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>PowerPoint 2.01 (Microsoft)</td>
<td>O</td>
<td>2Q '91</td>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>*Publish-and-subscribe will be in future versions.</td>
</tr>
<tr>
<td>Publish It! Easy 2.0 (TimeWorks)</td>
<td>O</td>
<td>2Q '91</td>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>*Does not support TrueType.</td>
</tr>
<tr>
<td>QuarkXPress 3.0 (Quark)</td>
<td>O</td>
<td>3Q '91</td>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>QuickKeys 2.0.1 (CE Software)</td>
<td>O</td>
<td>June '91</td>
<td></td>
<td>O</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>QuickMail 2.2.3 (CE Software)</td>
<td>O</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
</tbody>
</table>

Legend: **O** = yes, **O** = no, **TBD** = to be decided, **NA** = not applicable.
System 7 is here. The biggest improvement in Macintosh since Macintosh.

System 7 brings many new and exciting capabilities to Apple® Macintosh® computers. It also makes the computer that's famous for being easy to use even easier.

But what's really exciting is the fact that the Macintosh computer sitting there on your desktop has the power to take advantage of all these advanced capabilities.

System 7 can run on every Macintosh personal computer we've built since 1986. (All you need is a hard disk drive and at least two megabytes of memory)

It's like getting a whole new Macintosh without buying a whole new Macintosh.

And while we have been busy reinventing your Macintosh, the best software developers in the world have been busy, too. Creating the next generation of Macintosh software. Bringing new powers to your favorite Macintosh applications. And creating new programs that will enable your Macintosh to do things no other personal computer has ever done before.

System 7 is just the latest example of how Apple moves technology ahead without leaving you behind. To not only protect your investment, but also to make it worth more than ever.

To make the transition easy, we've prepared two System 7 Upgrade Kits.

The Personal Upgrade Kit is for individual users and contains everything you need. Including System 7 software, a compatibility checker, HyperCard® 2.1 software, a comprehensive manual and 90 days of toll-free upgrade assistance from Apple.

The Group Upgrade Kit is designed for managers of large Macintosh installations. It will let you upgrade your entire network quickly and easily. And it includes System 7 software, the compatibility checker, HyperCard 2.1, a special Macintosh guide to networking and 180 days of toll-free upgrade assistance.

For information on upgrade kits, call your authorized Apple reseller. For the name of the reseller near you, call 800-538-9696, ext. 777.

And rediscover the power no other computer can offer. The power to do more than ever. The power to be your best.

Introducing System 7 for Macintosh. 🍎
### Table 1: Seven-Savvy Programs, continued

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RagTime 3.1 (RagTime)</td>
<td>✗</td>
<td>May '91</td>
<td></td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>*Automatic shutdown doesn't work.</td>
</tr>
<tr>
<td>Retrospect Remote 1.2 (Dantz)</td>
<td>✗</td>
<td>May '91</td>
<td></td>
<td>✗</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>SAM 3.0 (Symantec)</td>
<td>✗</td>
<td>shipping</td>
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<td>✗</td>
<td>✗</td>
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<tr>
<td>Smartcom II 3.2A (Hayes)</td>
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<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>StrataVision 3d 1.4.2 (Strata)</td>
<td>○</td>
<td>Oct. '91</td>
<td></td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>*Compatible version (2.0) May '91; full support for System 7.0 will be in Oct. '91 release.</td>
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<tr>
<td>Studio/1 1.0 (Electronic Arts)</td>
<td></td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>Studio/32 1.1 (Electronic Arts)</td>
<td></td>
<td>4Q '91</td>
<td></td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td></td>
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<tr>
<td>Studio/8 2.0 (Electronic Arts)</td>
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<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
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<tr>
<td>StuffIt Deluxe 2.0.1 (Aladdin)</td>
<td></td>
<td>July '91</td>
<td></td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>*Current version supports TrueType.</td>
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<tr>
<td>Suitcase II 1.2.9 (Fifth Generation)</td>
<td>○</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>NA</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>SUM II 2.0 (Symantec)</td>
<td>✗</td>
<td>summer '91</td>
<td></td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>*New version will be 7.0-compatible but not 7.0-friendly. Shipping date not decided.</td>
</tr>
<tr>
<td>SuperCard 1.5 (Silicon Beach)</td>
<td>○</td>
<td>NA</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>SuperPaint 2.0A (Silicon Beach)</td>
<td>○</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>*Screen-refresh problems with scroll bar.</td>
</tr>
<tr>
<td>Super3D 2.1 (Silicon Beach)</td>
<td>○</td>
<td>○</td>
<td>NA</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>*New version (May '91) will be 7.0-compatible but not 7.0-friendly.</td>
</tr>
<tr>
<td>Swivel 3D Pro 1.5.73 (Paracomp)</td>
<td></td>
<td>Aug. '91</td>
<td></td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>Taste 1.01 (DeltaPoint)</td>
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<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>Tempo II Plus 2.0.1 (Affinity)</td>
<td>○</td>
<td>○</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>*Compatible version 2.1 ships May '91; shipping date of 7.0-friendly version undecided.</td>
</tr>
<tr>
<td>Timbuktu 4.0 (Paralline)</td>
<td>○</td>
<td>shipping</td>
<td></td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>*Version 3.1.2 is not 7.0-compatible. New version can share screens between Macs running Systems 6.x and 7.0.</td>
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<td>TypeStyler 1.5 (Breedbund)</td>
<td></td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>UltraPaint 2.0 (Deneba)</td>
<td></td>
<td>Aug '91</td>
<td></td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>Ventura Publisher 3.3.1 (Ventura Software)</td>
<td></td>
<td>Aug '91</td>
<td></td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td></td>
</tr>
<tr>
<td>Voice Navigator II 2.2 (Articulate)</td>
<td>○</td>
<td>Aug. '91</td>
<td></td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td></td>
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<tr>
<td>WingZ 1.1A (Informix)</td>
<td></td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>WordPerfect 2.0 (WordPerfect)</td>
<td></td>
<td>Aug. '91</td>
<td></td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
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<tr>
<td>WriteNow 2.2 (T/Maker)</td>
<td></td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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</tbody>
</table>

**Legend**

- ✗ = yes
- ○ = no
- TBD = to be decided
- NA = not applicable
A lot of manufacturers say they have the best trackball, but only the Kensington Turbo Mouse® has the awards to prove it.

MacUser gave it the coveted Five Mice. And the readers of Macworld magazine voted it "Best Input Device" — not just once but four years in a row.

What makes Turbo Mouse outshine the rest? Superior optical hardware and unique software are the difference.

A light click sends the signal quietly and instantly.

One button transmits a normal mouse command. The other locks the button in the down position for extended selection and graphic applications. You decide which button performs what function.

Press both buttons simultaneously, and our time-saving chording feature executes one of seven useful commands such as "save," "print," "quit," or "undo."

Navigating the screen is easy. A comfortable ball position makes the cursor easy to move. And a smooth ball movement means no jumping or sticking.

What's more, Turbo Mouse has unique software that lets you adjust both acceleration and double-click speed to exactly match the way you work. Move the ball slowly and the cursor moves pixel-by-pixel. Move it fast and it speeds across even the biggest screen.

The next time you read another claim for a trackball, remember the one that has earned all the acclaims. Turbo Mouse.

Six Reasons Why LaCie Hard Drives Are the Best You Can Buy.

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

*Typical application access time using 64KB DisCache.
**Seagate drive mechanisms also available (capacities from 300MB to 1.2GB).
Software with a Silverlining.

Every La Cie drive includes a FREE copy of Silverlining, the #1-rated hard drive management utilities program.

Silverlining drivers can get 30% more speed from a drive than the competition. It works with any true SCSI drive, internal or external. So one program can manage it all. Plus, Silverlining optimizes your data so it's consecutive on your drive, which makes your applications run faster.

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

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

A Company You Can Count On.

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

The Most Unusual Warranty in the Business.

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

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

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

A Company You Can Count On.

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

The Most Unusual Warranty in the Business.

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

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

*Restrictions apply. Please contact La Cie for complete warranty information.
Desktop Publishing

Budget page-layout programs don’t have to mean bland publications.

Layouts FOR LESS

Desktop publishing was originally labeled — or perhaps libeled — as a low-end version of typesetting. But as programs such as PageMaker and QuarkXPress have grown in sophistication — and price — the need for less expensive, simpler alternatives has also grown. And with the advent of cheaper Macs and printers, that need has grown even greater.

Fortunately, developers have responded, and now there are five programs aimed specifically at DTP users who design smaller projects such as newsletters, fliers, and reports: Personal Press, Publish-It! Easy, RagTime Classic, Ready, Set, Go!, and Springboard Publisher II. To test them, we specced out a four-page newsletter (see Figure 1) that incorporated various kinds of graphics and typographical elements and then we tried to realize those design specs with each product. Here’s how the five programs fared.

BY GREGORY WASSON
Figure 1: A Model Newsletter

Figure 1a: The cover of our fictitious newsletter includes an Illustrator 3.0 (EPS) logo with space for a reversed-out date above it. There’s a screen beneath the logo and another screen at the top of page. Other elements include a three-line drop cap, a jump line, and a table of contents with leadered tabs and a spread heading.

Figure 1b: A scotch rule with spot color sets off the inner two pages. There’s a byline style and a screen for the author’s bio. The Excel chart is a PICT image. You must draw the intercolumn rules, and the page number is designed as a reversed-out character in an opaque box with a bottom rule.

Figure 1c: The master-page elements (scotch rule and reversed-out page number) are repeated on page 3. A jump line references the cover story, which ends here with an EPS accent. News & Notes is a special heading style that requires forced justification and a 50-percent gray tint applied to selected words. A Photoshop TIFF halftone completes the page.

Figure 1d: There are no master elements on page 4. Various rules are used in the mailing area. The subscription form includes rules, leadered tabs, a special text header fitted to a specific width, and a gray tint applied to some words. The form must be rotated 180 degrees and positioned at the page top for bulk mailing.

Personal Press

At 780K, Personal Press (see Figure 2) is the largest of the programs we reviewed, and a lot of dandy features have been packed into those kilobytes.

Personal Press’ Publication Setup dialog box is one of the nicest you’ll ever see. It is here that you define the page size, number of pages, margins, and other elements in your publication. You can choose to have the program generate linked or unlinked text frames, according to the margin and column settings you select. A preview in the dialog box dynamically updates to display the rough appearance of the document as you define values. After you’ve clicked on OK, your document appears.

We used Personal Press’ master, or background, pages to set up and format the page numbers (automatic counters that you insert). As with all text editing in Personal Press, you have to be in the 100% view. The newsletter’s page numbers were designed as reversed type in black boxes. In Personal Press, you create a small text frame; specify the font, color (white), and point size of the page counter; insert it; and set the text frame to have a black fill. We drew a pair of rules at the top of the page with one of the program’s draw tools to form a scotch rule.

We set the color of the rules via the Spot Color palette. It’s a bit clumsy to do, because Personal Press doesn’t automatically select a graphic after you’ve drawn it — you have to select the graphic and then apply a color. You can choose from the basic eight Mac colors, but the newsletter design required some of the text in the special headings to be gray. Because Personal Press can’t specify tints for text colors, we resorted to a workaround. The program lets you modify any one of the eight spot colors with the Apple Color Picker, so we changed one we didn’t plan to use in the publication (yellow) to gray and then selected the special headings and clicked on gray on the Spot Color palette.

After we’d readied the master pages, we turned to the
actual pages and prepared them to receive imported text. In the best of circumstances, you want to be able to define style sheets so that your newsletter has a consistent look. Personal Press provides some of the power of a style sheet in its Custom Styles option. A custom style is simply a collection of text-attribute settings (bold, italic, font, point size) that you’ve saved under one name. It speeds up text formatting, but you can’t use Custom Styles to establish alignment, indents, and the like. Also, if you edit a style, text with that style won’t automatically update; you have to reapply it manually. To get around this limitation, we used a collection of custom styles for the article-title, body-text, and caption formatting, followed by a separate formatting pass for all the paragraph indents and alignments.

The back page of the newsletter was set up with two text frames to hold boilerplates: the mailing-label area and a subscription form. The subscription form was the most troublesome, because it involved a tabular arrangement. Fortunately, Personal Press’ tabs ruler bears no resemblance to its counterpart in PageMaker. It can be sized — you don’t have to scroll around to see the full width of a column. We set up a tab structure, using the underline character as the leader to create the fill-in lines for the form. The newsletter was designed to be folded in half for mailing, so we had to rotate the form text block. In Personal Press, you can rotate text objects and graphics by 1-degree increments, so this wasn’t a Herculean task.

Other text effects in the newsletter’s design were fitted text and drop caps. Personal Press doesn’t have a Set Width command or forced justification to achieve this kind of effect, so we resorted to a pre-PageMaker 4.0 trick: the use of Option-spaces after a heading to make it stretch across the frame. (Another way is to use a text utility such as TypeAlign.)

The drop caps were easy to fashion. You just create a separate text frame with the letter, format it, and use text wrap to make the drop-cap text frame repel the surrounding text. When you drag the frame over the main text frame, the body text shrinks away.

Once you’ve set up this sort of design, you should think about saving your document as an AutoCreate template (see Figure 3). This wonderful feature lets you assign text or graphic files to specific frames within a miniature mock-up of your document. You simply click on a frame and choose an external file from a list in the AutoCreate dialog box. When you’ve finished, a new document opens with all the text and graphics inserted. Then you fine-tune and format the text. You can do your text entry within Personal Press (it provides a spelling checker and search capabilities), but it’s faster to use a word processor. Personal Press accepts files in nine different formats, including the four standard formats — MacWrite 4.5/5.0, Word 3.0/4.0, WriteNow, and ASCII — and RTF.

Personal Press can flow text from page to page, but although the frames can be linked, Personal Press can’t create automatic jump lines (“continued on . . . “). These require separate text frames. Our newsletter design included a short screened biography of the author at the end of an article. Personal Press’ graphics-tool palettes came in handy for creating the screened bio box, which was put in last, because it couldn’t be anchored to the text.

Finally, we imported EPS, PICT, and TIFF graphics and resized and cropped all these images within Personal Press. (Personal Press can also import a large variety of other graphics formats.) If you use the AutoCreate feature, you can size and crop the images before you import them. The Excel PICT chart on page 2 of the newsletter involved using the Text Wrap command as described earlier. We modified the TIFF halftone somewhat with the built-in Digital Darkroom-like image and halftone controls (including Darkroom’s Advanced Halftones option).

Figure 2: Personal Press’ main window is an elegant and easy environment to work in. Personal Press can rotate text as well as graphics, so it was easy to rotate the subscription form 180 degrees.

Figure 3: Personal Press’ AutoCreate option lets you create layout templates that can be used to complete an initial layout rapidly. By selecting a frame and picking a file from the list, you can open directly to a document that has all the elements already placed.
**Page Layout**

Personal Press has features that weren’t even required for the newsletter. The two most attractive are an excellent story-navigation system called Link Navigator and libraries called Workbooks that can store graphics and text.

All in all, Personal Press made the process of putting the newsletter together almost pleasurable.

**Publish-It! Easy**

Publish-It! Easy proved well equipped to handle the task of setting up the newsletter, and because it’s the smallest of the programs we looked at (320K), it’s the best choice for those restricted to floppy disks or with limited RAM.

Publish-It! Easy doesn’t provide a new-document dialog box when you launch the program. A standard one-page document just appears. It’s not hard to make the format changes — columns, page size (including custom sizes), and so on — but Publish-It! Easy makes the process confusing by spreading out the relevant commands over more than one menu.

Once we’d set the basic parameters, it was off to the master pages. Publish-It! Easy’s drawing tools made short work of the scotch rules; they could even be grouped and locked so they couldn’t be moved accidentally. The basic array of eight colors is available for use as spot colors, and Publish-It! Easy lets you set tints via the fill-pattern tool.

Like Personal Press, Publish-It! Easy inserts page counters on the master pages. To reverse-out the numbers, we changed the text color with the pop-up Pen Pattern palette. Because the text frame with the number can have a fill, we set that to black. We used the same technique, which is easier than adding boxes with drawing tools, for the bio. You can even select precise percentages by dragging along the gray ramp in the pop-up Fill Pattern pallet.

The main shortcoming of Publish-It! Easy’s master pages became apparent in the document itself — you can’t turn master elements off. We resorted to opaque white rectangles to “erase” the superfluous parts.

Once we’d set up the columns, we prepared the document for text importation. Publish-It! Easy offers only minimal style support, so text formatting was cumbersome. We found it useful to use a library-page approach — we inserted an extra page at the end of the document to hold formatted text frames such as captions. When we needed text in a certain format, a simple copy-and-paste from this page solved the problem.

The program’s controls over various aspects of word and
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character spacing (see Figure 4) made re-creating some of the special headings easier than in Personal Press. The Stretch option in the Text Specifications dialog box tightened or expanded text, and the pen-pattern tool let us assign a gray tint to selected words in the headings. The Forced Justify command was useful for the In This Issue table-of-contents heading.

The subscriptions form on the newsletter’s back page posed no major problems. You can rotate text blocks, and tabs are a snap. However, to create the leader, you have to set a tab and then choose a leader style — such as dashes, periods, or underscores — by clicking on the tab while pressing the Option and/or Shift keys.

You can import text from the standard word-processing formats listed earlier. Nothing special here, but one nice touch is that Publish-It! Easy can insert auto-updating jump lines into special text frames.

It was easy to create drop caps — we placed a separate text frame containing the capital letter over another frame with runaround.

Importing graphics went smoothly. You don’t have to create a graphic frame first — Publish-It! Easy does it automatically as you import. We just dragged our graphics to their position and then cropped or scaled them. The TIFF import filter offers you image controls and some special effects such as posterizing, which gives the image a silkscreened look, and negative, which reverses-out colors and grays.

Publish-It! Easy is aptly named — it is easy. Style sheets would be a welcome addition — but even without them, Publish-It! Easy remains delightful DTP software.

**RagTime Classic**

If RagTime 3.04 is the Swiss army knife of DTP (see review, June ’90, page 70), RagTime Classic, the low-end version of that product, is the rusted blade.

The program is key-disk copy-protected, and the manual is confusing and incomplete — a surprising approach to documentation in a product aimed at the low-end market. Fortunately, RagTime USA offers toll-free support.

RagTime Classic has no initial setup dialog box. As with Publish-It! Easy, you start with a blank page and then go menu hopping. RagTime doesn’t offer master pages within a document. You create the left and right page designs and save those two pages as a “form.” Then you start a new file and “tear off” either the left or right form page and insert it into your document. It sounds convoluted (and it is), but you can delete or modify individual master elements once you’ve inserted the form page into your document.

Once we understood the approach, we set up the master elements without a hitch. RagTime Classic can automatically insert column rules, which was a real time-saver. We gave the scotch rules at the top of each page their spot color from the basic eight-color palette. You can also tint these colors, so it wasn’t a problem to generate gray screens. To create the reversed-out page counters, we only had to modify the color/tint of the frame’s contents, background, and border.

The program doesn’t support style sheets, so we used the library-page approach described earlier. Some of the special text effects, however, proved troublesome. We had to create the special headings that had the words in gray and black, with the gray text in a separate frame, and then align it with the black text while Snap to Grid was active — RagTime Classic doesn’t let you mix different text colors in the same frame. We created the spread headings in two ways. We used RagTime Classic’s character-spacing controls (Command-keypad combinations) to create some headings and TypeAlign to create others. We then imported the TypeAlign text as a resizable EPS graphic.

The subscription form was also problematic, because RagTime Classic doesn’t support text rotation or leadered tabs. Ultimately, we imported the form as an EPS graphic.

Once we’d finished the preliminary grunt work, the text came in. Or didn’t — at least at first. RagTime, to our astonishment, accepts external text files in only three
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formats: ASCII, Word 1.0—not Word 4.0—and MacWrite 5.0—not MacWrite II (see Figure 5).
You can set text frames to repel each other, so the drop caps were no problem. The EPS, PICT, and TIFF graphics came in successfully. Text runarounds were restricted to rectangular borders. RagTime Classic’s irritating copy protection, poor documentation, and appalling text-import limitations clearly send it to the back of the pack.

**Ready, Set, Go!**

Ready, Set, Go! is an old favorite, but it was a surprise to find that Letraset hasn’t done much to improve it.
The first step in RSG is to create master pages. We sketched out the Scotch rules with the program’s drawing tools and applied spot color from RSG’s extensive color library — it even offers Pantone support. We reversed-out the page numbers by drawing out a suitably sized text frame and inserting the page counter within it. We then applied white to the counter we selected. We used the same method for creating gray text and the screens for the article bio. We set up a three-column grid, drew out text frames to form the newsletter’s columns, and used RSG’s linking tool to link the columns. For the main pages, we turned off the cover’s master elements and inserted the EPS masthead logo.
RSG supports style sheets (see Figure 6), so it was easy to maintain a consistent structure. You can apply RSG styles to selected characters or entire paragraphs, and these elements update automatically if you edit the style.
RSG’s tab ruler is similar to PageMaker’s. You have to scroll to see a wide column. It took some time to set tabs, because of the dexterity required to click and scroll through the tab types. We could have set up the subscription form with the tabs, but RSG can’t rotate text, so we imported the form as an EPS graphic.
We used Option-spacing to force-justify the heading for the table of contents. You can spread a heading across a line by mucking around with the character spacing, but Option-spacing is far faster.
RSG can import text from an adequate range of formats, including the standard ones. Once the text was in, we were able to format everything quickly, using the previously defined style sheets. Text runarounds and separate text blocks made forging drop caps similar to doing so in the other programs. There is no provision for automatic jump lines, so it took time to coordinate them — the Glossary feature made it easier. With RSG’s typographical controls such as custom kerning and tracking, we could fine-tune headlines and other text.

There were no big surprises in graphics importation. RSG provides text runaround and good halftone controls — second only to those of Personal Press.
Ready, Set, Go! is a former top-of-the-line product that seems to be losing its momentum, as Letraset concentrates on its Studio line and sleek DTP newcomers steal the limelight. But its style sheets, typographical controls, and ease of use still make it worth at least one last look.

**Springboard Publisher II**

Springboard Publisher II rounds out the quintet of budget layout programs. It opens to a new, untitled document when launched. Thankfully, all the relevant layout commands are corralled on one menu. However, the program is more like a word processor than a DTP application — for example, to create the page numbers, you specify their position and format in a dialog box.

There are no master pages, so handling repeating graphics took some planning. To work around this, we created a dummy master at the start of the document, with switch rules at the top and a thin bottom rule. When we needed these rules, we just duplicated the dummy page.

Each page has a background text frame that automatically links to the background frame on the next page. In
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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Page Layout

some cases, we needed a more flexible layout, so we drew out our own frames with the pointer tool and linked them. Linking, like page numbering, takes place in the dark confines of a dialog box. You have to select a frame, access the dialog box, and type in the frame number (Springboard numbers frames as you create them). This awkward implementation of frame linking takes patience. The dialog box did, however, let us insert jump lines. Unfortunately, they don't update automatically.

The screened bios caused some problems. Springboard can't specify a fill for a text frame, so we had to create a transparent graphic frame the same size as the paragraph, import an EPS graphic (actually, just a rectangular black block), and change its gray level to 10 percent—a complicated process, to say the least. You can't use Springboard's integrated painting tools for screens, because their resolution is too coarse (see Figure 7).

Springboard doesn't support spot color, but that didn't mean we had to abandon our blue scotch rules. If colored elements such as rules form distinct shapes on the page and don't touch different-colored objects, there's absolutely no reason to drop spot color. If you are working within budget constraints, then it's cheaper and faster simply to take a laser proof to the linoprinter with indications written on the proof of what colors the rules or objects should be. Printing separate spot-color plates is expensive and unnecessary.

Springboard imports the standard word-processing formats, and it also has a typing window, which is similar to PageMaker's Story Editor. There are no style sheets, so we used the library-page technique again. Springboard can't color text, but the SmartArt DA, a PostScript graphics-effects package, is included with the program, so we used it several times for gray text (you need a PostScript printer to print it out). The old Option-spacing trick worked just fine for force-justifying headers, and we used the program's character-spacing controls to kern headlines.

We created the subscription form outside the program and imported it as EPS, because Springboard doesn't translate text. We created drop caps in separate frames and dropped them in as with the other programs.

Springboard can't handle color text—it's painting tools are in black-and-white—we had to redo the colored PICT Excel chart. We converted the TIFF scanned image to MacPaint in Adobe Photoshop. EPS posed no problems.

Springboard Publisher II is a decent program. It doesn't exactly shine, but it's the least expensive of the lot. If your needs are very, very modest, it's not a terrible choice.

### The Bottom Line

Of these five programs, Publish-It! Easy and Personal Press are the obvious first choices for anyone needing to do DTP on a budget. They offer the most features at reasonable prices. Publish-It! Easy is easier to use than Personal Press, but Personal Press has some unique and useful features such as AutoCreate. Of the others, Ready,Set,Go! is easily the best of the bunch. Springboard Publisher is only for those with extremely limited needs, and RagTime Classic is a reminder of why DTP was scorned years ago.

Gregory Wasson is a MacUser contributing editor and freelance typesetter.

### Table 1: Features of Budget Page-Layout Programs

<table>
<thead>
<tr>
<th></th>
<th>Personal Press 1.0</th>
<th>Publish-It! Easy 2.01</th>
<th>RagTime Classic 2.1</th>
<th>Ready,Set,Go! 4.5</th>
<th>Springboard Publisher II 2.0</th>
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</thead>
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<td><strong>List price</strong></td>
<td>$299</td>
<td>$249.95</td>
<td>$195</td>
<td>$295</td>
<td>$199.95</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>Memory and disk-space hog. Editing in 100% view only. Occasional slow screen refresh. Only one document open at a time.</td>
<td>100-page document restriction. Absence of real style sheets.</td>
<td>Copy-protected. No layout rulers. Poor documentation. Modal operation. Imports only Word 1.0, MacWrite 5.0, and ASCII files. No style sheets.</td>
<td>Limited graphic tools.</td>
<td>No TIFF-halftone support. No spot color. Clumsy text-frame linking. No master pages. Text editing and graphic creation in 100% view only.</td>
</tr>
<tr>
<td><strong>Company</strong></td>
<td>Silicon Beach Software, Inc. P.O. Box 261430 San Diego, CA 92126 (619) 695-6955</td>
<td>Timeworks, Inc. 444 Lake Cook Rd. Deerfield, IL 60015 (800) 535-9497 (708) 948-9200</td>
<td>RagTime USA 400 Walnut St. Sto. 501 Redwood City, CA 94063 (415) 780-1800</td>
<td>Letraset 40 Eisenhower Dr. Paramus, NJ 07653 (201) 845-6100</td>
<td>Spinnaker Software 201 Broadway Cambridge, MA 02139 (617) 494-1200</td>
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THE MAC/TV CONNECTION:

Video is changing the way we use Macs. Camcorders are replacing scanners, and live video from VCRs and videodisc players is giving motion to business presentations. MacUser Labs tests seven ways to add multimedia muscle to your Mac.

BY PAUL YI AND THE MACUSER LABS STAFF

Imagine using your Mac to manipulate video images — that’s right, television — as easily as you now write a memo, crunch numbers with your favorite spreadsheet program, create full-color images, or record and edit sound or music. Well, you can’t. Not yet, at least. The perfect Mac/TV connection is not as far in the future as you might think, though. The multimedia revolution has already provided products that let you show live full-motion video in a Mac window or digitize single or multiple images from any video source and then save and manipulate them as you would any graphics file. With products available today, any member of the Mac II family can play video in a resizable window, which makes it possible to overlay Mac text and graphics or create special effects that enliven the dullest quarterly sales projection.
Video

Figure 1: Making the Connection

- RCA-to-BNC converter
- RF: used for cable and broadcast video
- S-video: for Super-VHS and Hi-8 VCRs and cameras
- BNC: common in high-quality consumer and professional equipment
- RCA: most common for consumer-level equipment
- BNC-to-RCA converter

Figure 1: Making the right video connections is like solving a jigsaw puzzle: Once you have all the right pieces, everything should fit.

Single-frame video digitizers can provide instant color photos for desktop publishers armed with camcorders or still-video cameras. The image quality may not be as good as that of high-quality scans of traditional photographs, but the time you save by not having to wait for photo processing, printing, and scanning can prove invaluable when you’re on a tight deadline. Multiple-frame video digitizers can provide brief full-motion video animations playable by HyperCard, Macromedia Director, Authorware, and other popular multimedia and animation applications.

Versatile Video

This month MacUser Labs takes a first look at these emerging video tools. For this report, we tested and evaluated seven products that put TV images onto your Mac’s screen and that capture 16- and/or 24-bit-color video images. All the products in this report are NuBus cards. Two have external boxes attached, two also provide standard Mac video, and the rest work with third-party Mac video cards.

The Computer Friends ColorSnap 32+, Mass Microsystems QuickImage 24, and Neotech Image Grabber are strictly video digitizers—they let you take digital “snapshots” of any video image, whether it be from a video camera, a VCR, or a videodisc player. The E-Machines QuickView, Radius TV, RasterOps ColorBoard 364, and VideoLogic DVA-4000 can also convert television signals into full-motion video that can be played on your Mac screen—as long as your Mac is connected to a video source. The RasterOps ColorBoard 364 and the E-Machines QuickView go one step further by being able to digitize brief sequences of true digital video.

The three digitizing-only cards can preview live or taped video in a small window—although at an fps (frames per second) rate slower than the 30 fps needed for true full-motion video. The Neotech Image Grabber is a NuBus card that previews video only in gray scale, but you can use it to capture still video in color if you use the external Colour Adaptor Module, which connects to the Image Grabber card.

The more powerful products cost two to three times as much as the budget ColorSnap 32+ and QuickImage 24—but they also accomplish two to three times as much. For example, the Radius TV, a combination NuBus card and external box, is not just a capture/display product—it also includes a full-function television tuner with audio, and it can read and capture closed-captioned text.

The RasterOps ColorBoard 364 and the E-Machines QuickView both capture single or multiple frames of video, and the ColorBoard 364 also functions as a 24-bit-color video card. The QuickView provides only 16-bit color—and it costs more than twice as much as the ColorBoard 364. The VideoLogic DVA-4000 is an impressive two-card configuration targeted at the multimedia market. The DVA-4000’s sophisticated software can overlay Mac graphics onto video and can control stereo audio input.

The products we discuss in this month’s roundup put TV images onto a Mac screen. In an upcoming issue, we’ll review six products that put Macintosh screen images onto TV or videotape. The TV Board and the TV Box, from Generation Systems, and
the RasterOps Video Expander are external boxes and NuBus cards that convert Mac video images into TV ones; the Mass Microsystems ColorSpace III/FX, the RasterOps ProVideo 32, and the Truevision NuVista+ are NuBus cards that can manipulate live video and combine it with Mac graphics. Like this month's products, the Mass Microsystems ColorSpace III/FX and Truevision NuVista+ can capture frames — but we're saving them for an upcoming report, because their true power lies in putting Macintosh images onto videotape with overlays and other video effects.

**What's in a Board?**

To help you decide which desktop video product is right for you, we first played the role of users to see how easy the cards are to set up and use. We quickly discovered that although you don't have to be a video engineer to use them, they aren't as easy to use as most other Mac products are. We then tested each card's video-capture abilities by digitizing two industry-standard test signals and analyzing the results.

To analyze desktop-video performance, it's important to know the difference between Mac video and television video. Television video is an interlaced 525-line, 30-fps signal called NTSC video (see the "How It Works: Mac Video Versus TV Video" sidebar). NTSC is the U.S. standard for television broadcast and playback and is the signal broadcast over the air and sent via cable and what comes out of a VCR, videodisc, or video camera. The Mac, however, works with a non-interlaced video signal that shows video at 67 to 82 fps.

The first step in getting video on-screen or onto your hard disk is to convert the incoming NTSC signal into a Mac video signal. This is called decoding the NTSC signal. As it enters the Mac, the signal is still analog — that is, it carries information by making changes in its waveform — and not digital. Digital signals — used to carry and manipulate information in all computers — are based on patterns of 1s and 0s, or on and offs. If a frame of video is to be saved to your hard disk, the analog signal must be converted to a file that comprises digital signals. This analog-to-digital, or A/D, conversion happens on the video-in card as you save video frames to your hard disk in PICT or TIFF formats.

The desktop-video products that rely on third-party Mac display cards to show live video in a Mac window —

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### How It Works: Mac Video Versus TV Video

You can’t plug your TV into a Mac display card. To translate electrical signals into pictures on its screen, your television uses a video format, or set of rules, called NTSC video. Your Mac, on the other hand, uses a radically different format, usually referred to as Mac video.

**Mac video**

Noninterlaced, 640 x 480, 67 Hz

Mac video draws an image by using a progressive or noninterlaced scanning method. The video image is drawn line by line.

Mac video uses vertical-scan frequencies of 67 Hz (hertz, or times per second) to 82 Hz — the screen is redrawn 67 to 82 times per second. With this high refresh rate of 67 to 82 frames per second, Mac screen images look clear and text does not flicker.

**NTSC video**

Interlaced, 640 x 480, 30 Hz

NTSC video uses an interlaced scanning method. The video image is painted first by every odd line and then by every even line, together the two sets of lines make up a single frame of NTSC video.

The NTSC vertical-scan frequency — how fast it paints each picture on the screen — is 30 Hz for each frame. A refresh rate of 30 frames per second is adequate for color images, but fine lines and text are fuzzy and flicker is pronounced.
Video

On the Horizon

The source for live video today is an analog signal, but the future is all digital. You will soon be able to store full-motion video images on your hard disk and play them from it rather than from your VCR. Digital-video images will be as easily accessible and manipulable as text files — you’ll be able to move them and place them in other documents.

You can easily digitize single frames of video with all the products we looked at for this report. Some can also digitize multiple frames but not quickly enough to record full-motion video. It’s just as well, though: A single frame of 24-bit video at 640-x-480-pixel resolution needs almost 1 megabyte of storage space. If a board were able to digitize at 30 fps (frames per second) — and if the Mac’s SCSI port could keep up — you’d need a 300-megabyte hard disk to store just 10 seconds of digital video!

The answer to the storage dilemma is compression. Tomorrow’s digital-video products will offer real-time, on-the-fly compression with factors of 50:1 to 200:1. Color-prepress applications already use JPEG (Joint Photographic Expert Group) compression to get high-quality compression in the neighborhood of 50:1 for still images. JPEG is an industry standard for still-image compression that’s beginning to make its way into full-motion video.

Besides JPEG there’s MPEG (Moving Pictures Experts Group), which has a digital-video- and digital-audio-compression standard. MPEG compression compresses similar frames of video, keeping track of elements that change between frames and discarding redundant information. The resulting compression allows full-motion video to be sent at CD-ROM data rates — around 160K per second.

Products are already on the way that will bring long-playing full-motion digital video to your desktop. SuperMac plans a line of products from high to low end that should be available by the third or fourth quarter of this year. At the high end — around $5,000 — is a Mac display card that can digitize video with real-time JPEG compression and decompression, digitize audio, and output both to videotape.

SuperMac will also be offering a low-end video and audio digitizer for less than $1,000. Unlike its more powerful sibling, the low-cost hardware/software product will provide digital video slower than full-motion speed and smaller than full-screen. SuperMac Technology, 485 Potrero Avenue, Sunnyvale, CA 94086; (408) 245-2202.

A small Boston-area company called DiVA, formed by some MIT Media Lab graduates, is also planning low-end digital-video and digital-audio software currently code-named Chaplin. The company promises that Chaplin will easily and powerfully digitize video from a camcorder or VCR and will work with a variety of compression boards. Its software offers a new file format called Micon — short for “movie icon” — that shows a preview version of the digitized-video image at the size of a normal Mac icon. Like any other icon, a Micon can be moved, copied, and pasted. The difference is that the Micon shows an 8-bit movie representation of the digitized-video file. A combined software and hardware product will retail for around $1,000. DIVA (Digital Video Applications), 222 Third Street, Suite 3332, Cambridge, MA 02142; (617) 491-4147.

Another Cambridge company, Videologic, has a video-compression card in the works, although it still hasn’t decided whether to go with a stand-alone board or integrate compression with its current DVA-4000 product. Videologic, Inc., 245 First Street, Cambridge, MA 07142; (617) 494-0530.

Another piece of the digital-video pie — QuickTime, a multimedia coordinator that will be part of the Mac’s operating system — will soon arrive from Apple. QuickTime will define digital-video and digital-audio formats and will allow digital animations to play at the same speed, no matter the Mac platform. Without such a controller, a Mac will be slower than on a Mac IIx, because of the IIx’s faster processing speed. QuickTime will go a long way toward making multimedia more consistent and predictable — good news for developers and users.

Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014; (408) 996-1010.

[Figure 2: Computer Friends includes useful image-cataloging software with its ColorSnap 32+ video-digitizing board. The Gallery function stores multiple "galleries" of images, even in compressed form, with thumbnail views of each image in a gallery.]

[Figure 3: The E-Machines QuickView board can digitize multiple frames of video and save them in PICS format — a series of PICT files linked to make a short video animation. The software’s excellent interface includes thumbnail views of each frame.]
the Computer Friends ColorSnap 32+, E-Machines QuickView, Mass Microsystems QuickImage 24, Neotech Frame Grabber/Colour Adaptor Module, and RadiusTV—all work with a range of Mac video cards and monitors (see Table 1). However, the speed at which decoded RGB video passes to the resident video card is limited by the Mac’s NuBus and the response time of the resident video card.

A single frame of a 24-bit full-resolution (640 x 480 pixels) video image is a whopping 1 megabyte. So sending 24-bit video at 30 fps (full-motion) from a digitizing card to a Mac display card requires data-transfer rates of around 30 megabytes per second. Although in theory the NuBus can move data at this speed — using a special transfer mode called block-mode transfer — we’ve never seen the Mac’s NuBus transfer data as fast as this in real-world applications. The best any card can accomplish with 24-bit color is to display video images at a quarter of full size and at 15 fps. This small and slow preview is enough for digitizing, however, because you don’t need to view each frame to capture a single video image.

Full-motion video is possible if you set your Mac monitor to 8 bits, or 256 colors. This setting significantly reduces the amount of information sent over the NuBus but gives you a disappointing video image compared with the original. A minimum of 16 bits is required for color that approximates what you expect a television picture to look like.

The E-Machines QuickView and the RadiusTV provide full-motion video by passing 8 or 16 bits of converted video over the NuBus to the third-party display card. If the display card has a 24-bit display mode but no 16-bit mode, the QuickView and the RadiusTV can display video only in 8-bit color. The RadiusTV has no problem showing full-motion video in 16-bit color, but the E-Machines QuickView manages a full-sized 16-bit screen only at 15 fps.

The RasterOps ColorBoard 364 and VideoLogic DVA-4000 aren’t constrained by the need to pass converted video over the NuBus — each acts as a Mac display card as well as a digitizer. The ColorBoard 364 has digitizing and display circuitry on a single card — it merely passes the decoded NTSC video from one part of the card to another, providing an Apple 13-inch RGB monitor with a full 24 bits of color. Physically, the ColorBoard 364 looks like any other Mac display card, except that in addition to a 15-pin connector for the Apple monitor, it includes two video-input connectors: a composite-RCA-video connector — the most common type of video connector for camcorders and VCRs — and an S-video connector — an input for the high-quality transmission scheme used in Super-VHS and Hi-8 tape decks and cameras.

The VideoLogic DVA-4000 comprises two cards — make sure you have two free adjacent NuBus slots. One card serves as the Mac’s RGB display card, driving the Apple 13-inch monitor, and the other serves as the encoder/digitizing card. The digitizing card passes the encoded video over a special cable that connects the two cards, thus avoiding NuBus limitations and enabling video to be shown in 24-bit color and Mac graphics in 8-bit color.

A Plug for Video

Installation of the cards in any member of the Mac II family is as straightforward as installing any other NuBus card. Getting everything else — external boxes and video devices — connected and working is another matter, however. Each card has its idiosyncrasies. Part of the RadiusTV package, for example, is an external
Figure 6: Digitizing and Display Quality

<table>
<thead>
<tr>
<th>Overall Image Quality</th>
<th>Color Accuracy</th>
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<td><strong>Worse</strong></td>
<td><strong>Better</strong></td>
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Neotech Image Grabber | VideoLogic DVA-4000 | RadiusTV | RasterOps ColorBoard 364 | Computer Friends ColorSnap 32+ | E-Machines QuickView | Mass Microsystems QuickImage 24 |

**Performance factor**

- 25
- 50
- 75
- 100

**Degrees of deviation**

- 5
- 10
- 15
- 20

Although these three systems scored the lowest, their image quality is quite acceptable for most users.

The Neotech Image Grabber produces digitized images with the most accurate color, but it can capture images only from a single video source and can show live video in gray scale only.

Box that connects to its NuBus card via two special cables. The Neotech Colour Adaptor Module has a cable that connects to the Neotech Image Grabber and one that attaches to the ADB port.

If your video experience is limited to connecting your VCR to your TV, the myriad of possible connections involved in the installation of any of these products may be confusing (see Figure 1). You'll find a variety of video connections and cables — RCA, BNC, RGB — and you'll need to learn about them all when you use any of the video products.

Manuals can help in this process, and the nod goes to VideoLogic for a manual that has the clearest instructions of any of the products, complete with diagrams of configurations and answers to any questions you may have — especially impressive because the DVA-4000 is the most complicated product to install. We especially appreciated that the cables are labeled "top" and "to Apple monitor"; no other vendor labeled its cables. The Apple monitor connection requires the use of a small screwdriver — you can't tighten the screws by hand as you can with most Mac video cables — but this is the only quibble we had about the DVA-4000's installation.

A HyperCard stack, The VideoLogic Guide to Multimedia, gives an overview of video formats and devices and a rundown on authoring and video-controlling software. Other companies — even those with products that are relatively easy to set up and use — should take note of VideoLogic's excellent package. With multimedia and video still misunderstood by a lot of potential users, education is important and may even end up sealing the buying decision.

One Step at a Time

All the desktop-video products we looked at come with at least one application that displays live video on your Mac screen and digitizes single or multiple frames of video into memory or onto your hard disk. The E-Machines QuickView, Mass Microsystems QuickImage 24, RadiusTV, and VideoLogic DVA-4000 have startup software that gives you control of the active video inputs; hue, saturation, and brightness levels; and product-specific features such as audio levels — just drag the INITs and cdevs into your Mac's System Folder. The RadiusTV and the RasterOps ColorBoard 364 also provide DAs that give you access to the video hardware while you're working in another application — a boon for graphic artists and multimedia developers.

For desktop publishers, the most useful piece of software is a plug-in, an add-on utility for an image-manipulation or page-layout program. The appropriate plug-in can, for example, give you access to the digitizing card directly from Photoshop. The convenience of using an already popular program makes a video digitizer as easy to use as a color scanner. The Neotech Image Grabber has plug-ins for Adobe Photoshop, Letraset's ImageStudio, and Silicon Beach's Digital Darkroom. The Computer Friends ColorSnap 32+ has plug-ins for QuarkXPress — called Xensions — and for Photoshop. After our testing, Mass Microsystems announced a Photoshop plug-in.

The Computer Friends ColorSnap 32+ includes the best software for
Lack of Noise

Besides coming with plug-ins, the ColorSnap 32+ has an easy-to-use image-capture application, ColorSnap-32, that includes a powerful image-cataloging system called Gallery (see Figure 2). The software shows a thumbnail of all the stored images in a “gallery”; you can also have multiple galleries.

The ColorSnap 32+ is also the only product to offer compression of any sort. Its algorithm, similar to the JPEG (Joint Photographic Expert Group) still-image-compression standard, can compress single as well as multiple images. You can save a compressed image by itself or into a gallery. The Gallery function creates a thumbnail view and automatically decompresses and re-creates the full image when you double-click on the thumbnail. There are several image-cataloging programs on the market, but they cost close to half the price of the ColorSnap 32+ alone and don’t work seamlessly with the capture card.

Less useful but more powerful software is included with the Neotech Image Grabber, which is designed for use with still-video cameras from Canon and Sony. The Image Grabber card itself digitizes 8-bit gray-scale video, and the Colour Adaptor Module external box adds color capability. The module accepts inputs from composite, RGB, and S-video connectors and passes 24-bit-color video in three stages: red, green, and then blue, each color using 8 bits’ worth of information per pixel. The Image Grabber is limited to still-video images, because the Colour Adaptor Module can digitize only one color channel at a time.

Because of this “three pass” operation, digitizing with the Image Grabber takes longer than with any of the other products. Although the software gives powerful color- and image-analysis and -editing tools, only the most sophisticated and experienced users will be able to take advantage of all of its power. Neotech should work on adding a more user-friendly interface to the rich set of technical controls it currently offers.

Mass Microsystems provides easy-to-use software called QuickImage that includes a variety of effects filters. After digitizing an image, you can manipulate it in various ways, including posterizing and blurring. Although we welcome the promised Photoshop plug-in, QuickImage would benefit from more plug-ins and an image-cataloging system.

The Future’s Not Here Yet

Although the hardware of all seven desktop-video products is capable of capturing multiple sequential frames, only the RasterOps ColorBoard 364 and the E-Machines QuickView provide the necessary software (although Mass Microsystems should join them by the time you read this report). But don’t expect these products to replace your VCR — long-playing full-motion digital video is still a gleam in some developer’s eye.

Of the two multiple-frame grabbers, the E-Machines QuickView has the more powerful features: Sequences can be saved either as individual PICT files or in PICS format — an animation scheme that involves a series of linked PICT files. However, our testing showed that neither card is fast enough to capture every consecutive video frame, despite such claims in the

Figure 6: We tested two aspects of the video-digitizing and -display boards’ image quality: color and noise. We used the products to digitize an industry-standard color pattern — SMPTE color bars — and a 50-percent-gray signal called a pedestal. The signal generator we used provided a clean signal; any color errors or noise were introduced by the video-in products — the quality of your own digitizing will depend on the quality of the video source you use.

Overall Image Quality:
The overall ranking shows the result of combining the results of the color-accuracy and noise tests. The Neotech Image Grabber produced the overall best images — although its live video is limited to 8-bit gray scale. We ranked all the other products by how they performed relative to the Image Grabber.

Color Accuracy:
We measured color accuracy by degrees of deviation from the original color in the 360-degree color wheel, familiar from the Apple Color Picker. The Neotech Image Grabber with its optional Colour Adaptor Module showed the least color deviation from the original colors, whereas the Mass Microsystems QuickImage 24 was noticeably inaccurate.

Lack of Noise:
Signal noise causes digitized images and live video to have artifacts — deviations that show up as spots or blues — that aren’t in the original TV image. The Radius TV and the Videologic DVA-4000 produced the most noise-free images, although all the products performed well. All the other products’ performances is shown relative to that of the Radius TV.
QuickView manual and software.

The ColorBoard 364 can capture multiple frames to RAM or to your hard disk. When capturing to RAM, the ColorBoard 364 can grab every sixth frame; a hard disk limits the rate to one capture every five seconds. The speed advantage of RAM-based capture seems obvious — until you learn that one 24-bit, full-resolution video image (640 x 480 pixels) fills nearly an entire megabyte of RAM. So if you have 5 megabytes of RAM in your Mac, you can capture a grand total of only five frames! This is just a tiny taste of true digital video — and a major reason why we say that the future’s not here yet. Not long from now, however, emerging technology that can compress video 50:1 to 200:1 will let you play full-motion video from your hard disk, a magneto-optical disc, or even a sluggish CD-ROM (see the “On the Horizon” sidebar).

Using the software included with the E-Machines QuickView, you can vary the size of a digitized image from a full 640 x 480 pixels to a small icon-sized window. At full size, the QuickView captures every fourth frame, and it gets every other frame at quarter size and smaller. You cannot capture to disk, however, so your video sequence is limited by the amount of available RAM. Because small images take up less memory, a 5-megabyte Mac can capture up to 30 quarter-screen frames — two seconds of video at 15 fps, a playback rate that produces acceptable, if slightly jumpy, images. These “video animations” in PICS format can be used in HyperCard, MacroMind Director, or other programs that support PICS. The QuickView software also shows a thumbnail representation of each digitized frame, and you can capture a sequence with a tumble or zoom effect (see Figure 3).

The first version of the QuickView software — even though it was a full shipping version — frequently crashed our Mac II. And the new software we received after our testing was completed still had menu items that, when selected, responded with an alert box informing us that our choice was “not yet supported by this version.” E-Machines assures us that by the time you read this, the QuickView software will be complete and will support all menus. The company also plans to add such features as audio support.

Although the software that comes with the RadiusTV doesn’t offer sequential captures, it has one important unique feature: a built-in television tuner, so you can view broadcast television on your Macintosh. Radius’
Theatrics software and the RadiusTV DA provide familiar TV controls, including a channel selector and a volume control (see Figure 4). You can switch among broadcast- and cable-television reception and two composite-video inputs.

The RadiusTV also accepts audio from broadcast TVs, VCRs, and videodisc players. Monophonic digitized audio is sent over the NuBus along with the converted video and played through the Mac's internal speakers. The data-transfer limitations of the NuBus, however, can cause the audio to break up and be out of sync with the video, so that sounds — especially dialogue — are sometimes unintelligible. Radius should provide audio outputs on the external box that would let you pump the audio to external speakers.

For multimedia users, VideoLogic ships the most impressive array of software with its DVA-4000 card. Besides the already mentioned Guide to Multimedia instructional HyperCard stack, it supplies two applications that control video input and capture. The DVA-4000's real power, however, lies in its MIC Producer software, which uses HyperCard 1.2.5 or 2.0 to run (see Figure 5). MIC Producer creates automatic scripts for controlling how video and audio are handled; these scripts can then be output in HyperCard, Macromedia Director, or Authorware Professional format. The DVA-4000 can mix graphics and live video and create video overlays and audio fades—all in a Mac window—and export the routine to one of the three multimedia packages it supports. The E-Machines QuickView card can also do overlays, but its software limits you to a live-video window. You can't automate or integrate the overlay with a scripted presentation.

**Video Tests**

In addition to having a broad range of capabilities and features, these desktop-video cards also vary greatly in the quality of the images they provide. To obtain an objective assessment of signal quality, we used a piece of industry-standard test equipment called the Magni 1515 Signal Generator to test the cards' NTSC-signal-decoding quality and their A/D-conversion fidelity.

The first test image was the set of SMPTE color bars that television engineers and camera operators use to tune the colors on TV sets (see Figure 6). We then used Photoshop's analysis tools to compare the digitized-video file with an ideal set of bars, thus determining how much the colors had been shifted by the digitizing card. The second test file was a 50-percent-gray signal — called a pedestal — to see how much noise the analog components of the video cards introduced into the signal.

The products were all fairly accurate in maintaining the true colors of the SMPTE color bars, although the Neotech Image Grabber with the Colour Adaptor Module and the RasterOps ColorBoard 364 stood out as most true to the SMPTE standard. As for noise, the RadiusTV and the VideoLogic DVA-4000 were the cleanest, and the RasterOps ColorBoard was the noisiest — but overall the quality of all the digitized images was acceptable.

When you're choosing and using a board, however, remember that we used a sophisticated signal generator to provide each board with a clean test signal of far better quality than that

<table>
<thead>
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<th>Table 1 Criteria</th>
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<tr>
<td><strong>List price</strong> — The list price is the vendor's suggested retail price.</td>
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<tr>
<td><strong>Street price</strong> — The street price is a typical actual price charged by dealers or mail-order companies during April 1991.</td>
</tr>
<tr>
<td><strong>Hardware configuration</strong> — The video products come as single NuBus cards, two NuBus cards, or a NuBus card and an external box.</td>
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<tr>
<td><strong>Cables</strong> — Does the vendor provide cables for hooking up external boxes and video sources such as VCRs, camcorders, or videodisc players?</td>
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<tr>
<td><strong>NTSC-video input</strong> — A list of the types of NTSC connections.</td>
</tr>
<tr>
<td><strong>Live-video window (no. of bits)</strong> — Some of the products show 24-bit true-color video, whereas the most bits the others can show is 16.</td>
</tr>
<tr>
<td><strong>Live-video resolution (pixels)</strong> — Some of the products are unable to show the full 640 x 480 resolution of the NTSC signal.</td>
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<tr>
<td><strong>Mac-display-card support</strong> — The types of Mac display cards supported. The products that also double as display cards can show live video only on their own display.</td>
</tr>
<tr>
<td><strong>Video digitizing (no. of bits; resolution)</strong> — A list of digitizing options in pixel depth and resolution.</td>
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<tr>
<td><strong>File-save formats</strong> — After digitizing, you can save in PICT and other Mac color-image formats.</td>
</tr>
<tr>
<td><strong>Multiple-frame digitizing</strong> — Can the product digitize multiple frames of live video, producing short video animations?</td>
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<tr>
<td><strong>Image effects</strong> — Does the product offer special manipulation effects similar to those in Adobe Photoshop?</td>
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<tr>
<td><strong>Mac-monitor support</strong> — Does the product also act as a display card for the Apple 13-inch RGB monitor?</td>
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<tr>
<td><strong>Mac RGB output (no. of bits; resolution)</strong> — At what bit depths and resolution does the product support the Apple 13-inch RGB monitor?</td>
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<tr>
<td><strong>HyperCard XMCDs</strong> — Does the product offer XMCDs — external hooks that let you control the hardware from HyperCard?</td>
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<tr>
<td><strong>Macromedia Director XOBs</strong> — Does the product offer XOBs — external hooks that let you control the hardware from Macromedia Director?</td>
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<tr>
<td><strong>Other external hooks</strong> — Any other hooks to multimedia applications are listed here.</td>
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<tr>
<td><strong>INITs and codecs</strong> — Any startup software is listed here.</td>
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<tr>
<td><strong>Applications</strong> — Bundled programs range from simple digitizing to full-function scripting applications.</td>
</tr>
<tr>
<td><strong>Plug-ins</strong> — The most convenient way to digitize video is through a plug-in for popular image-manipulation and page-layout programs.</td>
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from any consumer-level video source. The quality of the images you capture with these boards depends greatly on the quality of the VCR, camcorder, or still-video camera you use.

The overall image-quality champ was the Neotech Image Grabber with the Colour Adaptor Module. If your work is limited to high-quality image capture from a still-video camera and you feel confident enough to handle its sophisticated software, this is the card for you. As far as the other two capture cards were concerned, the Computer Friends ColorSnap 32+ provided more-accurate colors than the Mass Microsystems QuickImage 24, and the color fidelity of the QuickImage 24 was the worst of all the products.

The VideoLogic DVA-4000 finished second in overall image quality and tops among full-motion-video cards. The RadiusTV came in third, with the RasterOps card trailing it. The E-Machines QuickView had the poorest image quality of the full-motion-video cards.

If you plan to use one of these cards to play full-motion video in a multimedia program, we recommend that you choose among the DVA-4000, the RadiusTV, and the RasterOps ColorBoard 364, because they can display full-motion video at 30 fps. The E-Machines QuickView has trouble displaying video at the full 30 fps, even though it sends 16-bit video over the NuBus, as does the RadiusTV.

Mightier Than Hardware

Desktop video has been a hot topic in Mac multimedia for the past few years, but only with the release of these products has it become a data source that can be combined with Mac graphics and animation to create a fully integrated single-monitor multimedia presentation. Desktop publishers and image database programmers can create instant full-color images by pointing a video camera and clicking a mouse, thanks to convenient plug-ins for popular image-manipulation applications such as Photoshop.

Although all the products’ hardware performed flawlessly, the paucity of competent software heavily influenced our recommendations (see the “Bottom Line” sidebar). No vendor yet provides complete and powerful software that would make integration of video images into multimedia applications simple and easy. However, the glimpses of such power we saw in some of the products are tantalizing evidence that desktop video is well on its way to joining the next wave of the communications revolution.

Paul Yi is a MacUser associate editor. He would like to acknowledge the invaluable assistance of Pete Nehl in research and testing for this report.

The Bottom Line

Desktop video is rapidly making the transition from hype to reality — although long-playing, full-motion video stored on and played from a hard disk is still over the horizon. However, integrating full-motion video into multimedia presentations from a camcorder, VCR, or videodisc player is becoming increasingly easier and the quality is also improving. In addition, capturing single-frame video images is now an inexpensive and quick alternative to using a color scanner.

For graphics users who want to digitize single frames of video, we recommend the Computer Friends ColorSnap 32+ ($995). Although its image quality may not be the best, it is more than adequate for most uses. What really impressed us was the ColorSnap 32+’s ease of use and powerful and complete software — including image cataloging and plug-ins for Photoshop and QuarkXPress, with more on the way.

For multimedia use, the nod goes to the VideoLogic DVA-4000 ($2,995) — a complete audio/video product for multimedia. The DVA-4000 is the easiest board to integrate into multimedia packages, including HyperCard, Macromind Director, and Authorware Professional. It produces the cleanest video image and the most-accurate colors of all the full-motion boards, but its real power lies in its software. MIC Producer is a great place to start creating your own video presentations, complete with graphics overlays onto live video. The DVA-4000 also has stereo audio that’s controllable through software.

Two very strong hardware video products are the RadiusTV ($2,795) and the RasterOps ColorBoard 364 ($1,295). The RadiusTV represents the future of computer television, with audio capabilities, the ability to read and capture closed-captioned text, and a tuner that can pick up broadcast and cable television. It provides clear and accurate video images but has little software to take advantage of its capabilities. Developers will appreciate its power, but prospective purchasers might have a tough time justifying a $3,000 TV.

The RasterOps ColorBoard 364 is the best buy for hardware features and power. Besides being a digitizing and display board, the ColorBoard 364 is also a 24-bit-display card for the Apple 13-inch monitor — a feature that makes it extremely attractive for new Mac buyers. RasterOps has just introduced a new version of the ColorBoard 364, the 24STV, which should offer even more bang for the buck.

We recommend the Computer Friends ColorSnap 32+ (bottom left) for capture of single frames of video. The VideoLogic DVA-4000 (bottom right) is the clear choice for using full-motion video. Two very strong hardware products with limited software are the RadiusTV (top left) and the RasterOps ColorBoard 364 (top right).
“Truevision NuVista brings you ultimate creativity at a reasonable cost.”

The Post Group uses a Truevision NuVista video card to capture their ideas and shape them into high quality productions. The same power can transform your Mac II into a broadcast-quality video production system.

And now with advanced features like chroma-keying and enhanced video overlay on the Truevision NuVista+ it's easy for you to communicate in ways more exciting than ever before.

For as little as $2,995, the Truevision NuVista+ provides everything you need to convince your audience with a creative, professional product.
## Table 1: Features of Desktop-Video Products

<table>
<thead>
<tr>
<th>Feature</th>
<th>Computer Friends</th>
<th>E-Machines</th>
<th>Mass Microsystems</th>
<th>Neotech Image Grabber/Colour Adaptor Module</th>
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<td>$995</td>
<td>$1,998°</td>
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<td>$1,998°</td>
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<td><strong>Cons</strong></td>
<td>Slow live-video display in a small window.</td>
<td>Expensive. 16-bit live video is slower than 30 fps.</td>
<td>Slow live-video display in a small window.</td>
<td>Only digitizes still video. Live video in gray-scale only.</td>
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<tr>
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<td>NuBus card</td>
<td>NuBus card</td>
<td>NuBus card + external box</td>
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<td>composite, RGB, S-video</td>
<td>composite, S-video</td>
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<td>24-bit, 320 x 240, 640 x 480</td>
<td>8-, 24-bit; 640 x 480</td>
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<td>MacroMind Director XOBJs</td>
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<td>QuickImage</td>
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<td>1 year</td>
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<td><strong>Company</strong></td>
<td>Computer Friends</td>
<td>E-Machines</td>
<td>Mass Microsystems</td>
<td>Advent Computer Products, Inc.</td>
</tr>
<tr>
<td>Portland, OR 97229</td>
<td>9305 S.W. Gemini Dr.</td>
<td>810 W. Maude Ave.</td>
<td>449 Santa Fe Dr., Ste. 213</td>
<td></td>
</tr>
<tr>
<td>(503) 626-2291</td>
<td>(800) 344-7274</td>
<td>Sunnyvale, CA 94086</td>
<td>(619) 942-8456</td>
<td></td>
</tr>
</tbody>
</table>

° The list price is that of the tested version, which included both the Image Grabber ($1,498) and the optional Colour Adaptor Module ($499).
When it comes to 21" color video systems, the new RasterOps® 24XLTV is in a league by itself. Using unsurpassed VLSI and state-of-the-art surface mount technology, we’ve packed an unprecedented combination of features and functionality into a single slot solution.

Consider the stats. Our 21" color video display system adds 24-bit True Color brilliance to any design. And the on-board accelerator does it fast. The video in a window, as well as Mac® to video output, lets you catch all the best plays. And the optional JPEG compression adaptor lets you do all this in less space than you thought possible.

With these kinds of advancements in the art and science of color, there’s no doubt that the new RasterOps 24XLTV is a whole new ball game. But that should come as no surprise. After all, in the field of color video solutions, RasterOps has consistently been batting 1000 season after season.

To find out more and get a free poster size version of this True Color photo, call us today at 1.800.SAY.COLOR, ext. 320.
Table 1: Features of Desktop-Video Products, continued

<table>
<thead>
<tr>
<th>Feature</th>
<th>Radius</th>
<th>RasterOps</th>
<th>Videologic</th>
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<td>Video in</td>
<td>NTSC-video input</td>
<td>composite, RF, RGB</td>
<td>composite, S-video</td>
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<td>24-bit</td>
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<td>Mac-display-card support</td>
<td>Radius GSIC, DirectColor Series, Apple display cards</td>
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<td>8-, 16-bit, resizable</td>
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<td>8-, 24-bit, resizable</td>
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<td>File-save formats</td>
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<td>PICS, PICT, TIFF</td>
<td>PICT</td>
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<td>Multiple-frame digitizing</td>
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<tr>
<td>Mac display</td>
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<tr>
<td>Mac-monitor support</td>
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<td></td>
<td></td>
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<td>Mac RGB output</td>
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<td>8-bit; 640 x 480</td>
</tr>
<tr>
<td>(no. of bits; resolution)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td>HyperCard XMCDs</td>
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<td>FrameGrabber, 364 Video DA</td>
<td>MIC ToolBox, MIC Videosnap, MIC Producer</td>
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<td>Company</td>
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<td>RasterOps</td>
<td>Videologic, Inc.</td>
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<tr>
<td></td>
<td>1710 Fortune Dr. San Jose, CA 95131</td>
<td>2500 Walsh Ave. Santa Clara, CA 95051</td>
<td>245 First St. Cambridge, MA 02142</td>
</tr>
<tr>
<td></td>
<td>(408) 434-1010</td>
<td>(408) 562-4200</td>
<td>(617) 494-0530</td>
</tr>
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</table>

*Optional external hooks are available from Radius, only on request.
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C&C Computers and Communications

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Gigadrives: THE 1,000-MEGABYTE SOLUTION

Parkinson’s law says that work expands to fill the time available for its completion. True — but incomplete: Work also expands to fill the space available for its storage. There’s no such thing as too much room on a hard disk, especially for work that involves graphics or sound. As your files — in ever-greater sizes and numbers — start straining the seams of 150-, 300-, and even 600-megabyte drives, it’s time to contemplate the great leap into the gigabyte zone.

MacUser Labs explores the Land of the Giants! If you’ve outgrown your current hard drive, a compact high-volume solution might be easier — and cheaper — than you think.

BY
H. B. J. CLIFFORD, STEPHEN SATCHELL, AND THE MACUSER LABS STAFF
Partitioning

Disk partitioning has a lot in common with filing your income tax: it’s highly recommended, there’s more than one way to do it, and some ways are more advantageous than others. Of the three disk-partitioning methods in general use today, two are fraught with serious problems. Fortunately, none of these problems is as annoying or long lived as disagreements with the IRS.

Generally, disk partitions fall into two main classes: hard and soft (see Figure A). Hard partitions divide a hard disk into one or more areas (logical volumes) that all look like individual hard drives to the Finder. Each partition is independent of the others; if a crash destroys one partition’s file system, the other partitions on the same disk may well survive intact.

Hard partitions come in two flavors: “old,” as described in Inside Macintosh, Volume IV, or “new,” as described in Inside

---

Hard partitioning

Application

File Manager

Device driver

The application sends a request for a file to the File Manager, which tells the device driver from which partition to retrieve the file.

Soft partitioning

Application

File Manager

Device driver

Soft-partition driver

The application sends a request for a file to the File Manager, which cannot communicate with the device driver without the help of the soft-partition driver.

Figure A: Hard partitions are distinct physical blocks of space on a hard disk. Each hard partition contains a complete and independent Mac HFS. Soft partitions function more like files than distinct partitioned areas; they are accessed through the disk’s main HFS.

---

This month MacUser Labs looks at 19 of the highest-capacity storage devices available for your Mac: gigadrives — hard-disk drives that can hold 1,000 megabytes, or one gigabyte. If you do full-color desktop publishing — in which a single 8.5-x-11-inch 24-bit-color image can fill a 20 megabyte file, a 1,000-megabyte drive will help you pay more attention to your projects and less attention to their management. If you work with enormous databases, a gigadrive will keep you from having to distribute fragments of the master file over several drives. Ditto if you work with laboratory systems that need to capture hundreds of thousands or millions of observations and then make sense of the numbers. Finally, a gigadrive can be a godsend if your office file server is rapidly filling up with information that you absolutely, positively must have available at all times. With prices starting at less than $3,000, a gigadrive can be a surprisingly affordable solution to your storage problems.

Beyond Speed

You shouldn’t choose a gigadrive solely for its speed and formatted capacity. Except for the standout Wren-Runner 2-equipped MicroNet SBT-1288NP, each of our 19 drives worked about as well as any other. And for good reason: Fourteen use the fast Seagate/Imprinus ST4200NM mechanism (more prosaically known as the Wren 7), whereas the remaining four use the only slightly slower Micropolis 1508-15. Performance differences among identically configured drives are caused by their drivers — the software that manages how your Mac reads data from and writes it to the drive.

Although the vendors’ representations of their products’ formatted capacities are somewhat optimistic, the differences between the implied and actual capacities are slight. Most drives weigh in at between 988 and 1,000 megabytes each after formatting. Again the MicroNet SBT-1288NP is an exception, with 1,266 megabytes of usable space. The CMS PD1000S disappointed us by providing only 886 megabytes.

Your buying decision should also be based on the quality of a gigadrive’s bundled software, its compatibility with A/UX and with various Macs, its quality of construction, and the vendor’s service and support promises. Price, of course, is important too — and we found some exceptional values (see Figure 1). Whatever the price, any drive larger than 300 megabytes should come with
partitioning software that helps you subdivide the hard-disk space into manageable chunks that appear on your desktop as separate volumes. All but one of the drives we tested — the Deltaic Server 1G — did, although Relax charges an extra $59 for the privilege. A simple way to evaluate partitioning software is to check its compatibility with A/UX — even if you never plan to use Apple’s version of the UNIX operating system. A/UX-compatible drives use software that follows Apple’s latest recommended method for hard-partitioning disks, as opposed to earlier schemes, which aren’t recommended on drives this big (see the “Partitioning” sidebar).

In addition to good partitioning software, compatibility with the Mac II, IIci, or IIfx or on any Mac that’s running System 6.0.7. We had no problems with any of the drivers included with the gigadrives we tested — if you’re looking at a drive that’s not included in this report, make sure you conduct your own compatibility test.

Also remember that most failures happen in the first two to four weeks of a drive’s life, so you should look for a vendor that offers a money-back guarantee: one with at least a 15-day and preferably a 30-day return period. If the vendor doesn’t offer such a guarantee, check the details of the warranty: it may cover early failures. Either way, the guarantee or warranty should apply to any exchanged or replacement drives as well as to the original unit.

The Careful Buyer’s Checklist

Doing your preshopping homework doesn’t guarantee that you’ll get a good product, but it improves your chances enormously. Before signing the check for your new gigadrive, make sure it has all the following:

A UL or CSA Label. Many companies and government organizations require that equipment installed on their premises carries a UL (Underwriters’ Laboratories) or CSA (Canadian Standards Association) label, which indicates that a product has been tested and meets UL or CSA safety requirements. Some insurers don’t cover damage (by fire or otherwise) caused by unlabeled products. Only the Microtech MicroKCN N1000, Rodine Cobra 1000e, and Storage Dimensions MacinStor 1020-S1 gigadrives had UL or CSA certification at the time of our testing, but all the other manufacturers were in the process of being certified — check if they’ve been approved before you buy.

An ID Tag. The unit should carry a permanent label bearing the vendor’s name and the drive’s model and serial number. Most reputable manufacturers use a metallic label that bears the company’s logo. If the drive doesn’t have such a label, don’t buy it. The

Safe Gigadriving

1. Keep the drive spinning. Perpetually. Unless you’re moving it, never turn it off, not even when you turn off your Mac. That way you’ll never have problems with stickiness, the drive manufacturers’ term for what happens when read/write heads adhere so strongly to the platter surface after the drive is powered down that the drive motor can’t start the platters spinning again.

2. Keep the drive spinning “Hat.” Set it up either perfectly horizontally or perfectly vertically, as determined with a standard carpenter’s bubble level.

3. Isolate the drive from vibration. Install your drive so that it’s safely away from fans, elevators, desks that get bumped and kicked, refrigerators with thumping compressors, and passing motor traffic. Perhaps set it on a slab of marble or granite, the way some audiophiles do with turntables for records.

4. Keep the power clean. At a minimum, plug the drive’s AC power cord in to a surge suppressor strip. If you have a UPS (uninterruptable power supply), use it.

5. Keep your data backed up. Ideally, back up your disk onto tape or optical discs. A gigabyte of data represents a severely nontrivial chunk of work. If doing backups sounds like a nuisance, just consider how long it would take and how much fun it would be to try to reconstruct the files, starting with an empty drive.

6. Use Disinfectant and other virus-prevention tools. Install the INIT, and at the first hint of trouble, “disinfect” the hard disk — and all other volumes that were mounted since the virus arrived.
Good Housekeeping

Whether your hard drive's capacity is big or small, you can't get away from the problem of how to manage your files. For drives with less than 100 megabytes, you're constricted by the space limit — and having less space to work with often forces you to look for a better file-handling system. With bigger drives, files pile up too easily, and the disk can end up looking like Filber McBee's closet.

Like the contents of that infamous closet, much of what collects in big drives is stuff you probably don't really need. To pack it away, the space on a gigadrive's disk is simply one big empty closet bagging to be filled, and as long as users are human, clutter is inevitable. To keep the mess to a minimum, anyone who invests in a gigadrive should be prepared to handle the idea of managing data actively rather than by benign neglect — or worse, by crisis. Active data management starts with partitioning and includes the habit of backup.

Backup? Ugh. What a chore. Why take the time and trouble to make spare copies of all the data on a huge disk drive? Because power does fail. Drives do die. File system do get corrupted. Viruses do creep in. Managing data is like staying healthy: No matter how diligently you take precautions, you may not be able to avoid the occasional flu or wrench an ankle. Best be prepared. Backup may be a chore — and for gigadives it doesn't come cheap — but just imagine trying to rebuild all your files from scratch.

The backup options for gigadives are relatively limited. With list prices on the order of $3,000 to $4,000, Winchester (write-once, read-many) drives are expensive — but not as expensive as erasable optical drives, which list for about $1,000 more. Helical-scan 8mm tape drives are popular, less expensive alternatives, as are the large-capacity (150-megabyte) tape-cartridge drives. Standard tape drives cost hundreds of dollars, whereas one that uses DAT (digital audio tape) can cost as much as $4,000.

Don't even think about the latest removable backup technology — megafloppies. When they finally appear later this year, their maximum capacity will be around 20 megabytes. They may serve as convenient backup media for megabyte drives but not for drives ten times as large. And forget about any kind of standard floppies, unless you want to spend hours feeding disks to your system. Finally, skip Bernoulli, SyQuest, and Iroh cartridges. At 40 to 50 megabytes and about $80 each, they're a very expensive way to back up an entire gigabyte — and that's on top of the cost of the drive itself (several hundred to more than a thousand dollars).

Backing up regularly doesn't mean that you can forget about file housekeeping. Backup programs don't distinguish between clutter and "real" files. If your disk contains a lot of junk, the backup will take longer (maybe a lot longer) than it would if the disk held only your lean-and-mean essentials. But if you try to quickly delete all your junk files before backing up, you may accidentally trash some valuable ones. We recommend that you first do a "long" backup of everything on your disk and then clean off the junk — restoring from the backup any files you've accidentally deleted. Over the long term, this method is both efficient and good for peace of mind. We also recommend that every gigadriver owner have a copy of Norton Utilities, MacTools Deluxe, or any other utility with an Undelete feature that lets you rescue files from the Trash.

Finally, anyone who isn't supremely disciplined and meticulously organized would do well to read Clutter's Last Stand by Don Aslett, published by Writer's Digest Books, Cincinnati, OH 45207 (800) 543-4644 or (513) 984-0717. Aslett's bête noire is physical clutter, but much of what he says can be applied directly to the folders and files on your Mac.

lack of a serial number means iffy warranty service. All the drives we looked at had ID tags or manufacturers that promised they would have them by the time this report went to press.

FCC Declaration. It's illegal for dealers or mail-order firms to sell any computer or external peripheral that doesn't have an FCC declaration. This statement, which tells you that the drive complies with the Federal Communications Commission's technical rules and regulations concerning radio-frequency emissions, usually appears on the drive's ID tag. If the statement is missing, don't buy the drive. All the drives we tested were approved by the FCC — we wouldn't have tested them if they hadn't been.

Easy Hookup

When connecting to the Macintosh, the drives we tested fall into two classes: MicroNet's and everybody else's. Unlike the others, the two MicroNet drives don't hook into the Mac's SCSI port. Instead, each connects to a MicroNet NuPort card — a NuBus SCSI accelerator that can transfer data in bursts more than twice as fast as our Mac IIci test platform's transfer rate.

To connect either of the MicroNet drives, you install the NuPort card in any NuBus slot in your Mac II, IIx, IIcx, Ici, or Ilx — or to the NuBus adapter available for the Ili — and then cable the card to the hard drive. If your system is a Classic, Plus, LC, SE, or SE/30, you're limited to the MicroNet SB-1000NP, which you can connect to the SCSI port of those CPUs via a standard SCSI cable — you lose the advantage of the NuPort card, though. The SB-1000NP's sister product, the SBT-1288NP, requires the use of a NuPort card.

The SBT-1288NP is unique among the systems we tested in that it consists of not one drive mechanism but two 644-megabyte Wren-Runner 2 drives operating together (see the "How It Works: Dual-Mechanism Drive" sidebar). To applications and to the Mac's operating system, the two Wren-Runners look and run like a single drive.

All the non-MicroNet drives we tested came with 25-to-50-pin SCSI-to-Mac adapter cables. If you have other devices — a scanner, a tape drive, or another hard drive — you can use 50-to-50-pin SCSI-to-SCSI cables to add the drive to your SCSI device daisy chain. Setting the SCSI address on most drives is as easy as pushing a button or turning a dial; only the APS 1 Gig, Rodime Cobra 1000e, and Yulm A-Hive Hard Drive force you to contend with DIP switches.

You'll also want to ensure that the signals that travel over the bus stay clean. You do that by making sure that
both ends of the SCSI bus are properly terminated — that is, that the first and last devices on your SCSI chain have external terminators installed, a termination switch or switches set to on, or internal terminators preinstalled. If either or both of the terminators are missing, your Mac may not recognize your drive — or any other device in your SCSI chain.

Most SCSI devices use an external flow-through terminator plug, which fits into the unused SCSI port on the back of the drive. If you need to place your new gigadrive in the middle of your SCSI chain and if your drive is from HDI, La Cie, MacLand, MacTown, Microtech, or Rodime, you’ll have to perform surgery to remove the terminator from inside the drive’s case. For greater ease of use, we prefer drives that use an external terminator.

**Floor Plans**

Your new gigadrive is cabled and connected, and you’re ready to start organizing it to receive your files. Now come the decisions: To partition or not to partition? How many partitions and what size? And at what intersection should you format?

Many drives come preformatted. The APS 1 Gig, MacProducts Magic 1.2 Gig HD, MacTel HD Index Gigabyte, and PLI PL 1.2 Gig even come with public-domain or shareware software preinstalled. But if you want to get the most out of your drive, expect to reformat the hard disk and to set up partitions different from those the vendor created. Only one drive, the MacTown DataStor HMI.2/15M is not only a great buy but it’s also the third-fastest drive we tested.

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**Figure 1: Gigadrive Bargains**

<table>
<thead>
<tr>
<th>Drive Model</th>
<th>Kilobytes per Dollar</th>
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<tbody>
<tr>
<td>MacTown DataStor HMI.2/15M</td>
<td>Better</td>
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</tbody>
</table>

40-megabyte drive  | 100 |
300-megabyte drive | 500 |

Figure 1: Although gigadrives may seem expensive, you get a lot of space for each storage dollar. When compared with smaller drives, a gigadrive can be a real bargain. Because gigadrives can often be found for sale below the manufacturer’s list price, we called dealers around the country to determine actual prices as of March 1991 and used these street prices — along with direct prices charged by mail-order houses — to calculate the number of kilobytes of storage space per dollar compared with that of average-priced 40-megabyte and 300-megabyte drives.
Gigadrives

Figure 2: Recommended Gigadrive Partitions

- A 5K file uses two and a half 2K allocation blocks.
- A 21K file wastes nearly all of one 5K allocation block.

100-megabyte partition
Applications, System Folder

300-megabyte partition
Medium-sized files, 8-bit-color and gray-scale files

600-megabyte partition
Sound, video, and 24-bit-color files

(Allocation blocks are not drawn to scale. Gray areas indicate lost data-storage space.)

Only large files should be stored in a 600-megabyte partition, because of its 9.5K allocation blocks.

Figure 2: The larger the disk partition, the larger the building blocks used for each file — and the more space that goes unused. Correct partitioning of your gigadive can significantly reduce this waste. Three partitions — one each of 100, 300, and 600 megabytes — work well for gigadives used for color images, very large databases, or multimedia applications. Gigadives used as office file or mail servers do well with five 200-megabyte partitions.

Deltaic Server 1G, comes with no partitioning software at all. And only one drive — the MacLand Imprimis 1.2 Gigabyte — comes with software that doesn’t let you create partitions of different sizes.

It’s usually necessary to reformat your hard disk before you create partitions, because the partitioning process changes the way data is stored on the disk. Some disk-management software forces you to wipe the disk completely clean before you change the location of its partitions, whereas others let you do the remodeling without this preparatory step.

Small (20- to 100-megabyte) drives don’t need multiple disk partitions. Larger drives do, because they waste more space per file. For example, a 150-megabyte drive stores files in 2.5K chunks. Unless a file consists of an exact multiple of 2.5K, the last 2.5K chunk of space for that file will be only partly filled. Multiply this partly filled chunk by the total number of files on a disk, and the leftover empty bytes can add up.

The larger the disk — or the larger the disk partition — the larger the allocation block, or smallest chunk of data that can be written to the disk or partition. A gigadive with no partitions stores data in allocation chunks of 16K — meaning that each file contains, on average, 8K of empty space. Partitioning software breaks the uninterrupted expanse of a 1-gigabyte disk into more-manageable chunks. For example, a 600-megabyte partition uses 9.5K allocation blocks, a 300-megabyte partition uses 5K allocation blocks, and a 100-megabyte partition uses allocation blocks of a mere 2K.

Partition your gigadive’s disk with these allocation-block numbers in mind. For example, if you work with color graphics, you might want to set up your disk with three partitions: a boot volume of about 100 megabytes for your System files and applications, a 300-megabyte area for small images, and a 600-megabyte area for large images (see Figure 2). This way you can stockpile your large 24-bit-color images in the big room, ensconce smaller and less colorful pictures in the middle-sized room, and store your administrative files in the closet.

Safety is another good reason for subdividing. If your disk is unpartitioned and something happens to its data structures, you’ll have to restore the contents of the entire disk (see “Surviving the Crash: Hard-Disk Recovery,” April ‘91, Buyer’s Guide page 42). With hard partitions — each of which contains its own data structures — you need to restore only the data in the partition that blew up.

The Fast and the Faster

As mentioned earlier, all but one of the drives in our test group were built around either the Micropolis 1598-15 drive mechanism or the Seagate/Imprimis Wren 7 drive mechanism. So we weren’t surprised when they all performed admirably. But perhaps more central importance than the drives’ nearly identical performance is that today’s Macs can’t begin to keep up with the raw data-transfer rates of gigadives.
Both the Wren 7 and the Micropolis 1598-15 drive mechanisms can read and write data at a sustained rate of 2.3 megabytes per second. The Wren-Runner 2 mechanism in the MicroNet SBT-1288NP can zip along at a fast 3 megabytes per second. However, not even the Macs with the fastest SCSI ports — the IIfx and the IIci, rated at about 2 megabytes per second — can match a gigadrive’s best performance. And most members of the Mac II family — including the flagship Mac IIIfx — poop out at about 1.5 megabytes per second. A gigadrive without a MicroNet NuPort SCSI card is like a Ferrari stuck in a school zone. What’s more, simply moving data is easier than processing it; even an efficiently written application running on a Mac IIIfx — the Mac with the fastest microprocessor — has trouble handling more than 600K’s worth of data per second.

To give each gigadrive its best opportunity to prove itself, we used the Mac SCSI chimp — the IIci — for our testing. We began with MacUser Labs’ tried-and-true hard-drive benchmark test, DiskBasher, which we’ve found to be an excellent predictor of real-world performance (DiskBasher is available free on Zmac). We first observed that the four drives with the Micropolis mechanism — the CMS PD1000S, Deltaic Server 1G, HDI PowerDrive 1050EMC, and Tulin A-Hive Hard Drive — ran slightly slower than the drives that have the Wren 7 mechanism (see Figure 3). A major reason is that the Wren 7’s 256K cache is four times as large as that of the Micropolis mechanism. Among the four Micropolises, the three slower ones — from CMS, HDI, and Tulin — did not have the most recent ROMs. The performance of the Deltaic Server 1G — with new ROMs — was almost
equal to that of the top Seagate/Imprimis Wren 7 drives. The superfast 6-millisecond access time of the MicroNet SBT-1288NP enabled it to score well above the pack.

Our next test, using Adobe Photoshop, put stress on each gigadrive by making it perform many small contiguous reads and writes — much as does the virtual-memory scheme built into System 7.0 — an excellent test of the strength of the drives' mechanism and ROM. The PLI PL 1.2 Gig and Rodime Cobra 1000e drives, for example, which both contain an earlier

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**Figure 3: Gigadrive Performance**

<table>
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<tr>
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<th>Worse</th>
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**Real-World Performance**

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**Performance factor**

Overall Speed:
We determined overall speed by combining the test results of each drive in each of three sets of tests. Real-world-performance results contribute 50 percent of the final rating; the other two tests contribute 25 percent each. These results and those for the individual tests are shown as a percentage of the speed achieved by the all-around champ, the MicroNet SBT-1288NP.

Real-World Performance:
The MacUser Labs DiskBasher benchmark writes and reads 10 megabytes of medium-sized files, giving an accurate simulation of real-world performance. All the drives performed almost equally well,
version of Wren 7 ROM, were noticeably — although not significantly — slower than the other Wren 7-based drives. Again the SBT-1288NP’s access speed put it on top.

We then used the popular shareware benchmark test SCSI Evaluator (also available on Zmac) to see how quickly each gigadrive could send files of various sizes through the fast SCSI port of our IICi test Mac. SCSI Evaluator reported data-transfer rates of 1.5 to 2.5 megabytes per second.

SCSI Evaluator tests show not only drive performance but also software.

**Photoshop**

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

- MicroNet SBT-1288NP
- MicroNet SB-1000NP
- MacTown DataStor HM1.2/15M
- MacProducts Magic 1.2 Gig HD
- La Cie 1000MB ZFP Plus
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- PL1 PL 1.2 Gig
- Relax Hard Plus 1.0 Gig
- Microtech MicroKCN N1000
- Deltaic Server 1G
- CMS PD1000S
- Tulin A-Hive Hard Drive
- HDI PowerDrive 1050EMC

**Performance factor**

- except for the MicroNet SBT-1288NP, which was more than 20 percent faster than its nearest competitor. Individual DiskBasher results are listed in Table 2.

**Photoshop**

To test an application commonly used by purchasers of gigadrives, as well as the type of quick sequential seeks characteristic of the virtual-memory feature of System 7.0, we timed how fast Adobe Photoshop could rotate a 30-megabyte color image by 90 degrees.

**Throughput**

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</table>

- The superior driver software of the MacTown DataStor HM1.2/15M speeds it past the other Wren 7-based drives.

**Performance factor**

- Their small disk caches hurt these Micropolis-based drives.

- The Micropolis-based drives’ slower performance shows the drawbacks of their small caches.

**Throughput**

We used the popular shareware benchmark utility SCSI Evaluator to determine the read, write, and seek performance of all the drives when unencumbered by a specific application. Again, the MicroNet SBT-1288NP led the pack in cumulative performance, and the MacTown DataStor HM1.2/15M showed surprising speed as the runner-up.
Gigadrives

How It Works: Dual-Mechanism Drive

To speed up hard drives, designers use many tricks, such as packing more bits onto each track or revving up the platters to 4,400 or 5,400 rpm. One scheme — used by MicroNet in its superfast SBT-1288NP and its new Raven-series drives — is to distribute the data in parallel across two drive mechanisms and access those drives simultaneously. This method works best when your application reads and writes a lot of data — 512K to 1 megabyte — each time it accesses the drive.

Driver software separates the data into two streams, one track (about 54K) at a time. One stream contains data for even-numbered tracks and is written to one mechanism; the odd-numbered tracks are written to the other mechanism. When the Mac reads the data back, the software asks both drives for the requested data at the same time and reassembles the data in its original form from the two data streams.

MicroNet NuPort SCSI accelerator card
Provides a high-speed communications path, using the new SCSI-2 scheme.

High-speed NCR 53C90A SCSI controller chip

SCSI-2-to-SCSI-1 cable

Connecting ribbon cable

Seagate/Imprimis Wren-Runner 2 mechanisms
(8 platters each)

Single power supply

performance — that is, the quality of each drive's driver software and how well it interacts with the Finder. That performance may have changed since we ran these tests, however: Driver software is easier to modify than ROM, and at press time, several vendors told us they'd be introducing updated versions of their driver software over the next several months.

The hands-down winner in all tests was the $9,990 MicroNet SBT-1288NP. The SBT-1288NP contains two superperformance Seagate Wren-Runner 2 drives that spin at 5,400 rpm — 1.5 times as fast as the rate of the Seagate or Micropolis drives used in the rest of the products. A faster spin rate not only cuts down on the time the drive's read/write heads must wait until the data it's looking for passes underneath but it also means that the data can be transferred faster, because it passes under the heads more quickly. The SBT-1288NP's driver divides data into two streams — one for each drive — again increasing the data throughput. To keep the Mac's SCSI port from slowing things down, MicroNet includes a NuPort SCSI accelerator card.

Despite this technological edge, however, the SBT-1288NP had only a 5-to-10-percent advantage over the average Wren 7 drive on the throughput tests — whether that's enough to justify its premium price is up to you and your accountant. In the DiskBasher and Photoshop tests, the other hand, the SBT-1288NP was a full 25 and 15 percent faster, respectively, than the nearest non-NuPort drive. If that extra performance is worth an additional $5,000 to $7,000, go for it.

High-End Service

Each vendor offers at least a one-year warranty on parts and labor: If your gigadrive fails, the company will
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We design quality into each one of our products and services. Then we set the MacAvenue street price so you get the best deal. And since our price always includes MacAvenue’s support services and warranty, you not only get the best price, you get the best value.

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2. Toll-Free Technical Support
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3. Extended Limited Warranty
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Outbound Laptop System w/ 512KE ROMs, 1MB RAM and Floppy Drive ............. $2207 $2699

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NuVotink SC ......................... $22535 $339
Shiva
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Global Village
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Cutting Edge Syquest Removable Cartridge Disk Drive ..................... $24401 $597

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Customer Service Is Our Most Important Product

SOUND INTERFACES

<table>
<thead>
<tr>
<th>Product</th>
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<tr>
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<td>Typtester v1.5</td>
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WRITING AND PUBLISHING

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<td>DigiTime</td>
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<tr>
<td>10MB disk</td>
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The Asante MacCon+ EtherNet boards are among the fastest EtherNet boards on the market. The MacCon+ gives you the highest return on your network investment through full compatibility with AppleShare, Netware, Net and TOPS. Support 32-bit data transfers at speeds up to 10MB/sec.

BONUS SOFTWARE

<table>
<thead>
<tr>
<th>Product</th>
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<td>$145</td>
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<tr>
<td>Write &amp; Sense v5.0</td>
<td>$145</td>
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</table>

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4 x 4MB SIMM Kit, 80ns     | $509.60 |
1MB module for Mac Classic | $254.93 |
3MB module for Mac Classic | $254.93 |

BUSINESS SOFTWARE

<table>
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<tr>
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<td>Microsoft Excel v3.0</td>
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COMUNICATIONS

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<td>I.B.S.</td>
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<td>DataClub v1.1</td>
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<td>Insigina Solutions</td>
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<td>Soft PC AT-EGA Add-on Module</td>
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<td>800-395-6221</td>
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</table>
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SimCity v1.2 .................................. 28678 $29
SimEarth .................................. 28764 $45
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Where in the World is Carmen Sandiego? .......... 26672 $29
Where in Time is Carmen Sandiego? .............. 28774 $29
Centron

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Casino Master Deluxe ......................... 28760 $38
Davidson & Assoc.

Math Blaster Mystery ......................... 27970 $29
Electronic Arts

Earl Weaver Baseball .................. 28768 $32
Pipe Dreams .................. 28740 $17
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Tesseract .................. 27936 $30

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Photoshop v1.0 .................................. 29266 $543
Aldus

Persuasion v2.0 .................................. 29782 $327
Broderbund Software

Print Shop v1.0 .................................. 29836 $35
Claris

Claris HyperCard v2.0 Development Kit ........ 30578 $145
Claris MacDraw II v1.1 ......................... 29294 $289
Claris MacDraw Pro v1.0 ......................... 29205 $289

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Generic Software

Generic CADD .................................. 29280 $99
Innovative Data Design

MacDraft v2.1 .................................. 29241 $278
Paracomp

Swept 3D Professional v1.0 .............. 29294 $437
Symantec

Symantec AntiVirus v2.0 .............. 30349 $546
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FilmMaker (Paracomp) .............. 29900 $49

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GDT

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PrintLink Collection (Serial) v3.0 .............. 30448
Ibis Software

Protector Shark .......................... 30538
Insight Development

MacPrint v1.2 .......................... 30428
Microcom

Verse .......................... 30413
Now Software

Now Utilities v2.0 ...................... 30498
Selenium

Disk Doubler v3.0 ...................... 30544
Symantec

Symantec AntiVirus v2.0 .............. 30349
SAM v3.0 .......................... 30343

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replace it with a new one. Eleven of the eight vendors offer 48-hour turnaround for replacement, and four offer 72 hours. Optima stands alone at 24 hours. Only HDI and PL1 don’t guarantee their turnaround time.

MacLand has the most comprehensive customer-satisfaction package, with a two-year warranty, 30-day money-back guarantee, and 48-hour turnaround. Microtech seems most confident about its quality control, as it offers the only five-year warranty; we would feel a bit more comfortable if it also offered a money-back guarantee. But to be fair, most gigadrives either work right away or not at all. A drive that does work right away is likely to go on working flawlessly.

Eleven of our vendors say they offer data-recovery services. That is, they try to transfer data from a dead drive to a new live one. At press time, several vendors were researching whether data-recovery services were a reasonable thing to offer.

### Big Is Beautiful

Gigadrives are no longer exotic, pricey luxuries for the data-rich. For many users, they’re rapidly becoming necessities—especially for those who work with video, audio, or high-end graphics or need to analyze very large masses of data. The mechanisms at the heart of these drives have been around long enough to reach a stable state in terms of both price and performance, and their performance challenges today’s Mac systems.

The size of these drives forces you to pay attention to how your files are organized, but that’s no bad thing. Neatness—including regular backups—not only counts but it’s also more efficient than haphazard disk stuffing. And if the disk-partitioning software that comes with the drive you select doesn’t let you arrange file-storage areas just as you’d like, third-party partitioning software is easy to find.

Except for those of the pricey MicroNet SBT-1288NP, the technical specs are almost identical across the entire range of gigadrives, although the Seagate/Imprimis-technology drives are slightly faster than the Micropolis drives. For the present, though, the difference is moot; today’s Macs just don’t have the horsepower to take advantage of all the performance any gigadrive may offer.

Once bought and installed, these drives are hard to tell apart. They’re all fast, with relatively few differences among them. However, our job at MacUser Labs is to find those few differences, recognize the important ones, and help you decide which gigadrive will solve your individual colossal-storage problems (see the “Bottom Line” sidebar).

---

**Table 1: Service and Support**

<table>
<thead>
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<th>Vendor</th>
<th>Warranty</th>
<th>Extended Warranty</th>
<th>Money-back Guarantee</th>
<th>Service Turnaround</th>
<th>Data Recovery Service</th>
<th>Toll-free Tech Support</th>
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<tbody>
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<td>APS 1 Gig</td>
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<td>48 hours</td>
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<tr>
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<td>30 days</td>
<td>direct</td>
<td>48 hours</td>
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<tr>
<td>Dellac Server 1G</td>
<td>1 year</td>
<td>$300</td>
<td>15 days</td>
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<td>72 hours</td>
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<td>FW3 Hammer 1000</td>
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<td>$384</td>
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<td>none</td>
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<td>La Cie 1000MB ZPP Plus</td>
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<tr>
<td>MacLand Imprimis 1.2 Gigabyte</td>
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<td>MacProducts Magic 1.2 Gig HD</td>
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<td>MacTown DataStor HM1215M</td>
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<td>30 days</td>
<td>direct</td>
<td>48 hours</td>
<td>48 hours</td>
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</table>

*For $250, CMS provides a 24-hour-turnaround guarantee.*
**The Bottom Line**

Gigadrives — hard drives that provide 1,000 megabytes of storage — are a godsend to desktop publishers, artists, multimedia developers, desktop-video and -audio producers, and users who must keep mountains of data on-line and available for analysis. Prices are surprisingly reasonable — especially on a dollar-per-megabyte basis — and the performance of all the gigadrives we tested was almost uniformly excellent. Although the Seagate-based drives proved slightly faster than their Micropolis-based counterparts, at the moment that difference is negligible.

The **MacTown DataStor HM1.2-15M** ($2,699) drive is the street-price leader and ties for lowest list price. Although it has only a one-year warranty, it has a 30-day money-back guarantee to get it through that first crucial month of day-to-day use and abuse. Despite its bargain price, it ranked near the top in all our performance tests.

Tied with the DataStor HM1.2-15M for our top pick is the **MicroNet SB-1000NP** ($5,995). Maccs will get faster over the next few years, and farsighted buyers should consider this speedy gigadrive. It has the same NuPort NuBus SCSI accelerator as the high-speed, high-priced **MicroNet SBT-1288NP** ($9,990) — which was, by far, the fastest drive we tested. The SB-1000NP has a formatted capacity of 987 megabytes, A/UX-compatible partitioning (with an Auto button that automatically creates six equal-sized Mac partitions on the drive), and a temperature-controlled fan to reduce operating noise.

If you’re running A/UX, we recommend that you take a close look at the **Mcland Imprimls 1.2 Gigabyte** ($2,899) — despite its misleading name (its formatted capacity is only 988 megabytes). The Imprimls 1.2 Gigabyte has A/UX-compatible hard partitioning and is the only drive we tested that comes with a formatter that runs under A/UX. Its two-year warranty is complemented by a 30-day money-back guarantee and 48-hour turnaround.

AppleShare users should put the **Storage Dimensions MacInStor 1020-S1** ($6,799) on their shortlist. In addition to a formatted capacity of 999 megabytes, a two-year warranty, an excellent manual, and guaranteed 48-hour replacement, the company offers software to ensure that all partitions mount properly under AppleShare.

---

**Table 2 Criteria**

| List price — The list price is the vendor’s suggested retail price. |
| Street price — The street price is a typical actual price charged by dealers or mail-order companies during March 1991. |
| Actual capacity — The actual capacity of the unpartitioned hard-disk drive. |
| Average seek time — The theoretical average time required to move the read/write heads between all possible combinations of two cylinders (sets of tracks) on the disk. Lower numbers indicate better performance. |
| Average access time — The theoretical average time required to read a block of data from or write it to the drive. Lower numbers indicate better performance. |
| DiskBasher score — The amount of time, in seconds, that MacUser’s DiskBasher benchmark application required to complete its series of disk operations. Lower numbers indicate better performance. |
| Mechanism — The manufacturer and model number of the mechanism used in the drive. Check with the drive vendor to see if the mechanism used varies. |
| SC5-I-D selector — The method used to set the SCSI ID for the drive. |
| SCSI termination — Whether the SCSI-bus terminator is inside the case or outside. |
| SCSI cable — The length and type of the SCSI cable supplied with the drive. |
| SCSI driver — The software that manages the SCSI hard drive. |
| System version supplied — The Mac System version provided. |
| Bundled — Commercial applications, utilities, shareware, or public-domain programs included with the drive, and software developed exclusively for the vendor’s drives. |
| User-selectable interleave — Can you force an interleave value during formatting instead of making do with a default or formatter-derived value? |
| IM-V partitioning — Is software provided for dividing the gigadrive into smaller units in the manner prescribed by Apple in Inside Macintosh, Volume IV? |
| Password protection — Does the drive software provide a password for disabling access by others? |
| Data encryption — Can the drive software scramble the data so that others cannot access it, even with special tools? |
| Disk optimizer — Does the drive come with utility software for reorganizing your disk so that all files are in one piece instead of scattered (fragmented) all over your disk? |
| Backup — Does the drive come with utility software that copies hard-disk data to floppy disks or other media for safekeeping? |
| File recovery — Does the drive come with a utility that rescues deleted files or extracts files from a damaged disk? |
## Table 2: Features of Gigadrives

<table>
<thead>
<tr>
<th>Company</th>
<th>APS 2990 S. 291 Hwy. Independence, MO 64057 (800) 233-7550 (816) 478-8300</th>
<th>CMS Enhancements, Inc. Apple Products Division 2722 Michelle Dr. Irvine, CA 92715 (714) 222-6000</th>
<th>Delta Systems 1401 Junction Ct., #3028 San Jose, CA 95122 (888) 745-1240 (408) 441-1240</th>
<th>FWB, Inc. 2040 Polk St., Ste. 215 San Francisco, CA 94109 (415) 474-8055</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>$2,999</td>
<td>$7,199</td>
<td>$3,199</td>
<td>$7,295</td>
</tr>
<tr>
<td>Street price</td>
<td>$2,999</td>
<td>$4,900</td>
<td>$3,199</td>
<td>$5,795</td>
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<tr>
<td>Cons</td>
<td>DIP-switch SCSI ID.</td>
<td>Low formatted capacity.</td>
<td>Lack of partitioning software.</td>
<td>outdated partitioning software.</td>
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<tr>
<td>Specifications</td>
<td>Actual capacity</td>
<td>968 MB</td>
<td>885 MB</td>
<td>990 MB</td>
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<tr>
<td></td>
<td>Average seek time</td>
<td>15 ms</td>
<td>15 ms</td>
<td>15 ms</td>
</tr>
<tr>
<td></td>
<td>Average access time</td>
<td>23 ms</td>
<td>24 ms</td>
<td>24 ms</td>
</tr>
<tr>
<td></td>
<td>DiskBuster score</td>
<td>16.30 sec</td>
<td>17.10 sec</td>
<td>15.83 sec</td>
</tr>
<tr>
<td></td>
<td>18.45 sec</td>
<td>20.45 sec</td>
<td>23.85 sec</td>
<td>15.45 sec</td>
</tr>
<tr>
<td>Technology</td>
<td>Mechanism</td>
<td>Seagate ST41200NM</td>
<td>Micropolis 1598-15</td>
<td>Seagate ST41200NM</td>
</tr>
<tr>
<td></td>
<td>SCSI-ID selector</td>
<td>DIP switch</td>
<td>button</td>
<td>button</td>
</tr>
<tr>
<td></td>
<td>SCSI-termination</td>
<td>external plug</td>
<td>external plug</td>
<td>external plug</td>
</tr>
<tr>
<td></td>
<td>SCSI cable (length, type)</td>
<td>30-inch, 25/50-pin</td>
<td>36-inch, 25/50-pin</td>
<td>24-inch, 25/50-pin</td>
</tr>
<tr>
<td></td>
<td>Software</td>
<td>Alliance Power Tools 1.13</td>
<td>CMS Utility 6.0.1</td>
<td>Delta Systems 2.01</td>
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<tr>
<td></td>
<td>System version supplied</td>
<td>6.0.7</td>
<td>6.0.7</td>
<td>6.0.1</td>
</tr>
<tr>
<td></td>
<td>Bundled</td>
<td>18 MB of shareware</td>
<td>Symantec Utilities</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>User-selectable interface</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>IM-V partitioning</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Password protection</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Data encryption</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Disk optimizer</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Backup</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>File recovery</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Case</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>indicator lights</td>
<td>access, power</td>
<td>access, power</td>
<td>access, power</td>
</tr>
<tr>
<td></td>
<td>Size (L x W x H, in.)</td>
<td>7 x 8 x 12</td>
<td>11.25 x 10 x 4.75</td>
<td>5.0 x 9.75 x 6.75</td>
</tr>
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<td></td>
<td>Weight</td>
<td>18 lb</td>
<td>7.6 lb</td>
<td>11 lb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11.5 lb</td>
<td>36 x 9.5 x 4.5</td>
<td>11.5 lb</td>
</tr>
</tbody>
</table>
This is your hard disk severely fragmented

This is how a typical fragmented hard disk looks. The abuse of fragmentation can deal a serious blow to performance. It's causing a national epidemic in offices everywhere. But the more you use your computer, the more your files are spread all over your hard disk. As a result, your disk has to work a whole lot harder than it has to. And increased head movement not only slows down your file access times, it will slow you down, too.

This is your hard disk defragmented

Even defragmentation software can't help much. Wimpy defraggers just place pieces of individual files adjacent to each other. Defraggers just don't have the intelligence to constantly monitor your file usage. So, any increases in performance are modest and only temporary, disappearing as soon as you use your computer again.

This is your hard disk with DiskExpress II

Only DiskExpress II has revolutionary Disk Optimatic™ technology designed to safely keep your disk optimized forever. And only DiskExpress II has the intelligence to work transparently while you work, the way you work. Which means only DiskExpress II can monitor your daily file activity and determine the absolute optimum priority for file placement on your particular computer. Frequently used files are placed first, then free space and then seldom used files are placed at the back of your disk where they belong. That not only minimizes head movement, it delivers the kind of mind-boggling increase in speed and performance you could get hooked on and be better off for it. To order your new DiskExpress II 2.07, call ALSoft today.

Any Questions?

DiskExpress II
Disk Optimizing
$89.95

MultiDisk
Disk Partitioning
$89.95

MasterJuggler
Resource Optimizer
$89.95

Please circle 75 on reader service card.
# Gigadrives

## Table 2: Features of Gigadrives, continued

<table>
<thead>
<tr>
<th>Feature</th>
<th>HDI PowerDrive 1050E 9G</th>
<th>La Cie 1000M9 ZFP Plus 9G</th>
<th>MacLand Imprimis 1.2 Gigabyte 9G</th>
<th>MacProducts Magic 1.2 Gig HD 9G</th>
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<tbody>
<tr>
<td>Price</td>
<td>$2,699</td>
<td>$4,549</td>
<td>$2,899</td>
<td>$2,795</td>
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<td>$4,000</td>
<td>$2,899</td>
<td>$2,795</td>
</tr>
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<td>Pros</td>
<td>Price leader</td>
<td>Data-encryption and</td>
<td>Inexpensive. Two-year warranty,</td>
<td>Inexpensive.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-recovery software,</td>
<td>30-day guarantee.</td>
<td></td>
</tr>
<tr>
<td>Cons</td>
<td>Internally terminated.</td>
<td>Internally terminated.</td>
<td>Internally terminated. 22-hour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Slowest drive.</td>
<td>Outed partitioning</td>
<td>repair turnaround.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>software.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spec.</td>
<td>Actual capacity</td>
<td>960 MB</td>
<td>988 MB</td>
<td>988 MB</td>
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<td></td>
<td>Average seek time</td>
<td>15 ms</td>
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<td>15 ms</td>
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<td></td>
<td>Average access time</td>
<td>24 ms</td>
<td>23 ms</td>
<td>23 ms</td>
</tr>
<tr>
<td></td>
<td>DiskSeek score</td>
<td>17.82 sec</td>
<td>15.35 sec</td>
<td>16.06 sec</td>
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<td>Technology</td>
<td>Micropolis 1593-15</td>
<td>Seagate ST41200NM</td>
<td>Seagate ST41200NM</td>
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<td></td>
<td>Mechanism</td>
<td></td>
<td>button</td>
<td>button</td>
</tr>
<tr>
<td></td>
<td>SCSI ID selector</td>
<td>internal</td>
<td>button</td>
<td>button, software</td>
</tr>
<tr>
<td></td>
<td>SCSI termination</td>
<td>internal</td>
<td>external plug</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SCSI cable (length, type)</td>
<td>24-inch, 25/50-pin</td>
<td>12-inch, 25/50-pin</td>
<td>36-inch, 25/50-pin</td>
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<tr>
<td>Software</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>SCSI driver</td>
<td>Disk Manager Mac 2.23</td>
<td>Silverlining 5.27</td>
<td>Format Two 3.27</td>
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<tr>
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<td>System version supplied</td>
<td>6.05</td>
<td>6.0.5</td>
<td>6.0.5</td>
</tr>
<tr>
<td></td>
<td>Bundled</td>
<td>none</td>
<td>Norton Utilities (except optimizer)</td>
<td>A/DUX formatter</td>
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<tr>
<td></td>
<td>User-selectable interleave</td>
<td></td>
<td></td>
<td>10 MB of swapware</td>
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<td></td>
<td>IM-V partitioning</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td></td>
<td>Password protection</td>
<td>●</td>
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<td>Data encryption</td>
<td>○</td>
<td>●</td>
<td>○</td>
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<td></td>
<td>Disk optimizer</td>
<td>○</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Backup</td>
<td>○</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>File recovery</td>
<td>○</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Case</td>
<td>Indicator lights</td>
<td>access, power</td>
<td>access, power</td>
<td>access, power</td>
</tr>
<tr>
<td></td>
<td>Size (L x W x H, in.)</td>
<td>9.75 x 9.75 x 4.25</td>
<td>9.75 x 9.75 x 4.75</td>
<td>10 x 9.5 x 3.75</td>
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<td>12 lb</td>
<td>11.5 lb</td>
<td>11.3 lb</td>
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<td>Company</td>
<td>Hard Drives International</td>
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<tr>
<td></td>
<td>La Cie Ltd.</td>
<td>A Plus Development Co.</td>
<td>MacLand</td>
<td>MacProducts USA</td>
</tr>
<tr>
<td></td>
<td>Tempe, AZ 85281</td>
<td>19552 S.W. 90th Ct</td>
<td>4685 S. Ash Ave., Ste. H-5</td>
<td>8303 Mopac, Ste. 216</td>
</tr>
<tr>
<td></td>
<td>(602) 350-1128</td>
<td>Tempe, AZ 85282</td>
<td>Tempe, AZ 85282</td>
<td>Austin, TX 78759</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(800) 999-0143</td>
<td>(800) 853-3933</td>
<td>(800) 622-3475</td>
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<tr>
<td></td>
<td></td>
<td>(503) 891-0771</td>
<td>(602) 820-5502</td>
<td>(512) 243-9411</td>
</tr>
</tbody>
</table>
Complete Ready-to-Run Macintosh Systems

Macintosh IICi Power System
- Macintosh IICi w/built-in Video Card, Apple SuperDrive, 5 Mbs of RAM
- Microtech Nova 105 Mb Internal Hard Drive w/5 Year Warranty
- Magnavox 14" Color RGB Monitor
- MacPro Plus Keyboard w/Tempo II
- Freeware Anti-virus Software
- Adobe Type Manager Software
- Norton Utilities, Total Recall, World Map Plus! Demos of Excel & 4th Dimension
- 6 Outlet Surge Protector
- Mouse Pad
- Fuji High Density 3.5" Diskettes (10)
- Diskette Storage Case
Ask for Package #9107
CDA $5,299 or $125.99/month**
*Based on 60 month FMV lease

Macintosh LC 40Mb System
- Macintosh LC w/Apple 40Mb HD, Apple SuperDrive, 2 Mbs of RAM, Microphone, Keyboard and Mouse
- Apple 12" Color Monitor
- Free! Personal Training Tutorial
- Adobe Type Manager
- Fuji High Density Diskettes (Box of 10)
- Diskette Storage Case
Ask for Package #9152
CDA $2,569 or $67.26/month**

Macintosh IIsi 40Mb System
- Mac IIsi w/Apple 40 Mb HD, SuperDrive, 3 Mbs RAM, Microphone
- MacPro Plus Keyboard w/Tempo II
- Magnavox 14" Color RGB Monitor
- Free! Personal Training Tutorial
- Adobe Type Manager
- Norton Utilities, Total Recall, World Map Plus! Demos of Excel & 4th Dimension
- 6 Outlet Surge Protector
- Mouse Pad
- Fuji High Density Diskettes (Box of 10)
- Diskette Storage Case
Ask for Package #9114
CDA $3,699 or $87.75/month**

Memory Upgrades
2 - 1 Megabyte Simms (80 ns) ............. $130
4 - 1 Megabyte Simms (80 ns) .......... $258
4 - 4 Megabyte Simms (680ns) ............ $999
1 Megabyte Upgrade (Mac Classic) ......... $89
3 Megabyte Upgrade (Mac Classic) ......... $169
GDA Tool Kit ........................................ $17

DataLink LC by Applied Engineering
The DataLink LC is a Hayes-compatible internal 2400 bps modem w/send fax. Designed exclusively for the Mac LC, it saves desktop space without occupying one of the LC's two serial ports. ........... $239

CDA Systems Now Include Free Training
CDA now includes a free Learning Tutorial by Personal Training Systems ($79 value) with any Mac Classic, LC or IIsi system. You can choose The Basics if you are a first time Mac user, or Beyond the Basics if you have previous Mac experience. Both interactive tutorials will talk you through your learning process step by step.

Macintosh Classic 40Mb System
- Macintosh Classic w/Apple SuperDrive, Keyboard, Mouse, & 4 Mbs of RAM
- Apple 40 Mb Internal Hard Drive
- Free! Personal Training Tutorial
- Adobe Type Manager
- 6 Outlet Surge Protector
- Fuji High Density Diskettes (Box of 10)
- Diskette Storage Case
- Mouse Pad
Ask for Package #9106
CDA $1,599 or $45.30/month**
Macintosh Classic system above with:
100 Mb Hard Drive .............. $1,799

CDA's Mac Catalog!
Call or write for your free copy of CDA's latest Mac Catalog featuring complete systems, and a large selection of Mac hardware, software, and accessories.

Name ____________________________
Address __________________________
City __________________ State ______ Zip________

Write to: CDA Plaza, Route 513
P.O. Box 533 Califon, NJ 07830 #36-06

CDA Computer Sales
NJ/Outside US 908-832-9004

US/Canada 800-926-5313

The Magic of Mac, The Power of People
Asante FriendlyNET LC ....................... $269
Farallon PhoneNET StarController 300 ......... $825
Farallon PhoneNET StarController 3000 ........ $982
Farallon PhoneNET StarController EN .......... $1599
Farallon PhoneNET Controler (DIN-8) ........ $315
Dayna EtherPrint .................................. $299
Dayna EtherPrint/EO/30, E/E, or EUI .......... $289
Dayna Dos Mounter 2.0 ............................ $119
Dayna Talk PC ....................................... $219
Dayna Talk Micro Channel ......................... $298

New! MacPro Plus

No matter which Mac you use, old or new, the MacPro Plus keyboard gives you the ability to get to work faster and easier. The 105-key layout is similar to the Apple Extended keyboard, but with more features. Also included is a free offer for Tempo II Software ($149.95 value) ......$139

Printers

New! Apple StyleWriter Printer ..................... $499
Apple ImageWriter II w/cable ...................... $459
Apple Personal LaserWriter LS .................... $1099
Apple Personal LaserWriter NT .................... $1099
Apple LaserWriter IINT .......................... $3099
Apple LaserWriter IINTX ......................... $3879
CosStar LabelWriter ............................... $179
HP DeskWriter w/cable ............................ $759
Kodak Dimage MX + w/ATM & cable .......... $499
LaserMax 400 9400 Only) ......................... $179
Microtek Truemage Laser Printer ............... $2149
NEC SilentWriter 2 Model 90 w/cable ....... $1799
TI microLaser Ps 35 w/AppleTalk ............... $1799
QMS PS-810 w/cable & toner ..................... $299
QMS PS-810 w/cable & toner ..................... $2199

Outbound Portable Laptop

Outbound w/o ROM, 40Mb HD, 2Mbs RAM (use your Plus, SE, or Classic's ROM) .......... Call
Outbound/Classic Bundle w/40Mb HD, 2Mbs RAM, and the Macintosh Classic CPU .... Call

Mac Portable

Mac Portable w/2 Mb & 40Mb HD ................ $3399
1 Mb Upgrade ....................................... $249
2 Mb Upgrade ....................................... $689
3 Mb Upgrade ....................................... $899
Farallon Portable Pack - Includes: Timbuktu/Remote and Timbuktu screen-sharing & file transfer software, PhoneNET StarConnector device for connecting to an ApplcTalk network, tools & wiring accessories. .......... $309

Connectivity

Asante FriendlyNET LC .......................... $269
Farallon PhoneNET StarController 300 ........ $825
Farallon PhoneNET StarController EN .......... $1599
Farallon PhoneNET Connecter (DIN-8) ........ $315
Farallon PhoneNET Repeater ....................... $315
Farallon Timbuktu 3.1 ................................... $95
Farallon Timbuktu Remote 2.0 ....................... $125
Dayna EtherPrint .................................. $299
Dayna EtherPrint/EO/30, E/E, or EUI .......... $289
Dayna Dos Mounter 2.0 ............................ $52
Dayna Talk PC ....................................... $219
Dayna Talk Micro Channel ......................... $298

DoveFax Mods

The DoveFax and the DoveFax+ Mods combine a 9600 baud fax modem and a 2400 baud Hayes compatible data modem into one compact unit. Both include software features such as full background operation when sending or receiving, automatic answer, redial, prescheduled transmission, customized cover sheets & more!

What's more, the new DoveFax+ turns your Mac into a personal voice messaging system, as well as a full featured fax machine.

DoveFax Desktop .................................. $289
DoveFax + ............................................. $395

Modems

AE DataLink MacPortable w/Send Fax .......... $199
AE DataLink Express 2400 External .......... $169
AE DataLink Express 2400 External ......... $199
AE DataLink Mac 2400 Internal (Mac II) .... $199
AE DataLink Mac 2400 Internal ................. $199
Zoom 2400 Band w/cable & software .......... $109
Zoom V.42 bis w/cable & software .......... $179
Zoom 2400 External w/9500 Send Fax ........ $129
Micromom MacModem 9600 Band ............... $898

Printers

New! Apple StyleWriter Printer ..................... $499
Apple ImageWriter II w/cable ...................... $459
Apple Personal LaserWriter LS .................... $1099
Apple Personal LaserWriter NT .................... $1099
Apple LaserWriter IINT .......................... $3099
Apple LaserWriter IINTX ......................... $3879
CosStar LabelWriter ............................... $179
HP DeskWriter w/cable ............................ $759
Kodak Dimage MX + w/ATM & cable .......... $499
LaserMax 400 9400 Only) ......................... $179
Microtek Truemage Laser Printer ............... $2149
NEC SilentWriter 2 Model 90 w/cable ....... $1799
TI microLaser Ps 35 w/AppleTalk ............... $1799
QMS PS-810 w/cable & toner ..................... $299
QMS PS-810 w/cable & toner ..................... $2199

Mega Graphics Rival 19" Monochrome

MacWorld Magazine rated the Rival the top-performing WYSIWYG big screen outranking dual-page displays costing much more.

Rival 19" Monochrome w/Video card ........ $1169
Rival 19" Gray Scale (Mac II) w/video card $1749
Rival 19" Gray Scale (SE/30) w/video card .. $1789

Input / Output Devices

Wacom Graphics Tablets ......................... Please call
Karta Tablet (8 1/2" x 11") .......................... $319
Kensington Turbo Mouse ADB ...................... $109
Altra Felix Mouse ADB .................................. $119

Scanners

DEST Scan 3000 (256 Level gray scale) ........ $499
DyeStar OCG Software (uses only 1Mb) ...... $169
Logitech ScanMan Model 32 ....................... $319
Microtek MS-II w/Unim press OCG .......... $839
Microtek MSF 300GS w/Scsi ....................... $1359
Microtek MSF 300GS w/PhotoShop .......... $1895
Sharpe JA-600 ....................................... $11,999

New! MacPro Plus

No matter which Mac you use, old or new, the MacPro Plus keyboard gives you the ability to get you through your work faster and easier. The 105-key layout is similar to the Apple Extended keyboard, but with more features. Also included is a free offer for Tempo II Software ($149.95 value) ...... $139

Monitors & Video Cards

Apple High Resolution 14" RGB ................... $799
E-Machines Color, T-16 w/Video card ...... $2199
E-Machines T8xi ..................................... $3089
Regami CT20 20" Trinitron w/8-bit card ..... $2899
Magnavox Mac Color 14" RGB .................. $459
Micron 8-bit Video Card (Mac II/SE/30) ... $349
NEC MacSync 14" Color HC ....................... $499
Radius Pivot Visi/IIi .................. $1199
RasterOps 8LC System ............. $2899
RasterOps ColorBoard 24S (Mac II) ........ $579
RasterOps 24STV Board ................ $1299

Sigma Designs L*View Multi-Mode

Now you can truly zoom in and out of your work. Zoom in to see 70% more of your job on screen. Zoom in to see at a 200% close-up. No matter which software program you're working in you have the power to see your work in 0 sizes and resolutions. (for SE/30, Mac II) Sigma L*View MultiMode 19" ................ $1470
Sigma PageView GS (11x11/i) .................. $639

NoRad Anti-Radiation Filters

NoRad Filters have been independently tested and certified to be the most effective radiation blocking shield on the market. It greatly reduces glare and increases contrast while blocking 99.9% of the electromagnetic radiation coming from your monitor's screen.

Averages Anti-Radiation Shields are available for the following CPUs and monitors:

Mac 512, Plus, SE, SE/30, Classic ................ $129
Magnavox 9CM080 RGB, NEC Mac Sync, Mac II 14" RGB, Sony CPD-1304 ................... $129
Mac II Monochrome ............................... $139
Apple Portrait, Radius Pivot, Full page .... $139
Sigma Designs Pageview ......................... $139

DES Personal Scan

The DEST Personal Scan makes OCR scanning a breeze. This is the first scanner to combine full-page, one pass, hand-held scanning with 10 page capacity sheeted scanning. Included is a free copy of Recognizer OCR software ($500 value) which gives you the ability to quickly use scanned text in your word processing, desktop publishing or spreadsheet documents.

Requires only 1 Mb of memory .................. $685

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Call 1-800-526-5313

**Music & MAGDATA**

*Music & MAGDATA* is a quarterly MIDI Newsletter published by CDA. Our latest issue highlights CDA's new Sampled Sound Library, Mac/MIDI product reviews and an interview with guitarist Al DiMeola. Call or write for your free copy of *Music & MAGDATA*.

---

### Microtech Hard Drives

All Nova series hard drives include the following:

- Norton Utilities, and other utilities including:
  - World Map, Close View, and MacroMaker
  - Demos of Microsoft Excel, 4th Dimension by Acus, Opcode's Vision & Cue and more!

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>Nova 100 Mb Internal</td>
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<td>Nova 100 Mb External</td>
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<td>Nova 200 Mb Internal</td>
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<td>Europa 40 Mb External</td>
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<td>Europa Classic 50 Mb Int. w/3 Mbs RAM</td>
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<tr>
<td>Europa Classic 100 Mb Int. w/3 Mbs RAM</td>
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### Removable Cartridge Drives

<table>
<thead>
<tr>
<th>Model</th>
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<tr>
<td>PLI Infinity Turbo SX/Quest 45 Mb</td>
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<tr>
<td>PLI 68 Mb Removable</td>
<td>$1279</td>
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</tr>
<tr>
<td>Mass Micro Systems 45 Mb (includes blank cartridge and Diskdoubler)</td>
<td>$1279</td>
<td></td>
</tr>
</tbody>
</table>

---

### Make your IICi Run Faster than a IIFx!

The DayStar PowerCache IICi Card will accelerate your Mac IICi to IIFx speeds and beyond. It installs easily into your cache card connector slot. (w/o Math Chip)

- **PowerCache IICi 40 MHz** | $949
- **PowerCache IICi 50 MHz** | $1679

---

### CDA's Top 10 Software List

<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>Adobe Photoshop</td>
<td>$499</td>
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<tr>
<td>Adobe PageMaker 4.0</td>
<td>$499</td>
</tr>
<tr>
<td>Aldus Freehand</td>
<td>$529</td>
</tr>
<tr>
<td>Aldus FrameMaker</td>
<td>$699</td>
</tr>
<tr>
<td>Adobe Illustrator 3.0</td>
<td>$339</td>
</tr>
<tr>
<td>Aldus PageMaker 3.0</td>
<td>$339</td>
</tr>
<tr>
<td>Eagle Draw</td>
<td>$499</td>
</tr>
<tr>
<td>Adobe Encore</td>
<td>$299</td>
</tr>
<tr>
<td>Adobe Streamline</td>
<td>$1299</td>
</tr>
<tr>
<td>Adobe Freehand</td>
<td>$679</td>
</tr>
</tbody>
</table>

---

**CDA** ships stock items promptly via Federal Express Economy. Overnight delivery available.

Items weighing 15 lbs or less are sent via Federal Express Economy. Items over 15 lbs can be delivered via a variety of services. **Please call for rates.**

**Customer Service:** 800-526-5314 or 714-549-3500

---

**Order via CompuServe!**

- **GO CAD** on CompuServe's Electronic Mall 24 hours a day & watch for weekly specials!
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- **Customer Services:** 800-526-5314 or 714-549-3500
- **Order via Fax:** (908) 832-9740
- **CODs** up to $1000 accepted ($4 charge)

---

**Ad# 36-07**

---

**Music & MAGDATA**

**Type On Call from Adobe**

Now you can get the entire Adobe Type Library on a Macintosh formatted CD-ROM. The fonts arrive locked; you can "unlock" as many as you wish to instantly obtain your new typeface.

Simply call CDA to purchase and receive the access code necessary. Initial purchase includes the CD-ROM disc, Adobe Type Manager (including the base 13 fonts), bitmaps to all of the fonts included on the disc, and access to 2 typeface packages to be selected from a list of eight. Or purchase all eight and save over $200!

- **Type On Call w/two fonts** | $49
- **Type On Call w/eight fonts** | $229

---

**FREE!**

Get Type On Call free when you purchase a CD-Rom Porta-Drive by GD Technology...

**Micron Image Compression Card for Mac II**

- **Xceed ICP-II Picture Press Accelerator** | $659

---

**Type On Call**

- **Call 1-800-526-5313**
- **Please circle 147 on reader service card.**

---

**Magic of Mac, The Power of People**

**CDA Computer Sales**

Please circle 147 on reader service card.
### Table 2: Features of Gigadrives, continued

<table>
<thead>
<tr>
<th>Feature</th>
<th>MacTel</th>
<th>MacTown</th>
<th>MicroNet SB-1000NP</th>
<th>MicroNet SBT-1288NP</th>
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</thead>
<tbody>
<tr>
<td><strong>Pros</strong></td>
<td>🍁 🍁</td>
<td>🍁 🍁</td>
<td>🍁 🍁</td>
<td>🍁 🍁</td>
</tr>
<tr>
<td>List price</td>
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<td>$5,995</td>
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<td>$2,599</td>
<td>$4,000</td>
<td>$6,000</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>🍁 🍁</td>
<td>🍁 🍁</td>
<td>🍁 🍁</td>
<td>🍁 🍁</td>
</tr>
<tr>
<td>Internally terminated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expensive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Specifications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual capacity</td>
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<td>990 MB</td>
<td>987 MB</td>
<td>1,266 MB</td>
</tr>
<tr>
<td>Average seek time</td>
<td>15 ms</td>
<td>15 ms</td>
<td>15 ms</td>
<td>13 ms</td>
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<tr>
<td>Average access time</td>
<td>23 ms</td>
<td>23 ms</td>
<td>23 ms</td>
<td>19 ms</td>
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<tr>
<td>DiskBasher score</td>
<td>15.92 sec</td>
<td>15.24 sec</td>
<td>14.72 sec</td>
<td>11.37 sec</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanism</td>
<td>Seagate ST41200NM</td>
<td>Seagate ST41200NM</td>
<td>Seagate ST41200NM</td>
<td>Seagate Wren-Runner 2 (pair)</td>
</tr>
<tr>
<td>SCSI ID selector</td>
<td>button</td>
<td>button</td>
<td>button</td>
<td>button</td>
</tr>
<tr>
<td>SCSI termination</td>
<td>external plug</td>
<td>internal</td>
<td>external plug</td>
<td>external plug</td>
</tr>
<tr>
<td>SCSI cable (length, type)</td>
<td>30-inch, 25/50-pin</td>
<td>24-inch, 25/50-pin</td>
<td>72-inch, SCSI-2-50/SCSI-1-50-pin</td>
<td>72-inch, SCSI-2-50/SCSI-1-50-pin</td>
</tr>
<tr>
<td><strong>Software</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>StorageWare 1.3b13</td>
<td>MicroNet Utility 5.0.3</td>
<td>MicroNet Utility 5.0.3</td>
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<td>6.0.4</td>
<td>6.0.7</td>
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<tr>
<td>Bundled</td>
<td>20 MB of shareware</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>User-selectable interleave</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>IMV partitioning</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Password protection</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Data encryption</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Disk optimizer</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>Backup</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td>File recovery</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
<td>☑️</td>
</tr>
<tr>
<td><strong>Case</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicator lights</td>
<td>access, power</td>
<td>access, power</td>
<td>access, power</td>
<td>access, power</td>
</tr>
<tr>
<td>Size (L x W x H, in.)</td>
<td>9.75 x 4 25 x 4</td>
<td>10 x 9.75 x 4.4</td>
<td>12 x 7.75 x 6.5</td>
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</tr>
<tr>
<td>Weight</td>
<td>13 lb</td>
<td>11.1 lb</td>
<td>11.2 lb</td>
<td>15.7 lb</td>
</tr>
<tr>
<td><strong>Company</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Austin, TX 78705</td>
<td>(800) 950-9411</td>
<td>Boulder, CO 80303</td>
<td>20 Mason</td>
<td>Irvine, CA 92718</td>
</tr>
<tr>
<td>(512) 451-2600</td>
<td>(800) 338-4273</td>
<td>(714) 837-6033</td>
<td>(714) 837-6033</td>
<td>(714) 837-6033</td>
</tr>
</tbody>
</table>
You asked for higher capacity
You asked for greater reliability
And you always ask for more speed
Now, you can have it all...
Step up to the PLI Infinity 88 Turbo
From the most trusted name in removable hard drive technology.
800-288-8754 or 415-657-2211
## Table 2: Features of Gigadrives, continued

<table>
<thead>
<tr>
<th></th>
<th>Microtech MicroKCN N1000</th>
<th>Optima Concorde 1050</th>
<th>PLI PL 1.2 Gig</th>
<th>Relax Hard Plus 1.0 Gig</th>
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</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$4,599</td>
<td>$5,995</td>
<td>$4,999</td>
<td>$2,999</td>
</tr>
<tr>
<td><strong>Street price</strong></td>
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<td>$4,990</td>
<td>$3,700</td>
<td>$2,649</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>Internally terminated. Slowest Seagate drive.</td>
<td>Expensive.</td>
<td>No auto-switching power supply.</td>
<td>Format scheme provides fewer spare sectors than others.</td>
</tr>
<tr>
<td><strong>Specifications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Actual capacity</strong></td>
<td>988 MB</td>
<td>988 MB</td>
<td>990 MB</td>
<td>1,000 MB</td>
</tr>
<tr>
<td><strong>Average seek time</strong></td>
<td>15 ms</td>
<td>15 ms</td>
<td>15 ms</td>
<td>15 ms</td>
</tr>
<tr>
<td><strong>Average access time</strong></td>
<td>23 ms</td>
<td>23 ms</td>
<td>23 ms</td>
<td>23 ms</td>
</tr>
<tr>
<td><strong>DiskBash score</strong></td>
<td>16.95 sec</td>
<td>15.32 sec</td>
<td>16.00 sec</td>
<td>16.44 sec</td>
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<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mechanism</strong></td>
<td>Seagate ST41200NM</td>
<td>Seagate ST41200NM</td>
<td>Seagate ST41200NM</td>
<td>Seagate ST41200NM</td>
</tr>
<tr>
<td><strong>SCSI-1D selector</strong></td>
<td>button</td>
<td>button</td>
<td>button</td>
<td>button</td>
</tr>
<tr>
<td><strong>SCSI termination</strong></td>
<td>internal</td>
<td>external plug</td>
<td>external DIP switches</td>
<td>external plug</td>
</tr>
<tr>
<td><strong>SCSI cable (length: type)</strong></td>
<td>24-inch, 25/50-pin</td>
<td>60-inch, 25/50-pin</td>
<td>16-inch, 25/50-pin</td>
<td>24-inch, 25/50-pin</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SCSI driver</strong></td>
<td>Microtech HFD 3.27</td>
<td>Diskink 2.1</td>
<td>PLI Formatter 3.0</td>
<td>Relax 1.10*</td>
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<td><strong>System version supplied</strong></td>
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<td>6.0.7</td>
<td>6.0.5</td>
<td>6.0.5</td>
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<tr>
<td><strong>Bundled</strong></td>
<td>none</td>
<td>none</td>
<td>PLI Turbo Utilities</td>
<td>none</td>
</tr>
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<td><strong>User-selectable interleave</strong></td>
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<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>IM-V partitioning</strong></td>
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<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Password protection</strong></td>
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<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td><strong>Data encryption</strong></td>
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<td>yes</td>
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<tr>
<td><strong>Disk optimizer</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Backup</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>File recovery</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Case</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Indicator lights</strong></td>
<td>access, power</td>
<td>access, power, term power</td>
<td>access</td>
<td>access, power</td>
</tr>
<tr>
<td><strong>Size (L x W x H, in.)</strong></td>
<td>11 x 11 x 4</td>
<td>4.25 x 11.5 x 10.25</td>
<td>11.5 x 9.5 x 4.75</td>
<td>10.75 x 10.25 x 3.75</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>14.7 lb</td>
<td>13 lb</td>
<td>9 lb</td>
<td>20 lb</td>
</tr>
<tr>
<td><strong>Company</strong></td>
<td>Microtech International, Inc.</td>
<td>Optima Technology Corp.</td>
<td>Peripheral Land, Inc.</td>
<td>Relax Technology, Inc.</td>
</tr>
<tr>
<td></td>
<td>158 Commerce St.</td>
<td>17520 Von Karman</td>
<td>47421 Bayside Plw.</td>
<td>3101 Whipple Rd.</td>
</tr>
<tr>
<td></td>
<td>East Haven, CT 06512</td>
<td>Irvine, CA 92714</td>
<td>Fremont, CA 94538</td>
<td>Union City, CA 94587</td>
</tr>
<tr>
<td></td>
<td>(800) 826-4276</td>
<td>(714) 478-0515</td>
<td>(800) 288-8754</td>
<td>(415) 467-4211</td>
</tr>
</tbody>
</table>

*The Diversified I/O 2.01 SCSI Driver, necessary for partitioning, is available at extra cost ($59).*
Why settle for an incomplete set of utilities when you can have them all? Presenting MacTools® Deluxe—the most comprehensive, powerful collection ever assembled for the Macintosh.

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

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

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

MacTools Deluxe...from the leading developer of Macintosh utilities since 1984.

For a free brochure or the MacTools dealer nearest you, call 1-800-445-0412.

Central Point Software INC
Making Computing Safer, Simpler, Faster.

Minimum requirements: Macintosh Plus. MacTools is a registered trademark of Central Point Software. All other product names are trademarks of their manufacturers.

Please circle 151 on reader service card.
### Table 2: Features of Gigadrives, continued

<table>
<thead>
<tr>
<th>Feature</th>
<th>Redline Cobra 1000e</th>
<th>Storage Dimensions MacinStor 1020-51</th>
<th>Tulip A-Hive Hard Drive</th>
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<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$8,999</td>
<td>$5,799</td>
<td>$3,419</td>
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<tr>
<td><strong>Street price</strong></td>
<td>$6,299</td>
<td>$4,500</td>
<td>$3,419</td>
</tr>
<tr>
<td><strong>Pros</strong></td>
<td>Encryption software, Two-year warranty</td>
<td>Recovery software, Two-year warranty</td>
<td>SCSI-cabling option.</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>Expensive, Internally terminated, DIP-switch, SCSI ID.</td>
<td></td>
<td>DIP-switch SCSI ID.</td>
</tr>
<tr>
<td><strong>Specifications</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual capacity</td>
<td>990 MB</td>
<td>999 MB</td>
<td>990 MB</td>
</tr>
<tr>
<td>Average seek time</td>
<td>15 ms</td>
<td>15 ms</td>
<td>15 ms</td>
</tr>
<tr>
<td>Average access time</td>
<td>23 ms</td>
<td>23 ms</td>
<td>24 ms</td>
</tr>
<tr>
<td>DiskRush score</td>
<td>15.57 sec</td>
<td>15.63 sec</td>
<td>17.49 sec</td>
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<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanism</td>
<td>Seagate GT41200NM</td>
<td>Seagate GT41200NM</td>
<td>Micropolis 1300-15</td>
</tr>
<tr>
<td>SCSI-SD selector</td>
<td>DIP switch</td>
<td>dial</td>
<td>DIP switch</td>
</tr>
<tr>
<td>SCSI termination</td>
<td>internal</td>
<td>external plug</td>
<td>external plug</td>
</tr>
<tr>
<td>SCSI cable (length, type)</td>
<td>24-inch, 25/50-pin</td>
<td>30-inch, 25/50-pin</td>
<td>36-in or 72-inch, 25/50-pin</td>
</tr>
<tr>
<td><strong>Software</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SCSI driver</td>
<td>Cobra 1.1.3</td>
<td>MacinStor 3.0</td>
<td>DataWare 1.3b x3</td>
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<tr>
<td>System version supplied</td>
<td>6.0.7</td>
<td>6.0.5</td>
<td>6.0.5</td>
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<tr>
<td>Bundled</td>
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<td>MacTools Deluxe</td>
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</tr>
<tr>
<td>User-selectable interface</td>
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<td>●</td>
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</tr>
<tr>
<td>FM-V partitioning</td>
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</tr>
<tr>
<td>Password protection</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Data encryption</td>
<td>●</td>
<td>○</td>
<td>○</td>
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<tr>
<td>Disk optimizer</td>
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<td>●</td>
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<tr>
<td>Backup</td>
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</tr>
<tr>
<td>File recovery</td>
<td>○</td>
<td>●</td>
<td>●</td>
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<tr>
<td><strong>Case</strong></td>
<td></td>
<td></td>
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<tr>
<td>Indicator lights</td>
<td>access, power</td>
<td>access, power</td>
<td>access, power</td>
</tr>
<tr>
<td>Size (L x W x H, in.)</td>
<td>14.5 x 7 x 4</td>
<td>14.5 x 7.5 x 5.75</td>
<td>10 x 9.6 x 4.25</td>
</tr>
<tr>
<td>Weight</td>
<td>13 lb</td>
<td>12 lb</td>
<td>16 lb</td>
</tr>
<tr>
<td><strong>Company</strong></td>
<td>Redline Systems, Inc. 901 Broken Sound Pkwy. N.W. Boca Raton, FL 33487 (800) 888-9300 (407) 994-5565</td>
<td>Storage Dimensions 2145 Hamilton Ave. San Jose, CA 95125 (408) 679-0300</td>
<td>Tulip Corp. 2156 N O'Toole Ave. San Jose, CA 95131 (408) 432-9025</td>
</tr>
</tbody>
</table>
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Never again will you have to quit your word processor just to answer a question about a spreadsheet. Install extra memory and you can leave your letter open while you refer to last month's sales figures. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at $59.

The chart explains exactly what you need to achieve the desired level of performance.

To upgrade a 4-socket Mac Plus or SE to this amount of memory:

- **2 MB**
  - Remove all four existing 256K SIMMs.
  - Install two 1 MB SIMMs.

- **2-1/2 MB**
  - Remove only two 256K SIMMs, install two 1 MB SIMMs.

- **4 MB**
  - Replace all four 256K SIMMs with four 1 MB SIMMs.

To upgrade an 8-socket Mac II, IIx, or SE to 32 MB:

- **4 MB**
  - Remove all four existing 256K SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.

- **5 MB**
  - Keep existing 256K SIMMs, install four 1 MB SIMMs in remaining sockets.

- **8 MB**
  - Remove all four 256K SIMMs, install eight 1 MB SIMMs.

Overnight delivery is available for just $3.00.

### PLUG IN INSTALLATION

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

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs - (2 @ $59 ea.).

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMS (Single Inline Memory Modules). Each one megabyte SIMMS card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.

Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 100ns SIMMs is $59. Please call for the very latest prices and availability. Our sales staff will tell you what you need and help you make your choice an easy one.

### SPEED

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

### OVERNIGHT DELIVERY

Place your order by 12:00 am (E), weekdays and we'll deliver overnight for just $3.00. There's never been a better time to consider a memory upgrade. Call our toll-free number now and tomorrow morning your Mac will be off to a brand new start.
TrueLaser Printer (Microtek)

This revolutionary new laser printer gives you, for the first time, true image support. TrueLaser Printer (Microtek) with TrueType fonts, the same font technology that will go into every Macintosh running System 7.0 and IBM running Windows 3.1. And TrueLaser is smart enough to automatically switch between different printer interfaces—AppleTalk, Centronics, RS-232C—all transparent to the user. It’s powered by a 32-bit RISC microprocessor running System 7.0 and IBM running Windows 3.1. And TrueLaser is smart enough to automatically switch between different printer interfaces—AppleTalk, Centronics, RS-232C—all transparent to the user. It’s powered by a 32-bit RISC microprocessor.

ACCOUNTING & PERSONAL FINANCE

Accounting

Symantec AntiVirus

The best selling, highest rated virus Protection, Detection and Repair program for the Macintosh is now even better. New SAM Version 3.0 has enhanced update and repair capabilities, and faster scanning. The INIT portions detect viral activity during startup. The CDEV portion detects viruses during normal usage and offers options for checking disks and folders. Audit Trail tracks your activity and your responses. Includes Virus Clinic, a stand alone detect-and-remove application you can run at any time. UTI 0214 $65.

BUSINESS & PRESENTATION

Microsoft Excel 3.0 (Microsoft)

Microsoft Excel 3.0 offers many dramatic improvements in spreadsheet operations. You can place cells, graphs, and text anywhere, on the same page. Excel’s Toolbar (with AutoSum) automates common operations to save you time. The outline expands to show detail, or contracts them to show broad structure. You can display your data with 68 different chart types, 24 in 3D. Excel also accesses remote databases through Apple’s Data Access Language (DAL). Add support for System 7.0, plus goal seeking and equation solving, and Excel will stimulate you to look for new problems to solve.

BUS 0187 $309.
The fifth edition of Steven Bobker's Power User's Tool Kit is now available exclusively to MacWAREHOUSE customers. A hand-picked collection of six powerful programs on one handy disk, the newest Tool Kit includes The Power User's Tool Kit 5.0 — a unique desk accessory for organizing and implementing your daily tasks. The newest version of StuffIt Classic, also on the disk, will create freestanding space-saving archives of files that you can expand whenever you need them without having any special decompression software. The Power User's Tool Kit 5.0 is FREE from MacWAREHOUSE when you order from us. It would like the disk, please ask for product code number AAA 0011. You pay only $1.50 for shipping and handling. The programs are shareware, so you can try them free of charge. If you wish to continue using the programs, some authors ask that you pay a fee ($10-$25). All of the details are explained on the disk, which is yours to keep.

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We carry more than 2000 Macintosh products, including all the latest releases and new versions. We pride ourselves on getting new products first. Just fill in the information requested below and mail the coupon. We'll start your free, one-year subscription to the MacWAREHOUSE catalog with the next issue.

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The "ULTIMATE" SE Carrying Case
(1/O Design, Inc.)
The "ULTIMATE" SE Carrying Case is designed with the same high quality standards as other Macware products. This case offers internal, padded compartments for ANY Macintosh keyboard, mouse, external hard disk and cables also holds the new Macintosh Classic. It also features 2 additional exterior pockets for everything from disks to umbrellas. Combine these features with sturdy Dupont Cordura nylon and 1/2 inch high density foam padding and you'll see why this is the "Ultimate" carrying case for your Mac. Black: ACC 0427 $79. Navy: ACC 0440 $79.

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Provides the tools you need to create accurate drawings on your Mac. It supports PostScript output, has a moveable geometric drawing tool palette, automatic area calculation, and smoothing of freehand shapes. MacDraft supports 32-bit QuickDraw and custom fill patterns in both black and white and color. Reads TIFF and MacDraw II files. MacDraft 2.1 (Innovative Data) $279.

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COR0020 Connector SE $99.

COM0020 Macprice $129.
COM0020 Macprice SE $229.

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Microsoft

Microsoft is the leading provider of software and services for business, personal computing, and entertainment. Their products include the Microsoft Office suite, Windows operating systems, and Xbox video game consoles.
Earl Weaver Baseball

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DISK DRIVES & BOARDS

Applied Engineering

DRI0016 160K floppy disk drive .... 25
DRI0148 QuickLink........... 219
DRI0167 Macintosh Video .......... 349
DRI0168 Video MacPac ........... 349
Computer Friends

DRI0237 Color/Draw 32 Plus ....... 64
Cutting Edge

DRI0042 500K Floppy Disk Drive .... 119
DRI0157 260 meg Under the Mac .... 329
DRI0158 800 meg Under the Mac .... 579
DRI0159 55 meg Under the Mac ....... 389
DRI0161 160 meg Under the Mac ...... 469
Dayna Communications, Inc.

DRI0174 DaynaFile dual 360K (5.25) 1.144 (3.5) 499
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Kenneit Technology

DRI0218 Drive 1200 ............... 259
DRI0411 Drive 2:4 ................ 259
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Saves desktop space and makes your job easier. You simply roll the ball with your fingertips, while the mouse stays put. The Custom Control Panel lets you choose from dozens of button commands with on-screen menus, not DIP switches. The special Custom Command function simulates any keyboard command key sequence. Offers resolution of 200 dpi. Manufacturer's one-year warranty.

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DRI0261 60 Meg removable ............... 369
DRI0262 80 Meg removable ................ 459
DRI0263 105 Meg removable .............. 499

EDUCATIONAL & INSTRUCTIONAL

Beacon Technology, Inc.

HYPO0034 HyperSuite International Version 2.0 .... 125
HYPO0035 HyperSuite King James Version 2.0 .... 135
Broderbund

GRA0088 Kid Pix ............... 29
EDUC0170 The Playroom .......... 29
Davidison & Associates

EDUC0027 Math Blaster .......... 29
EDUC0018 Math Blaster Mystery ....... 29
Help Software, Inc.

EDUC0103 Desktop Help for Excel ..... 52
Learning Company

EDUC0098 Math Tutor .......... 30
EDUC0048 Reader Robot .......... 30
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Pamper your Mac with a Targus case made of Zilone treated nylon to give you waterproof durability and an impact absorbing high density foam layer with a soft protective lining for complete protection. Cushioned shoulder pad and handles provide extra comfort and convenience. There's room for everything from your Mac including the new Macintosh Classic, a hand disk drive and the extended keyboard to pockets for your mouse, tapes, cables, and pens.

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MECC Marketing

EDUC0110 Writer Munchers .... 29
EDUC0111 Writer Munchers .... 29
MicroMaps

GR0050 MacroArt PICT Format .... 95
GR0028 MacroArt EPS Format .... 95
Nordic Software

GR0042 Macintosh Pedestal Pack ..... 35
Penton Overseas (Full line available)

Vocabulary Level 1 (in 8 Foreign Languages: Hebrew, Italian, Japanese, Russian or Spanish) ca. 35
Personal Trench Systems

Macintosh, HyperCard, Finder/Pro, Microsoft Excel, Microsoft Works, MultiPascal 4.0, MultiFreehand, QuickPascal 3.0 ca. 52
Queue

EDUC0069 Computer SAT Prep ... 57
Visionary Software

EDUC0047 Mecanics ................ 49
EDUC0029 Synonymy ............ 49
Voice & Video

Getting Started Videos: Excel 2.2, PageMaker 4.0, Word 4.0 ca. 50
Advanced Techniques Video: Excel 2.2, PageMaker 4.0, Word 4.0 ca. 55
ED0U0063 HyperCard Getting Started Video .... 55
Zondervan Publishing House

BK0028 Macintosh - King James Version .... 79
BK0030 Macintosh - New International Version .... 79

ENTERTAINMENT

Artwork

ENT0031 Bridge 6.0 .... 29
ENT0169 ShutUp Duck Calls .... 25
Where's Caiman? Sandiego? 25
Bulls City Software

ENT0030 Mariner's Revenge ........ 29
Bullseye

ENT0045 Ferrari Grand Prix 1.5 .... 31
ENT0046 Fokker Triplane Flight Simulator 2.5 .... 25
ENT0169 PS1 Mustang 2.80 .... 35
Centron Software, Inc.

ENT0120 BlackJack Strategy Tester (w/ Blackjack Act) .... 65
ENT0121 Casino Master .... 27
ENT0127 Casino Master Deluxe Mac II Version .... 49
ENT0125 CrapsMaster .... 27
ENT0126 Blackjack Act .... 35
Electronic Arts

ENT0120 Easy Win Baseball .... 32
Sir Tech Software, Inc.

ENT0290 Base of the Cosmic Forge .... 35
ENT0347 Wargitty & Knight of Diamonds .... 29
Spectrum HoloByte

ENT0020 MUGS, THERS, Tillers and 49
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TouchBASE is a database to manage personal contacts. It combines power, functionality and speed with the handiness of a desk accessory. Prints labels, envelopes, fax covers, address books, and reports. Provides multi-user access over a network. Furnishes powerful searching, sorting, marking and much more. Easily imports data from other products such as FileMaker, HyperCard, Microsoft Works, and Excel. DAT 0076 $89.
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The Software Toolworks
ENT0281 Chomemaster 2100 32
ENT0273 Life D& Date 28
ENT0269 The Hunt For Red October 20
Three-Sixty
ENT0285 Safari of Fire 40
XOR Corporation
ENT0214 MacGolf Classic 52

Adobc Systems, Inc.
FON0384 Adobe Type Manager 2.0 59
FON0381 Adobe Type On Call NEW 47
Adobe Type Set 2 19
FON0386 Adobe Type Set 3 179
Adobe Type 1.2.1.1 65
DIAG0282 Typegosh 45
FON0295 Adobe Type Reunion 45
Alleys
FON0183 Art Importer 2.0 69
FON0184 Fontographer 3.2 269
FON0284 MorphoStrokes 2.0 89
Broderbund
DUB0130 TypeStyler 119
DUB0001 MonoFonts 3.0 31

Pacific Data Products
INP0153 Pacific MacPage 529
Postscript
DTP0007 Effects Expert 115
QMS
UIN0159 UltraScript 87
Tactic Software
FON0386 Airform 49
TeleTypesetting
FON0243 T-Script 87
FON0386 T-Script Basic 55

GRAPHICS & MULTIMEDIA
2D Graphics
GRA0100 Images with Impact! Accents & Borders 65
GRA0111 Images with Impact! Business 1 65
GRA0157 Images with Impact! People 1 95
Acrabadata
CAD0032 Design Your Own Home Architecture 65
CAD0036 Design Your Own Home Interiors 65
Adobe Systems, Inc.
EUC0048 Illustrator 3.0 (w/ ATM 2.0) 129
GRA0155 StreamLine 2.0 129
GRA0191 PhotoShop Carl
Aldus
GRA0164 FastHound 399
Baseline Publishing
GRA0242 Color Mac CHeese 59
GRA0238 Master Color 59
GRA0238 Master Paint 59

INP0184 MenuFonls 3.0
Innovative Data Design
CAD0039 MacDraft 2.1 239
GRA0108 Dreams 1.1 429
Letraset
GRA0151 ColorStudio 569
DTP0101 InscriptStudio 1.5 138
MacroMind
GRA0140 MacDraft Director 2.0 219
Metro Image Base (Full line available)
GRA0169 Newsletter Maker 85
Purecomp
GRA0175 FilmMaker 395
GRA0187 SwivelDraw 81
Praxitel
UL0181 Read My Ups 75
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INPUT & OUTPUT

Abbot
BIP157 Scan Only Color
BIP164 LaserWriter Printer L
CH Products
BIP121 LaserMouse AOB
Curtis
BIP141 LWP Mouse
NIOSoft
BIP174 Mac Mouse Pro
Digital Vision, Inc.
GRA0145 Computer Eyes B & W

Adobe
GRA012 SuperPaint 2.0
GRA020 SmartSnap & The Clipper 2.0
Strata
GRA179 StreamVision 3D 2.0
Strategic Mapping, Inc.
GRA027 Atlas MapMaker 5.0
SuperMac
GRA053 PixelPaint 2.1
GRA063 PixelPaint Professional 2.0
T/Maker Co.
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.NET 0060 $129.
## MODEMS & FAX

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## ELECTRONIC ARTS

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## OFFLINE

- Complete database management system
- Indexes and stocking of more than 50,000 bonds
- Offers a pass-test feature
- Stores 5000 stocks and 5000 bonds
- Enables the user to track stocks and bonds
- Includes a stock tracking feature

## UTILITIES & PROGRAMMING

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## WEALTHBUILDER BY MONEY MAGAZINE

- Money management
- Portfolio tracking
- Financial planning
- Investment tracking
- Budgeting
- Debt management
- Credit score
- Retirement planning
- Tax savings
- Emergency fund
- Estate planning
- College savings
- Retirement planning
- Home ownership
- Auto ownership
- Insurance
- Legal

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- Money management
- Portfolio tracking
- Financial planning
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- Budgeting
- Debt management
- Credit score
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- Emergency fund
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- Estate planning
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- Insurance
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- Financial planning
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- Debt management
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- Retirement planning
- Tax savings
- Emergency fund
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- Financial planning
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- Tax savings
- Emergency fund
- Estate planning
- College savings
- Retirement planning
- Home ownership
- Auto ownership
- Insurance
- Legal

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- Financial planning
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- Budgeting
- Debt management
- Credit score
- Retirement planning
- Tax savings
- Emergency fund
- Estate planning
- College savings
- Retirement planning
- Home ownership
- Auto ownership
- Insurance
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- Financial planning
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- Tax savings
- Emergency fund
- Estate planning
- College savings
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- Debt management
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- Tax savings
- Emergency fund
- Estate planning
- College savings
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- Insurance
- Legal

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- Budgeting
- Debt management
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- Tax savings
- Emergency fund
- Estate planning
- College savings
- Retirement planning
- Home ownership
- Auto ownership
- Insurance
- Legal

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- Financial planning
- Investment tracking
- Budgeting
- Debt management
- Credit score
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- Tax savings
- Emergency fund
- Estate planning
- College savings
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- Auto ownership
- Insurance
- Legal

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- Estate planning
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- Home ownership
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- Legal
Effects Specialist (PosterCraft)
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On a good day, he would take five or six hundred 4 x 5 pictures. — In your own quest for fresh insight, which type for the Macintosh® will be your most faithful servant? Perhaps it will be type from the foundry that spares nothing when it comes to capturing the original. Bitstream, where the spirit of type burns brightly. Where the kerning is exquisite. Where people go to outrageous lengths to preserve the integrity of a type designer’s dream. Where our library of over 1,000 faces is growing all the time. Call to order or ask for a complete showing of PostScript® compatible fonts. Bitstream. Labor of love.

THIS PAGE IS SET IN BITSTREAM OZ HANDICRAFT, A ORIGINAL TYPEFACE. TO ORDER CALL 1-800-237-3335.
LaserCheck turns your PostScript laser printer into a proofing device for an imagesetter. This clever utility scales the electronic image to fit the laser-printer page; shows crop and registration marks; and reports job information such as fonts used, output time, and PostScript errors. You can use the imagesetter’s printer files and output settings for the laser-printer output, and LaserCheck can do color composites on a QMS ColorScript 100. It’s a steal at $149 from Systems of Merritt ([205] 660-1240).

By Aileen Abernathy

Aldus resurfaces: The creator of desktop publishing has been lying low of late, licking its wounds from the unexpectedly harsh criticisms of PageMaker 4.0 and the newfound strength of archrival Quark. Now Aldus is trying to regain lost ground with Aldus Additions (see last month’s column) and a major upgrade to PrePrint. ♦ Aldus is repositioning PrePrint 1.5 as a stand-alone program that can separate all “color-conforming” PostScript files — those that respect Adobe’s conventions for document structuring and color separation. So far, it works with PageMaker, FreeHand, Photoshop, and Illustrator — but not QuarkXPress. Among the dozens of new or improved PrePrint features are the ability to color-separate an arbitrary page range, output of separations in page order rather than color by color, font downloading, support for EPS and DCS, and image resampling. ETA: summer ’91. ♦ The recently released PageMaker 4.01 supports PrePrint 1.5’s new features, fixes bugs, and is significantly faster during launch and for placing text files. ♦ In a glimpse of other things to come, Aldus president, Paul Brainerd, recently told Applicando, an Italian Mac magazine, that Aldus plans to split PageMaker into two versions, one for professional publishers and one for the business market. Aldus wouldn’t confirm this report, but it didn’t deny it either.

Meanwhile, Quark is solidifying its lead in the high-end-publishing market. Version 3.1 of QuarkXPress, due out this fall, eliminates the separate Data file and adds three new palettes (Colors, Trap Info, and Style Sheets). The Colors palette lets you make linear PostScript blends, and it supports the Focoltone and TruMatch color systems (in addition to Pantone). QuarkXPress 3.1 will also be System 7.0-friendly, incorporating balloon help and publish-and-subscribe. The real shocker: QuarkXPress will not support TrueType. Bad move, Quark. QuarkXPress’ price will jump $100, to $895.

Fonts galore: Adobe has jumped on the type-CD-ROM bandwagon with Type On Call, a disc that holds the entire Adobe typeface library (950+ faces), including the Adobe Originals series. For $99, you get ATM plus two typeface families. The remaining faces are locked away until you call Adobe or your dealer and trade your credit-card number for the access codes. A novel twist: You can purchase individual faces (such as Bodoni Poster) instead of just families for $50 each. ♦ Agfa Compugraphic has released version 2.1 of its AgfaType CD-ROM, which contains 1,650 Type 1 fonts — the complete Agfa and Adobe type libraries, including 126 symbol and Pi fonts — plus five type-related programs. Introductory pricing (with 20 unlocked display fonts) is $99 for the disc alone or $695 if it’s bundled with a Toshiba CD-ROM drive (the normal retail price is $1,920).
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What are you waiting for? Especially, since we'll give you a free demo version so you can see for yourself that anyone can do great desktop publishing.

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TrueType Arrives

Apple Computer's much-ballyhooed TrueType technology has finally shipped, and font vendors are scrambling to release TrueType fonts and type-conversion tools.

By Aileen Abernathy

At long last, TrueType. We've been hearing about Apple's new outline-font technology for nearly two years as a key component of System 7.0. Apple suddenly unbundled TrueType from System 7.0 last March when it unveiled its low-cost printers, the StyleWriter and the Personal LaserWriter LS. TrueType is now available in two ways: as an integral part of System 7.0 and as a separate INIT for System 6.0.7 users, who can obtain it free from user groups and on-line services. (For more on the new Apple printers and some early TrueType speed and compatibility tests as well as type samples, see "Personal Best: Two New Apple Printers," May '91, page 90).

The release of TrueType raises the type-quality baseline for nearly every Mac user. It will be built in to every Mac shipped with System 7.0, making jagged-looking type almost a thing of the past. TrueType offers many of the same benefits as ATM (Adobe Type Manager) and PostScript Type 1 fonts: scalable, high-quality type, both on-screen and on paper. Indeed, MacUser's first looks at TrueType fonts reveal them to be almost indistinguishable in quality from Type 1 faces, although slight differences in character widths may affect line endings if you switch from a face in Type 1 format to its twin in TrueType.

TrueType fonts use a single outline-font file for screen display and output rather than the separate screen (or bit-mapped) and printer (outline) fonts required for Type 1 fonts. Best of all, System 7.0 users no longer have to deal with the infamous Font/DA Mover. To install TrueType and bit-mapped fonts in System 7.0's System file, you just drag the fonts' icons over the System Folder icon — the fonts are then automatically installed in the System file. You can even see a type sample by double-clicking on the font icon; this is true even if the font is in the System file, because the System file behaves like a folder — you can open the file by double-clicking on it and see the individual bit-mapped and TrueType font-file icons. For those who prefer not to install the fonts in the System file, Suitcase II (version 1.2.9) supports TrueType. (MasterJuggler doesn't, and at press time, ALSoft hadn't announced its upgrade plans.)

The TrueType technology works with all printers, and TrueType fonts print at the maximum resolution of TrueImage, PostScript, and QuickDraw printers. Some third-party printers, such as Hewlett-Packard's popular DeskWriter, are already TrueType-compatible. Other printer manufacturers should have TrueType drivers for their printers by the time you read this (or shortly thereafter).

Apple provides eight TrueType fonts with System 7.0 — Times, Helvetica, Courier, and
Symbol, plus TrueType versions of Chicago, Geneva, Monaco, and New York—and type vendors have already announced hundreds of other TrueType fonts, some of which are already shipping. Other companies have released programs that let you convert fonts from Type 1 to TrueType format or even create TrueType fonts from scratch. Here's an overview of the TrueType offerings announced at press time (there are likely to be others by the time you read this).

Font Vendors

The major font vendors are busily converting their existing Type 1 libraries into TrueType format; a few are designing new faces exclusive to TrueType. Price tags for TrueType faces are usually comparable with those for Type 1 offerings, and some packages (such as Bitstream's) are available through dealers or mail-order houses.

**Bitstream** was the first font vendor to ship TrueType fonts, releasing Font Packs 1 and 2 for TrueType (see Figure 1) the same week in March that Apple announced its new low-cost printers. Each package will contain 2 to 8 typefaces; a typical 4-face family should retail for less than $175. Font Packs 1 and 2 for TrueType—(see Figure 2) along with Futura Black, Exotic Demi-Bold, and Embassy. In late spring, Bitstream will release Font Packs 3 and 4; these $149 packages will contain 13 TrueType faces each. By the end of 1991, Bitstream expects to have shipped more than 1,000 TrueType fonts. Bitstream provided Apple with two of its core TrueType fonts, Courier and Symbol, and its corporate typeface (Apple Garamond); it will also provide Apple with Japanese fonts in TrueType format (using designs from Ryo Watanabe) for future versions of Apple's KanjiTalk System software. Bitstream, 215 First Street, Cambridge, MA 02142; (800) 522-3668 or (617) 497-6222.

**Linotype-Hell** provided Apple with its other two core TrueType fonts, Helvetica and Times. The company's first commercial TrueType package, the Desktop Selection, retails for $185 and contains 7 TrueType fonts: Centennial (53 and 56), Memphis (medium and extra bold), Helvetica Compressed, Present, and Antiqua Olive Compact. Linotype plans to release more TrueType versions of its 2,000-face collection before the end of 1991. Linotype-Hell Co., 425 Oser Avenue, Hau烹k, NY 11788; (800) 633-1900 or (516) 434-2000.

**Monotype** has a two-pronged approach to TrueType. Its Imprints series offers popular display faces in TrueType format, retailing for $29.99 per face. Twenty designs were released in April—including Bodoni Ultra Bold, Gill Sans Light, and Photina Bold—and more than 100 faces should be out by midsummer. Monotype's Classic Fonts series of typeface families will also be available in TrueType format. Each package contains 2 to 8 typefaces; a typical 4-face family should retail for less than $175. Initial releases, due out in late spring, include Rockwell, Bembo, and Gill Sans, and Monotype should have more than 40 other faces shipping as you read this. Around 300 TrueType versions of Classic Fonts faces should ship by year's end. Monotype Typeworkers, 53 W. Jackson Blvd., Suite 504, Chicago, IL 60604; (800) 666-6897 or (312) 855-1440.

**Agfa Compugraphic** calls its TrueType collection the Desktop Series. Each volume (S99 and up) contains 1 typeface family in 4 styles (such as roman, italic, bold, and bold italic). The first releases include Garber Graphic and Shannon and should be available this summer. Agfa plans to have 200 TrueType faces available by the end of 1991. Desktop Series fonts will be included on version 3.0 of the Agfa TCP/CD-ROM, which is due out in late summer; registered users will receive a free upgrade disc (for more on the CD-ROM, see this month's Desktop Publishing column). Agfa
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Compugraphic, 90 Industrial Way, Wilmington, MA 01887; (800) 424-8973. Letraset has not been a serious player in the Mac font market to date, but now it's jumping in with both feet. The company will release 60 of its display faces — including Bordeaux Roman, University Roman Bold, and FreeStyle Script — by late summer. Each disk will contain 1 face in TrueType as well as Type 1 formats; pricing will be $39 per face. The company eventually hopes to convert the bulk of its 700+ display typefaces into TrueType and Type 1 formats. Letraset, 40 Eisenhower Drive, Paramus, NJ 07653; (800) 524-0785 or (201) 845-6100.

Image Club Graphics will release its Type 1 library of 600+ faces in TrueType format, possibly by midsummer. Individual TrueType faces will cost $25, the same as their Type 1 brethren. The TrueType library will be added to a future version of the Art + Type Vendor CD-ROM, which holds Image Club's Type 1 library and 23 volumes of Digit-Art clip art. For the initial $99 fee, you get 20 unlocked fonts and one clip-art package; as with Agfa's CD-ROM, additional fonts and clip-art packages are a phone call (and a credit-card number) away. No word yet on when its type-conversion program, Evolution, will be upgraded to handle TrueType/Type 1 switcheroos. Image Club Graphics, 1901 11th Street S.E., Suite 5, Calgary, Alberta T2G 3G2, Canada; (800) 661-9410 or (403) 262-8008.

Casady & Greene is offering the TrueType Starter Set, a collection of 22 TrueType fonts for $99.95. The company will also bundle TrueType versions along with the Type 1 versions of its typefaces in an updated release of the Fluent Laser Fonts Library, a $179.95 collection of 79 fonts that should appear in May. All future Fluent Laser Fonts packages will contain both TrueType and Type 1 versions of Casady & Greene's fonts. As an added fillip, the company is including the TrueType INIT in each package for the benefit of System 6.0.7 users. Casady & Greene, 22734 Pontola Drive, Salinas, CA 93908; (800) 359-4920 or (408) 484-9228.

Kingsley/ATF has converted its ATF Classic Type package to TrueType format. The $165 package contains TrueType and Type 1 versions of 4 display faces: Wedding Text, Bernhard Fashion, Thompson Quillscript, and Cleland Border. Registered users of the Type 1 version can receive the TrueType disk free of charge. Kingsley/ATF Type Corp., 2559 E. Broadway, Tucson, AZ 85716; (800) 289-8973 or (602) 325-5884.

Type-Handling Programs
For those who'd like to convert their existing Type 1 library to TrueType format, some companies offer Type-1-to-TrueType conversion utilities. (Whether the converted fonts will retain the quality of the original typefaces remains to be seen.) Or perhaps you want to try your hand at creating TrueType fonts — there are programs for that too.

Metamorphosis Professional, Version
2.0 of Altsys' font-conversion utility, now with Professional appended to the title, does much more—much more—than just create editable outlines of Type 1 fonts (see Figure 3). Meta Pro can convert Type 1 fonts into TrueType format (and vice versa) for both the Mac and the PC. It also converts Type 3 fonts, creates Type 1 fonts for NeXT machines, and produces font databases for use in Fontographer. Beyond that, the program can create editable PICT or EPS outlines from TrueType or Type 1 fonts, which can then be imported as graphics into either QuickDraw or PostScript drawing programs. $149; upgrades, $45. Altsys Corp., 269 W. Renner Road, Richardson, TX 75080; (214) 680-2060.

FontMonger. This new utility from Ares Software handles type conversions and transformations. It converts fonts in any direction among the Type 1, Type 3, and TrueType formats. You can turn type into Illustrator, EPS, or PICT files or turn EPS images into font characters instead. You can combine characters from different typefaces into a single font, and you can make a font with custom characters such as fractions and small caps. $99.95. Ares Software Corp., P.O. Box 4667, Foster City, CA 94404; (415) 578-9090.

FontStudio. Version 2.0 of Letraset's font-creation and -editing application provides full support for TrueType. You can create a font from scratch, using the outline- and bit-mapped-font editors, or convert among Type 1, Type 3, and TrueType formats. FontStudio 2.0 lets you apply character hints automatically or manually, auto-trace scanned images, assign EPS artwork to keyboard characters, and anti-alias screen fonts in up to 256 grays or colors. And—shades of Adobe's new Multiple Master technology—FontStudio offers font interpolation; that is, it can create an intermediate font between two specified typefaces (the possibilities for ugly fonts are mind-boggling.) Because Altsys is not immediately upgrading Fontographer to support TrueType, FontStudio is likely to become a major venue for original TrueType fonts created by individual users. $59.5; upgrades from version 1.0, $99. (For more on FontStudio's capabilities, see review, September '90, page 76.) Letraset, 40 Eisenhower Drive, Paramus, NJ 07653; (800) 524-0785 or (201) 845-6100.

ATF Type Designer I. Version 1.2 of this relatively new type-creation program lets you design typefaces in either Type 1 or TrueType format (for the Mac or the PC with Windows) and can perform conversions between the two. The program's feature set includes the ability to generate fonts with more than 256 characters; create composite characters; and output files in a wide variety of formats for the Mac, IBM, NeXT, and Digital environments. $549. Kingsley/ATF Type Corp., 2559-2 E. Broadway, Tucson, AZ 85716; (800) 289-8973 or (602) 325-5884.

MacUser senior editor Allen Abernathy has a true type personality.

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The Future of Type?

Adobe's Multiple Master font technology may be the wave of the future. The benefits — on-the-fly font creation, better copyfitting, and improved readability at small sizes — bring new power to desktop typography.

By Henry Bortman

So Apple shipped TrueType at last, and you thought you finally had a leg up on Mac fontography. You didn't know exactly how, but somehow you'd figure out whether to stick with the Type I PostScript standard or make the switch to that shiny new TrueType stuff. Or maybe you'd be one of the clever, masochistic ones who managed to get the two font technologies to coexist peacefully — and to behave in expected ways. It might take some fancy fontwork, but at least you knew the rules of the game.

Wrong. Just days before Apple's surprise announcement of a TrueType INIT for System 6.x users — most of us thought we'd have to switch to System 7.0 to use TrueType — Adobe fired its own salvo in the seemingly endless battle of the font standards. Adobe stole much of Apple's TrueType thunder by announcing its Multiple Master font technology (Adobe will probably have a sexier name by shipping time).

Multiple Master fonts are an extension of Adobe's Type 1 specifications and use the ATM (Adobe Type Manager) rendering technology. Any one of the Multiple Master fonts (we'll call them multimaster fonts for short) can contain several sets of character outlines, or master designs, representing extremes of design elements such as weight and width. From these you can create — on the fly! — a wide variety of intermediate fonts, which are called instances.

The Design Axes

Before multimaster fonts, a Type 1 font contained a single set of character outlines. For example, a condensed font was contained in a separate file from an extended font. With the multimaster technology, a single font can contain several sets of character outlines. For example, a single multimaster font file can contain a condensed set and an extended set of character outlines, enabling you to create fonts in a variety of intermediate widths.

Even without multimaster fonts, you can achieve something akin to condensed and extended type in several applications by applying varying amounts of horizontal scaling to a standard-width font. The results, however, send chills up the spine of any dyed-in-the-wool typographer. Stretching and squeezing type sacrifices one of the most crucial design elements: the proper ratio of horizontal and vertical strokes. In contrast, Adobe's multimaster fonts let you create a typographically accurate font anywhere on the continuum between condensed and extended (see Figure 1).

The width range defined by condensed on one end and extended on the other represents only one of the four axes along which you can create on-the-fly font variations with multimaster fonts. Multimaster fonts also support variations in weight, style, and size. Weight refers to the continuum between ultra-light and extra-black type — light, roman, bold, and heavy being some of the common intermediate points. The style axis can be used for just about anything: for example, a transition between a sans serif and a serif typeface or a roman and an italic one. The point-size axis brings a capability known as optical scaling to Type 1 fonts.

Optical scaling is an important concept that has so far been missing from digital typography. Character outlines that are designed to be
readable and aesthetically pleasing at small point sizes generally look too bold at larger sizes (see Figure 2). Enter optical scaling. Simply put, it means that separate sets of character outlines are used for small and large point sizes, thus ensuring legible, good-looking type at every size. Optical scaling is an integral part of traditional typography, and professional typographers have lamented its omission. Multimaster fonts achieve optical scaling by using the point-size axis — by providing, say, a 6-point and a 24-point set of character outlines within the same set and font and interpolating between them.

**How It Works**

A single multimaster font can support one, two, three, or all four of the possible design axes. It’s up to the typeface designer to decide how many variations to allow and to provide outlines for the appropriate control points in the matrix. A multimaster font that offered variation along the width and weight axes, for example, would probably contain four outlines: Light Condensed, Black Condensed, Light Expanded, and Black Expanded (see Figure 3).

The designer also decides how many discrete steps are possible along a particular axis and can assign names to subranges along the continuum. For example, a font called Sansifa might have a weight axis with 100 steps, with Ultra Light assigned to steps 1 through 10, Light assigned to 11 through 20, and so on, up to Extra Black, at steps 91 through 100. If you create an instance of Sansifa at step 14, it would appear on your Font menu as something like Sansifa 14Light.

Multimaster fonts will come with a predefined set of intermediate fonts, or instances. For example, if our mythical Sansifa font had both weight and width axes, it might come with a set of nine predefined instances: Light Condensed, Medium Condensed, Bold Condensed, Light, Medium, Bold, Light Expanded, Medium Expanded, and Bold Expanded. If you installed the Sansifa bit-mapped font into your system (or activated it with Suitcase), all nine of these fonts would appear on your Font menu. Adobe will provide a font-creation utility that will enable you to generate additional instances anywhere within the matrix (see Figure 4). Creating new instances will add more fonts to your Font menu.

You might be wondering where you’re going to find the disk space to store these proliferating fonts. Not to worry. When you create new font instances, you aren’t actually creating new fonts — you’re only creating pointers to positions in the multiple-font matrix. It’s like using a blend tool on fonts, but instead of creating all the intermediate steps at once, you create road signs that give directions on how to find them when you need them. These pointers are added to the bit-mapped font installed in your system. (For technical types: You’re creating new FOND resources.)
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Specifications

<table>
<thead>
<tr>
<th>LZR 960 Controller Features</th>
<th>Memory</th>
<th>LZR 960 Engine Features</th>
</tr>
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<tbody>
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<td>Standard 2MB</td>
<td>Print Speed 9 pages/minute—letter or A4 size</td>
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<td>Adobe PostScript Level 2</td>
<td>Optional Additional 1MB, 2MB, 4MB, or 8MB</td>
<td>Resolution 300x300 dpi</td>
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<td>Controller Weitek® 8200</td>
<td>Host Interfaces AppleTalk, LocalTalk, RS-232, Centronics parallel</td>
<td>Paper Handling</td>
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<td>Optional 250-sheet cassette feeder, Envelope feeder (50 capacity)</td>
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<td>Letter, legal, executive, statement, A4 &amp; B5 cassettes</td>
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Dimensions

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<td>Height</td>
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When you want to display multimaster type, ATM interprets the pointer, creates the necessary character outlines on the fly, and displays the appropriate dots on-screen. Likewise, ATM makes sure that at print time, the necessary PostScript command is sent to the printer so that it knows how to take advantage of any multimaster fonts that have been downloaded. And, by the way, you do need ATM for multimaster fonts to do their magic. They don't work properly without it — and don't look for Apple to incorporate support for multimaster technology in the Mac System anytime soon.

One question remains unanswered: How fast — or slowly — will it all work?

Who Will Use Them?

Multimaster fonts have enormous practical benefits, including better copyfitting and improved readability at every point size. By making subtle adjustments to a multimaster font's width, size, and/or weight, you can solve all manner of copyfitting nightmares. For example, you can expand or condense headlines and display copy to fit a given space while maintaining the typeface's size and weight; conversely, you can retain a font's width while tweaking the size or weight. These adjustments can work wonders with body copy too, allowing you (or your application) to fit text to a given column length; improve justification; and eliminate widows and orphans, text "rivers," and hyphenated lines. Optical scaling improves text legibility at small sizes and ensures well-balanced letterforms at large point sizes.

The early users of multimaster fonts will have to use a separate utility to generate new font instances, however, so the unique capabilities of this technology won't be appreciated by a wide audience at first. Designers and type nerds will be the ones who take the time to create custom fonts for specific design applications. Other users may like the convenience of getting a whole family of fonts in a single file, but they will probably be content to stick with the set of font instances provided by the vendor.

That's phase 1. Phase 2 will arrive once applications such as Illustrator, FreeHand, PageMaker, and QuarkXPress have begun to give users direct manual control over multimaster fonts instead of requiring them to leave the application to create new instances. Expect to see support for the optical-scaling feature first, because
Multiple Master Fonts

Because Multiple Master fonts can produce a wide range of typeface variations, they can precisely match the copyfit of a document created in an entirely different typeface, even though designs of the characters in the Multiple Masters font might have little in common with those of the font they’re trying to match.

Figure 5: Because multimaster fonts can match the character spacing and “color” of other typefaces, they will be a godsend for making font substitutions. In the top example, the headline is set in 18-point Avant Garde Bold Condensed and the paragraph in 10-point ITC Garamond Light. The bottom paragraph, which is set in instances of the Adobe Sans multiformat font, matches the line endings and character widths of both typefaces.

Multiple Master Fonts

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applications already have the interface for taking advantage of this capability: a point-size menu. Developers need only make their applications aware of the existence of multimaster fonts for optical scaling to work. ATM will do the rest.

This advance will be followed shortly by new dialog boxes that let users specify weight and width gradations for multimaster fonts as easily as they now specify a point size. Ideally, you will be able to move a slider in a type-spec dialog box, click on the Apply button, and watch the attributes of your selected type change onscreen. When it becomes this easy for users to take advantage of multimaster fonts, more people will exploit their full functionality.

Phase 3: The real fun will begin when applications develop intelligent support for multimaster fonts — such as automatically substituting a multimaster font for a missing typeface or altering font width or size to fit copy into a given space. Because multimaster fonts can produce a wide range of typeface variations, they can precisely match the copyfit of a document created in an entirely different typeface, even though the characters in the multimaster font might have little in common with those of the font they’re trying to match (see Figure 5). This could be very handy if someone sent you a document in a font you didn’t have. Instead of your software reformatting the document and possibly destroying the original word positioning and line breaks, an application that made intelligent use of multimaster fonts could create a professional facsimile — right down to maintaining the text blocks’ color or overall density. Once applications have become this smart, you will find yourself taking advantage of multimaster fonts without even knowing you’re doing it.

Phase 4: Multimaster fonts will be incorporated into PostScript-printer controllers and drivers. Today when you print a document that was created with a typeface that isn’t available at print time, another font is usually substituted — Times or Helvetica if you’re lucky, Courier if you’re not. You’ve all seen such documents. They’re at their most entertaining when the person who created the original
lives 3,000 miles away and just went on vacation. You can wait for the designer's return, buy yourself a copy of the font used to create the document, or reformat the entire piece in a font you do have.

If printer controllers had built-in multimaster fonts, however, and applications and printer drivers had the smarts to direct the printer to use multimaster fonts when doing font substitutions, the resulting documents would satisfy user requirements in most cases.

Let's Get Real

Adobe says that it will release the first multimaster fonts this summer. (For the sun-worshippers among you, the last day of summer is September 20 — mark your calendars.) At press time, the company had announced plans to release a newly designed sans serif face with weight and width axes and a serif face based on Adobe's Minion design, with width, weight, and size axes. Other typefaces are sure to follow, but Adobe isn't making any commitments yet.

Several font vendors — ITC, Linotype, Monotype, and Agfa — have expressed interest in the multimaster technology. They say they will study their type libraries to see which typeface families are appropriate for redesign as multimaster fonts and will ponder using the technology to create new typefaces. But none of the companies is ready to announce any specific product plans.

Nor were the vendors of page-layout and drawing applications prepared to make promises. Even Adobe was unwilling to provide a shipping date for a version of Illustrator with built-in controls for multimaster fonts. However, you can expect font-format-conversion programs such as FontMonger and Metamorphosis to add the capability to create multimaster fonts from existing PostScript Type 1 outlines. But don't expect written guarantees that the results will be pleasant — or even usable. For multimaster fonts to work properly, the component outlines have to be designed very carefully.

As for printer controllers with built-in multimaster fonts or intelligent drivers: Don't lose any sleep waiting for them. Adobe would be happy to get PostScript Level 2 drivers and controllers out the door — with features it has already promised. The company's not exactly rushing to add new items to the vaporware list.

But don't despair: It may take years for all of this to happen, but happen it will. This is the future of desktop typography. ... And wait — for a moment, I thought I saw someone in an Apple T-shirt lurking in the corner, arms crossed, lower lip sticking out just a little. I thought I heard him mumble, "I bet TrueType could do that too." But he disappeared before I could ask any questions.

MacUser technical director Henry Bortman thinks fonts are OK but wishes he had a multimaster brain.

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(415) 321-4488.

By Henry Bortman

Data, anyone? Apple recently licensed its DAL (Data Access Language) technology to Blyth, maker of the Omnis 5 relational-database program. Blyth will develop DAL client software for DOS, Windows 3.0, OS/2, and UNIX machines. DAL is Apple’s connectivity language, a programming interface that allows application developers to write a single set of instructions for connecting to and accessing data from a variety of relational databases—Oracle, Ingres, Sybase, DB2, and others—on many different mainframes and minicomputers. DAL is built into System 7.0, but prior to the Apple/Blyth agreement, it could be used only from Macs, which limited its acceptance. On the server side, Pacer will develop DAL server software for database programs running on several UNIX platforms, including HP 9000, Sun SPARC, IBM RS/6000, and DEC ULTRIX computers. Apple will also market two new DAL servers—one for A/UX, Apple’s version of UNIX, and one for MVS/VTAM, an IBM-mainframe operating system. And Novell will develop DAL-server capability for its NetWare SQL database. In other words, DAL is well on its way to becoming an industry standard for flexible database connectivity. It’s about time.

For those who want an easy way to query their databases, Brio’s DataPrism is the easiest to use end-user query tool around. The newest version, 1.1, adds the ability to do local sorts and searches on large data sets retrieved from a database server. It also adds support for two database-connectivity options: Oracle’s SQL*Connect and TechGnosis’ SequeLink. $345, with free upgrade to registered 1.0 users; available now. In August, Brio will offer DataPivot, an Improv-like data-manipulation tool that lets you dynamically alter your view of data relationships and quickly format new reports. (415) 961-4110.

Crossing platforms? IPT’s Sun-Partner has upsed the interoperability ante for Macs and Sun SPARC stations. When installed on a SPARCstation, Partner lets Mac users access files on the SPARCstation’s NFS server volumes as if they were AppleShare volumes and lets Sun users access AppleShare server volumes (and under System 7.0, FileShare volumes) as if they were NFS volumes. $695 per SPARCstation, available soon. (818) 347-7791. NeXT: innovative interface, short on software. DOS: scads of software, no interface (at least none worth mentioning). Solution: Run DOS applications on the NeXT. SoftPC 2.0 for NeXT (Insignia Solutions, [415] 694-7600) lets you do just that while you’re waiting for all those NeXT applications Steve Jobs promised would be so quick and easy to develop. $499.
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System 7.0 on a Network

There are lots of tools for coordinating site installations of System 7.0—but most of the work comes before you run the Installer.

By John Rizzo

The network administrator’s nightmare: System 7.0 ships, and everyone wants its cool new features right now. A few users get copies of System 7.0 from friends and install it themselves. Then something goes wrong, and a dozen people are at your desk seeking help and you don’t know what they did or what was in their Mac when they did it. Other users are less well connected and want you to run around installing the new System on every Mac. Meanwhile, users of System 6.x and 7.0 battle each other for printer time, while everyone waits for the printers to reinitialize with different versions of the printer driver. There’s got to be a better way to do an upgrade.

Fortunately, there is: Use the network. The transition to System 7.0 can be a smooth and quick one if you use the network-upgrade tools available from Apple and third parties. Apple’s System 7.0 Group Upgrade Kit comes with a CD-ROM filled with goodies that ease installation frustrations. The kit lets users upgrade their own Systems over the network with a mouse click (see Figure 1).

Third-party network-management tools can save sneaker tread by telling you what each Mac needs in order to become System 7.0-ready. Unlike with previous System upgrades, however, much of the work will come before you run the Installer. (For a detailed look at System 7.0’s new features, see “70 Things You Need to Know About System 7.0,” June ’91, page 96.)

The Group Upgrade Kit

The first thing you should do is buy Apple’s System 7.0 Group Upgrade Kit. At $349 (estimated price at press time), the kit is more expensive than getting a copy through your local user group, but it’s worth its weight in shoe leather. The Group Upgrade Kit also comes with a site license that gives you the right to make copies and upgrade all the machines at your site.

In addition to the installation floppies that come with Apple’s Personal Upgrade Kit, the Group Upgrade Kit gives you the System 7.0 Upgrade CD-ROM. You mount the CD-ROM on an AppleShare file server, and the Installer can then be used to upgrade multiple Macs at the same time, saving you the exercise of installing System 7.0 on each Mac individually. (For more on individual upgrades, see “Converting to System 7.0,” elsewhere in this issue.)

If you want to give your users their own System-backup disks, the CD-ROM comes with a set of disk images and the Copy Disk application, which enable you to automatically create sets of installation floppies. The floppies you produce from the disk images are exact copies of the official Apple installation disks; they contain the Installer, System files, print drivers, and AppleShare, plus the usual extras (such as TeachText and Apple File Exchange). You can make installation sets of eight 800K floppies or five 1.4-megabyte floppies for everyone in the office. (The CD-ROM
The new Installer can be accessed by several users simultaneously.

Figure 1: Users can install System 7.0 over a network with a mouse click. This user has mounted an AppleShare volume that contains the System 7.0 installation folders, which the network manager placed on the network by using System 7.0's built-in file-sharing capabilities. The new Installer can be accessed by several users simultaneously.

Figure 2: Apple's Compatibility Checker is a HyperCard stack that scans your hard disk and tells you if your software is completely, mostly, or not at all compatible with System 7.0. It can also identify and remove incompatible INITs in the System Folder.

Network Considerations

Before using the Group Upgrade Kit, you should plan how System 7.0 will affect each part of your network. First consider the users' workstations, and decide which Macs to upgrade. Not everyone will need or want System 7.0 at first, and users who are on a strict deadline won't have the time to learn System 7.0 can be upgraded later.

System 6.x and 7.0 users can coexist on the same network if you perform the upgrade properly. One potential problem with a mixed network is incompatible LaserWriter drivers. Version 7.0 of the driver is not compatible with version 6.x (or earlier versions), which means users of these two versions will continually be resetting the printers. Fortunately, Apple's Group Upgrade Kit comes with a special Printer disk that lets you install version 7.0 of the LaserWriter driver on Macs running System 6.x. Users who have driver 6.1 don't need an upgrade, because version 6.1 is compatible with version 7.0. Both the 6.1 and 7.0 versions of the LaserWriter driver enable Macs to use TrueType fonts (provided they are running System 6.0.7 and have the TrueType INIT).

To upgrade AppleShare print servers, you have to do is add the new LaserPrep file from Apple's Group Upgrade Kit. Important note: You should not upgrade the System running under the AppleShare print or file server to System 7.0; the current release (version 2.0) of the AppleShare print and file servers is incompatible with System 7.0.

Fortunately, you don't have to wait for a System 7.0-compatible AppleShare to upgrade your network, because System 7.0 users can access AppleShare servers running System 6.x. In addition, System 7.0's built-in distributed-server scheme, called file sharing, is completely compliant with AFP (AppleTalk Filing Protocol). Both System 6.x and 7.0 users can access folders or disks that System 7.0 users have chosen to share; the shared volumes look like normal AppleShare volumes and are accessible through the Chooser. These folders are also accessible by DOS users who have Farallon's PhoneNetTalk PC (formerly called AppleShare PC).

System 7.0 users with CE Software's QuickMail need to upgrade to version 2.5. Like AppleShare 2.0, however, the QuickMail server software must run on top of System 6.0.5 or 6.0.7. Microsoft Mail users must upgrade to version 3.0 to be compatible with System 7.0; Mail

also contains complete System software for versions 6.0.3 to 6.0.7.)

There's also a HyperCard stack called the Compatibility Checker (see Figure 2), which scans a Mac setup and tells you if there is enough RAM and hard-disk space to run System 7.0 and whether you have incompatible programs. (To find out whether your favorite software is System 7.0-friendly, see "System 7.0: Getting Down to Business," elsewhere in this issue.) Another HyperCard stack contains a list of network software that's compatible with System 7.0. The stacks work with HyperCard 1.2.2 or later, and HyperCard 2.0 comes with the Group Upgrade Kit.

The CD-ROM also contains electronic copies of the documentation included with the Group Upgrade Kit. Although most Mac users don't use manuals, System 7.0 is a new species. When people forget how to turn off Balloon Help, you can avoid a crowd at your desk by posting the documentation on a file server or printing out copies. The documentation includes the What's New and Installing System Software guides, a new Macintosh Reference, and the Macintosh Networking Reference. (Apple dealers will be selling additional "five-packs" of these manuals for $249.)
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BRIEFS

OPERATING SYSTEMS

7 Steps for Installing System 7.0 on Your Network

1. Buy Apple's System 7.0 Group Upgrade Kit. Make electronic copies of the documentation available on the network.
2. Decide which Macs will get System 7.0.
3. Become System 7.0-savvy: Install and use System 7.0 on your Mac first. Run the Compatibility Checker to see if you have incompatible INITs or applications on your Mac.
4. Check users' Mac setups with a network data gatherer (StatusMac, NetworkSuperView, or GraceLAN). Correlate the data with Apple's list of incompatible software. Install needed hardware (RAM, PMMU chips), and remove incompatible software.
6. Mount the System 7.0 installation folders on the network. Tell users to access them and to click on the Install button before leaving the office for the day.
7. Make the Compatibility Checker available to users via a file server. Encourage people to use it after installing additional INITs and applications on their Macs.

Figure 3: StatusMac's System 7.0 Readiness Kit comes with report templates that identify users who may need training or extra hardware for System 7.0. The templates sift through the mountain of information that StatusMac gathers over the network.

Getting Ready to Upgrade

Before upgrading the Macs on your network, you should first familiarize yourself with System 7.0 by upgrading your own Mac. The last thing you want is cries of "Return to System 6!" because you can't answer questions. To make sure you don't have any INITs or applications that will bring System 7.0 to its knees, be sure to run Apple's Compatibility Checker before you do anything else.

To upgrade the rest of your network, you must first prepare the Macs. System 7.0 requires a hard drive and at least 2 megabytes of RAM, but most users will probably want more than that to run System 7.0 and today's RAM-hogging applications. Owners of the original Mac II who want to use virtual memory will need 68551 PMMU chips (only the SE/30 and II family support virtual memory). You should also check the compatibility of add-in boards; at press time, there were indications that some NuBus boards may

advise errors on LocalTalk or TokenTalk networks that use AppleTalk Phase 2. (For more on AppleTalk Phase 2, see "Finally Phase 2," November '89, page 248.)

servers can remain under System 6.x if you wish, but Microsoft recommends upgrading them to System 7.0 so they can use version 3.0's new features.

Macs running Apple's Internet Router software can use either System 6.x or 7.0, although there is no particular benefit to running Internet Router on System 7.0. If you do upgrade the router Mac, be sure you drag the LocalTalk (Modem) and LocalTalk (Built-in) files that are in the Mac's System Folder into the Extensions folder. The Installer automatically moves all other files to where they should be.

When you install System 7.0 on a network, Apple recommends that you upgrade all routers and workstations to AppleTalk Phase 2, if you haven't already done so. A network that mixes AppleTalk Phase 1 and Phase 2 can have communications problems under System 7.0. For example, if you install System 7.0 on an Ethernet network, workstations that use Phase 2 won't be able to talk to those running Phase 1. If you decide to keep the entire network on AppleTalk Phase 1, you must reinstall Phase 1 EtherTalk drivers on the System 7.0 workstations. Upgrading to System 7.0 doesn't have any

adverse effects on LocalTalk or TokenTalk networks that use AppleTalk Phase 2. (For more on AppleTalk Phase 2, see "Finally Phase 2," November '89, page 248.)
have problems with System 7.0.

There are also software-preparation issues. You need to verify that users don’t have an extra System Folder or two squirreled away on their hard disks and that each Mac’s complement of software doesn’t contain incompatible applications, INITs, and cdvs. If your office is small enough, you can run around to each Mac and use the Compatibility Checker (it doesn’t run over the network), but the Compatibility Checker gives you information only on third-party software — it doesn’t tell you anything about System software and hardware. The best method is to use a network-data gatherer such as Status•Mac from Pharois Technologies, Network SuperVisor from CSG Technologies, or GraceLAN from Technology Works. In a matter of hours, these programs can deliver information on the network’s hardware and software that might otherwise take you weeks to collect.

Status•Mac and Network SuperVisor create a database of the information you collect; GraceLAN gives you a one-time report on-screen or on paper. All three tell you what INITs and applications each workstation is running as well as the version number of its printer driver and System file. (Don’t be surprised if several users are already on System 7.0!) The reports also tell you how much RAM each Mac has and whether it has the 68030 CPU or 68551 PMMU chip needed to run virtual memory.

Pharois is now shipping the System 7.0 Readiness Kit with version 2.0 of Status•Mac. (Owners of version 1.0 can get the kit free from Pharois.) The kit contains a set of Status•Mac templates (see Figure 3) that ask questions pertinent to System 7.0. The templates also identify those users who may need training — by letting you know, for instance, who is not using MultiFinder or the System RAM cache, neither of which can be turned off in System 7.0. The templates also tell you who has set large RAM allocations for applications; these users are probably working with large files and can make good use of additional RAM. Finally, the Status•Mac templates let you know whether each user has enough vacant hard-disk space to run virtual memory.

Although you have to fix hardware incompatibilities by hand, you can use VersionTerritory from SoftWriter (1512 244-3999) to upgrade users’ software over the network. You teach VersionTerritory how to upgrade one machine, and then the program can upgrade the same applications on other Macintoshes on the network automatically. VersionTerritory works in the background, without interrupting the users’ work.

**The Installation Process**

Once you’ve finished all your compatibility checks and other preparations, you’re ready to install System 7.0 on the workstations. The simplest method is to mount the installation folders on the network and let users access them individually, preferably by clicking on the Install button before they go home in the evening. The System 7.0 Installer can do multiple upgrades simultaneously, and night is a good time to perform the upgrades, because network traffic from the multiple installations is likely to be heavy.

There are three ways to mount the installation folders. The easiest method is to mount the System 7.0 Upgrade CD-ROM on a Mac running System 7.0 and then use file sharing to make the installation folders available on the network. There’s no mandate that file sharing has a limit of 10 users per folder.

For bigger upgrades, you can mount the CD-ROM as a volume on a dedicated AppleShare File Server, which is faster than System 7.0’s file sharing. However, you won’t be able to restrict users’ access to other parts of the CD-ROM, because it is a read-only volume. You can get around this by copying just the installation folders to an AppleShare hard disk. You’ll probably want to disable the Make Changes privileges to prevent people from fiddling with the files.

You should also make the Compatibility Checker available on a file server. Users should be encouraged to use it after installing new INITs or applications on their Macs, because fresh incompatibilities will probably crop up as time goes on. Before you trash a suspect INIT, however, try moving it around in the System Folder. Some INITs may not work in the Extensions folder (their new home in System 7.0) and may have to sit at the top level of the System Folder. These sorts of problems shouldn’t be of too much concern, but you’d better get used to troubleshooting for a while — there are likely to be lots of things floating around that System 7.0 doesn’t get along with.

Technical editor John Rizzo has been beta-testing System 7.0 for a year and is relieved to see the real thing.
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Holistic Troubleshooting

If your network isn't improving office productivity, the problem may lie not in the technology but in the way you're applying it.

By Kurt VanderSluis

The goal of a computer network is to improve productivity by streamlining communications, automating time-consuming and inefficient tasks, facilitating information access, and sharing expensive resources such as laser printers. As a network manager, you can do more to improve productivity than just installing the latest hardware and optimizing wiring schemes: You can teach people how to use the technology to complete their work faster and more easily. Sometimes this means trading a traditional method of exchanging information for a new one, such as replacing paper memos with electronic mail. In other cases, completely replacing a noncomputerized system can actually hurt productivity; instead, you should focus on enhancing it. The trick is to figure out which tasks are best suited to computerization and how to apply network technology for optimum productivity.

Some forms of interaction have to be done face-to-face and shouldn't be replaced by an electronic method. In such situations, you should consider how to enrich — rather than replace — the existing procedures. One example is an employee’s performance review by a supervisor. Although conducting the review by E-mail might make the process more efficient and less time-consuming, it’s the wrong sort of task to computerize, because the success of the review depends on face-to-face contact.

Improving productivity doesn’t mean depersonalizing the office; instead, we want to make people’s interactions more meaningful and effective. In terms of the performance review, using E-mail to schedule the appointment and exchange review materials that must be prepared ahead of time means that both the supervisor and the employee can arrive at the interview with all the “paper” work completed, thus focusing the meeting on their personal communication.

Other procedures can be enhanced by computer technology if current methods are only partially successful in accomplishing their goals. Suppose one of your company’s business goals is to have greater project visibility among departments. Increasing the information flow among departments would help avoid duplication of effort and create more synergy between the company’s projects. Unfortunately, communication between departments is almost nil. If your workplace is like most companies, the common methods of exchanging information interdepartmentally are casual encounters in the hallway, at the vending machines, or on the company sports team. Although some information is being exchanged, it happens only by chance and is therefore unreliable. Computerizing this random and incomplete information exchange won’t make it successful, however, unless it is first redesigned.

Sometimes you can prototype an electronic setup by first creating a noncomputerized system that accomplishes similar goals. In our example, you might create a special bulletin board that displays people’s pictures and their project descriptions, institute a series of lunchtime seminars, or start publishing a newsletter. During this prototyping phase, you can observe and fine-tune the process until you’ve learned exactly what works and what doesn’t. You’ll also find it easier to get people started using a brand-new system if it has a physical component. Having a bulletin board or a newsletter gives people a visual reminder to make their
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contributions to the interdepartmental exchange.
Once the new system is in place, casual conversations will still take place in the hallways, but they may be more informed. Instead of “Hey, nice tie — what are you working on these days?” you may hear “Hey, nice tie — that study of the ethnography of Pacific logging companies in the 1880s sure sounds interesting. How are you guys coming along?”

Now that you have a working setup that accomplishes your information goals, you can evaluate whether it can and should be computerized. The potential benefits of computerizing your information-exchange process might include the ability to add more people, departments, and company sites; the ability to update information more often and with less effort; and, place and time-independence of the information. There are also arguments against computerization: No one person is responsible for managing and updating the information, so the system might disintegrate or lose focus. Some people won’t use the computer, whereas everyone will certainly pass by the bulletin board.

It’s hard to predict exactly what will happen, so be flexible. Perhaps some people won’t like E-mail and will resist the new system. On the other hand, the very fact that the communication is time and place-independent may make some people who were formerly excluded from group dynamics feel included for the first time. During the precomputer phase, pay particular attention to elements of the system that make it successful. Do people like the pictures, the ability to casually browse through the information, or some particular gossip content? Be sure to integrate these success-making elements into the computerized solution.

Some office chores may work the way you’re doing them now but involve a lot of effort or drudgery to complete. Replacing the current procedure with an electronic method may significantly boost productivity. To find out which tasks would benefit from computerization, look around your office and talk to your users. The resulting list might include such things as filling out and turning in expense and status reports, scheduling meetings, generating and approving documents, coordinating resources, and leaving messages for people who are away from the office. Meet with a few of the users, and pick a task or two that you can automate with your existing technology. To computerize the task, you may have to develop some macros, make spreadsheet word-processing templates, create a new E-mail form, or develop a simple database or HyperCard stack.

For example, you might use a spreadsheet template and E-mail to automate expense-report filing. This is usually a good candidate task because it involves drudgery, it does not depend on human contact, and you probably have a working method already. To computerize this chore, you must create a spreadsheet template for the report and make it accessible to all users by placing a locked version on your file server. If using a spreadsheet is beyond your users’ capabilities, you can create a HyperCard stack that builds the report for them. Once the stack or spreadsheet has been created, you can make it easily retrievable by linking it to your E-mail system with Microsoft Mail’s HyperCard or Excel hooks or through CE Software’s QuickMail menus.

When you’ve finished the development phase, try your new solutions out for a week or so to make sure that you’ve worked out all the bugs. Be sure to include users with a complete range of computer abilities and aptitudes in your beta-testing process. This solution must be for everyone, not just the experts. Use this beta-testing period to find out where the new method is more difficult, confusing, or laborious than the old process. Don’t hover over the testers’ shoulders while they try it — you want to find out how usable the setup is when you’re not there.

Once you’re ready to unveil the enhanced or overhauled office procedure, do it with flair. It’s important to get a critical mass of employees using the new method right away, or it may fail for lack of participation. Put out memos and hold an open house to make sure that everyone finds out about the innovation. Create computer-based instructional materials to ease the transition. Use your beta testers to help people who have trouble with the new system.

Computerizing an office is tricky. If you’re flexible with your solutions and listen carefully to the users, however, your methods will be appreciated and successful. Applying the right solutions to the right problems will make your office more productive and help people spend their time doing more meaningful work.

Kurt VanderSluis is president of The Network Group, a training and consulting firm in Seattle.
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PACIFIC DATA PRODUCTS
Converting to System 7.0

This step-by-step guide to switching to the new System will have you up and running in no time.

By Craig Danuloff

Installing a System-software upgrade has its own thrills — where else can you find the allure of the new and exciting mixed with the danger of incompatibility? During its protracted beta-testing, System 7.0 proved itself to be fairly compatible with existing applications and utilities and safe to both hard drives and data — but this doesn’t mean that you should upgrade to System 7.0 without planning or taking some precautions.

There are two ways to get System 7.0: The Personal Upgrade Kit and the Group Upgrade Kit. For those who are using the Personal Upgrade Kit, the following ten steps show how to install the new System software and to quickly begin taking advantage of the new features of System 7.0. Before you do anything, however, remember to back up your entire hard drive and keep a copy of your old System in a safe place.

(See “System 7.0: Getting Down to Business,” elsewhere in this issue, for the ways to get aboard of System 7.0, and “System 7.0 on a Network,” in this issue’s Bridges section, for how to install it across a network.)

1. Take a tour of System 7.0’s new features. The Personal Upgrade Kit contains two extra floppy disks: Before You Install and Networking Basics Tour. If you’re unfamiliar with what the new System has to offer or if you’re new to the Mac, spend some time with these disks. Before You Install includes a HyperCard tour of System 7.0’s new features (see Figure 1) plus a minitutorial on multitasking within the new Applications menu.

The Networking Basics Tour is another HyperCard stack that introduces you to the Mac’s expanded networking capabilities and explains file sharing, the role of the Chooser.

![Figure 1: You can tour System 7.0 while still running System 6.x by exploring the Before You Install disk that comes with your new System software. A HyperCard stack on the disk outlines the System’s new features and includes a minitutorial on multitasking.](image1)

![Figure 2: Installing System 7.0 is simply a matter of launching the installer on the first disk of the new System software. The Easy Install option installs the System software and all printer drivers and network options. The Customize option, shown here, lets you select your own installation options.](image2)
and aliases across a network. (For a detailed description of what System 7.0 has to offer, see “70 Things You Need to Know About System 7.0,” June ’91, page 96.)

2. Run the Compatibility Checker. System 7.0 is a sophisticated leap forward in System software, so you may have some compatibility problems with programs you used without problems under System 6.x. To minimize the impact of incompatible programs, Apple has included a HyperCard stack on the Before You Install disk that searches for incompatibilities on all the hard disks connected to your system. The Compatibility Checker contains information on about 150 of the most frequently used Mac programs (the exact number of programs to be included was not set at press time). When you run the checker, you get the following information: whether you have enough memory and disk space to run System 7.0, which incompatible programs should be removed before you install System 7.0, and which applications that work under System 7.0 are in available newer versions.

After you’ve backed up your entire system, go ahead and weed out those applications and utilities that might cause problems under System 7.0. INITs and cdevs can also cause problems. If you’re installing System 7.0 onto a hard disk that’s running System 6.x, you should create a new folder for all the INITs and cdevs in the System Folder that you are not absolutely sure will work under 7.0—including network and printer drivers from vendors other than Apple.

3. Run the System 7.0 Installer. Your new System software comes on eight floppy disks; installing System 7.0 is simply a matter of using the Installer on the first of them. Unlike previous System-software versions, System 7.0 can be installed onto your hard drive even while that drive is the startup disk.

After launching the Installer, you can either use the default Easy Install, which installs the System software, printer drivers, and network options listed in the Easy Install dialog box, or you can use the Customize button, also in the Easy Install dialog box, to select your own installation options (see Figure 2). As the installation proceeds, you’ll be prompted for the additional floppy disks.

![Figure 3: System 7.0's "invisible hand" helps keep your System Folder organized. If you drag extensions, control panels, or other files into the System Folder, System 7.0 automatically places the files in the correct folder.](image1)

![Figure 4: System 7.0's Labels control panel lets you color-code your applications and files for easier identification. You can name up to seven category labels and configure their colors.](image2)
If you’re installing System 7.0 on top of an existing copy of System 6.x, bit-mapped fonts in the old System file will be moved into the new System file, and DAs will be converted into stand-alone applications and be placed in the Apple Menu Items folder.

4. Restart your Mac. Welcome to System 7.0! As the new System mounts each of your hard drives or partitions, you’ll see the message “Updating for New System Software.” Don’t be alarmed — no data on your drives will be changed and you can still use your data with older versions of the System software if you need to.

Once you’re sure your System is working, you can begin reinstalling your favorite INITs (renamed extensions) and edevs (renamed control panels). If you’ve created an INIT’s folder or if your 6.x System Folder is on a separate hard-disk volume, drag the icon of one extension or control panel at a time onto the icon — not into the window — of the System 7.0 System Folder.

It’s important to reboot after each new addition to make sure that each one works with other extensions and applications. If you install several at once and then have problems, you won’t know which is the troublemaker.

System 7.0 is “intelligent” about where to put extensions and control panels: It puts them into what it believes to be the proper folders (see Figure 3). Unfortunately, many extensions and control panels originally developed for use under System 6.x don’t behave properly when placed in their new homes. You may have to move things around a bit to get them to work. Try putting troublesome extensions into the System Folder itself instead of in the Extensions folder (you’ll have to open the System Folder window to do this instead of dragging the extension’s icon into the folder).

Also pay attention to where you (or System 7.0) put auxiliary files (such as preferences or data files) that some extensions and control panels need to access to run properly. Again, try moving things around if you have trouble. If all else fails, call the product’s tech-support service (if your problem is with commercial software) or hit the bulletin boards (if you’re dealing with shareware or freeware).

You can now install additional extensions, control panels, and printer or network drivers by dragging them into the System Folder.

You can add up to 52 items to the Apple Menu Items folder; each of these items then appears on your Apple menu.

5. Install additional fonts. System 7.0 automatically installs the default bit-mapped Mac fonts (New York, Monaco, Geneva, and Chicago) along with TrueType versions of Times, Helvetica, Courier, and Symbol into your System 7.0 System file. Any other bit-mapped fonts that were in your System file are also copied into the new System file.

To install bit-mapped fonts that aren’t in the System file, drag their suitcases onto the System Folder or System-file icon or open the font suitcase (double-click on it) and drag the fonts one by one onto the System Folder or System-file icon. Installing Type 1 outline fonts isn’t quite this straightforward. At press time, Adobe was still working out how ATM will operate under System 7.0. For now, if you use Suitcase II with ATM, you can continue doing so — but you’ll have to use version 1.2.9 of Suitcase II.

6. Convert your DAs. DAs stored in DA suitcases cannot be used in System 7.0 until they’re converted to stand-alone, double-clickable applications. The easiest way to convert them is to install them in the Apple Menu Items folder by dragging the DA suitcase into the System Folder. If you want to place DAs outside the Apple menu, double-click on the old suitcase icon. This opens a window in which the DA appears as an application icon. All you have to do is drag the DA out of this window into any folder or volume, close the suitcase window, and delete the empty suitcase.

7. Define labels. The Finder’s Label menu allows you to classify your files using seven categories. To configure the names for each label, open the Labels control panel in the Control Panels folder, usually found on the Apple menu (because control panels are double-clickable under System 7.0, they’re no longer necessarily on the Apple menu). This control panel lets you change not only the label names but the color as well (see Figure 4).

You can assign label categories any way you want. For example, you can use one label for System-software files, one label for applications and utilities, and the remaining five for large projects or data classifications that describe your files.

8. Create aliases. There are two types of aliases you’ll want to create immediately. First, create aliases for your favorite applications, utilities, folders, and files. Install these aliases on the Apple menu by placing them in the Apple Menu Items folder inside the System Folder. These programs will now be accessible from the Apple menu. Second, create aliases for files you would like to access easily but now keep on removable media, floppy disks, or network servers to save space on your local hard disk. Alias icons take up only 3K of space each, and you can store them anywhere on your hard disk. When you double-click on an alias icon or select the filename in an Open dialog box, you’ll be prompted to insert the disk containing the original file or the network volume containing the file will be mounted.

9. Customize the Apple menu. You can add up to 52 items to the Apple Menu Items folder, inside the System Folder, and each of these items then appears on your Apple menu. You can add five types of files: applications (including what were DAs in earlier System versions), control panels, folders, documents, and network volumes. To keep your hard disk organized, don’t put original files into the Apple Menu Items folder — use aliases instead.

10. Configure virtual memory and 32-bit addressing (optional). Using the Memory control panel, turn on the Virtual Memory option if you would like to use a portion of your hard disk to increase the amount of available memory. This option requires a 68030 or P6800 chip, which limits it to the SE/30 and Mac II family. If you’re using a Mac LC, IIsi, IICI, or IIfx, you can turn on the 32-Bit Addressing option, which allows you to use more than 8 megabytes of installed RAM in your Mac. By combining virtual memory and 32-bit addressing, you can access up to 1 gigabyte of memory (provided you have the disk space) — but only on the IIsi, IICI, or IIfx (the LC doesn’t support virtual memory). Some existing applications are not compatible with 32-bit addressing, so take care when first working with this option. After changing the options in the Memory control panel, you must restart your Mac for the new option settings to take effect.

Craig Danuloff is the author of The System 7.0 Book (Chapel Hill: Ventana Press, 1991) and the Encyclopedia Macintosh (San Francisco: Sybex, 1989).
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Seven Can Wait

When should you upgrade to System 7.0?  What’s it going to cost you?  Here’s the scoop about what to expect and when to expect it.

By Bob LeVitus

By now you’re probably sick of hearing about System 7.0.  The last couple of issues of MacUser have focused on it, and it’s been mentioned, dissected, discussed, analyzed, and speculated about in almost every issue for the past 18 months.  But with a couple of exceptions, almost everything I’ve read implies that you should switch to System 7.0 the moment it ships.

Not so fast.  This may be an unpopular viewpoint, but for many of you, sticking with System 6.x a while longer is smart.  Unless you don’t have to worry about deadlines and your work environment is extremely straightforward — that is, you don’t use a lot of applications, INITs, cdevs, and DAs — your upgrade will be smoother and you’ll encounter fewer bugs if you wait a few months.  When you do upgrade, be prepared to dip into your wallet frequently — not just for the System 7.0 upgrade itself but also for extra RAM (if you have only 1 megabyte) or a bigger disk drive as well as upgrades to any incompatible software you may use and upgrades to new System 7.0-friendly versions of your favorite programs.

Apple 7, Users 0

Let’s face it:  System-software version numbers that end with a zero can have their problems.  For example, the bugs weren’t shaken out of System 3.0 until version 3.2.  More recently, System 6 took a couple of upgrades to stabilize, and for some people, version 6.0.4 was the first reliable version.

Don’t get me wrong — rewriting the Macintosh operating system from the ground up is a big job, and System 7.0 is the most comprehensive, demanding software-engineering project Apple has yet undertaken.  What’s more, System 7.0 is undergoing the most extensive testing ever — several months before its official release, beta copies were in the hands of more than 13,000 software and hardware developers, Apple employees, and computer journalists.  When the fourth beta version was released last February, it was so stable that I started using it every day.  Even so, System 7.0 will have bugs — bet on it.  In fact, I’ll eat my cowboy hat if we don’t see System 7.0.1 (and maybe even 7.0.2) within six months of the initial release.

The point is, if you upgrade to System 7.0 the day it’s released, you’ll probably have to upgrade again in a few months.  Several months later, you may have to do it yet another time.  So why not save yourself a couple of painful and time-consuming upgrades by waiting a couple of versions before making the switch?  Let other people field-test System 7.0 while you’re being productive with System 6.x.

It’ll Cost You...

Because the upgrade is big (ten floppies or a CD-ROM), it’s going to cost something to get your copy, whether you get it from a user group; from an on-line service such as CompuServe, GEnie, or America Online; or as a shrink-wrapped upgrade from an authorized
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Apple dealer (see “System 7.0: Getting Down to Business” elsewhere in this issue for prices). The cost for copies from user groups will vary, but I can’t imagine it being much less than $30 or $40 per ten-disk set. The cost of downloading it from an on-line service will be at least that expensive. And, of course, copies downloaded or purchased from user groups don’t include printed documentation.

But the cost of System-software upgrades is only the beginning. The hidden costs come when you have to upgrade applications, INITs, and cdews. Although I’m still using a beta version of System 7.0 as I write this, if my experience is any indication, you’re going to find that some of the programs you depend on aren’t 100-percent compatible with System 7.0 and will require an upgrade (see Table 1 in “System 7.0: Getting Down to Business” to find out how several popular programs fare).

There are different degrees of compatibility. Totally incompatible programs — of which there are very few — crash immediately if you try to use them with System 7.0. Several programs are partially incompatible — they work most of the time but crash occasionally or malfunction in some nonfatal manner. You may be able to limp along with one of these programs, but you’ll want to upgrade eventually. And many of the programs you use under System 6.x work under System 7.0 with virtually no problems at all. The best programs of all, however, are those that are “System 7.0 friendly” — these programs not only run perfectly but also take advantage of System 7.0-specific features such as balloon help and publish-and-subscribe. A few System 7.0-friendly programs should be available by the time you read this, but System 7.0-friendly versions of some of your favorite programs may take a little while to appear.

Because I am writing this before System 7.0 ships, I tried to find out what other users think will happen when System 7.0 is released. I posted the following question on Znue: “What percent of the software that you use do you expect will require an upgrade to be totally compatible with System 7.0?” The responses ranged from 10 percent to 75 percent, with all respondents expecting at least one or two of the programs they use successfully with System 6.x to break under System 7.0. So you may be looking forward to upgrading at least 10 percent of your software after installing System 7.0. And if you want the snazzy new System 7.0-friendly versions that should start appearing about now, prepare yourself for even more (and more expensive) upgrades.

**Face it — no matter when you install System 7.0, some of your software will need upgrading. And that’s gonna cost you.**

Most of the publishers I talked to hemmed and hawed over committing to free upgrades.

**If It Ain’t Broke . . .**

System 6.0.5 and 6.0.7 are remarkably stable, as are the broad spectrum of applications, INITs, and cdews we use with them. Because this is the case, you may as well wait a while until both System 7.0 and all those new System 7.0-friendly programs get their kinks worked out. You may spend more time working and less time troubleshooting if you stick with dependable old System 6.x for just a little while longer.

Besides, for those who are in a hurry to use some of those cool new System 7.0 features — such as aliases and file sharing — some of them are available now from third parties for use with System 6.x (see “Living Without System 7.0,” June ‘91, page 218). You may find the System 6.x counterparts just as good as their System 7.0 equivalents. In fact, as Mac guru David Sterneight puts it, “Given the time, effort, and hype put into it, I feel that for users with sophisticated System 6 configurations, System 7.0 will prove a big disappointment. On the other hand, for those who haven’t spent heavily on System 6 extensions, they will get many features they now have to pay for ‘free’ (although
they're not as powerful in some cases) with System 7.0.

For example, if you like System 7.0's aliases (which let you clone icons and place the clones anywhere on your hard disk), you'll appreciate HandOff II (from Connectix), Tiles (from CE Software), and File Director (from Fifth Generation Systems), which are powerful tools for organizing your work in System 6.x without moving files or folders around. Although aliases are one of the nicer features of System 7.0, all three of these products provide (in my humble opinion) more elegant functionality under System 6.x than aliases do under System 7.0.

That's not to say that System 7.0 doesn't have powerful and unique features. IAC (interapplication communication), the feature that allows programs to send information to each other, will revolutionize the way we and our computers work together. A simple example of IAC is publish-and-subscribe, which provides live links between documents. Say you create a bar graph in Excel and want to use it in a program, such as MacWrite II, that doesn't have a built-in graphing function. Rather than copying the graph and pasting it into the word-processing document, you can publish it, which makes it available to other programs. When you open MacWrite and subscribe to the bar graph, it appears in your MacWrite document. If you return to Excel and change the bar graph into a pie chart, the bar graph in the MacWrite document automatically becomes a pie chart. The implications are astounding, especially when you consider that you can use publish-and-subscribe over a network, using System 7.0's built-in file-sharing capability.

Unfortunately, programs using publish-and-subscribe will initially appear slowly. The big players will implement it first — look for System 7.0-friendly applications from companies such as Microsoft, Claris, and Farallon when System 7.0 ships. Eventually, most Mac programs will have capabilities far more powerful than publish-and-subscribe built in to them, and you'll wonder how you ever got along without IAC. But I think the process is going to take a couple of years. Programs have to be rewritten to take advantage of IAC, and that won't happen overnight. In fact, I predict that by the end of 1991, less than 20 percent of available software will support publish-and-subscribe.

This is a case in which there is a similar feature under System 6.x but the feature is nowhere near as powerful as that in System 7.0-friendly programs. Microsoft Word and Excel have "hot links" that are similar to publish-and-subscribe, but the implementation is clumsy compared with that of System 7.0. PageMaker can update linked graphics or text automatically or manually. Although these features are mere shadows of what System 7.0 will eventually be capable of, they do work reliably — and they do work now — with System 6.x.

**The Bottom Line**

As MacUser contributing editor Robert Wiggins said last November, "If stability means more to you than being the first on your block with a new toy, you might just wait a few months to see how it goes for the pioneers" (see "Sixes and Sevens," November '90, page 41). Or as my friend Bubba says, "This is one case where it pays for power users to be behind the power curve.

For when you do decide to upgrade, here's my advice for making the transition smoothly:

If you have two hard drives or a removable drive, keep your stable everyday System 6.x configuration on one and install System 7.0 on the other (or install System 7.0 on a removable cartridge). Use the Startup Device cdev (it's called Startup Disk in System 7.0) to control which disk is the startup device. If you don't have two hard disks, keep a floppy System 6.x startup disk handy so you can start up under System 6.x if you need to.

This advice is particularly germane to people who are in tight deadline situations, are involved in production work, or can't afford any downtime. If something that used to work under System 6.x doesn't under System 7.0, you can just restart in your old, comfortable System 6.x environment and get the job done.

Last but not least, perform a complete backup before you install System 7.0 for the first time. Or at the very least, back up your System Folder.

I can't wait for the day when every one of my programs runs as well under System 7.0 as it does today under System 6.x. And the day when every program I use is System 7.0-friendly will really be a day to celebrate. Unfortunately, those days are still sometime in the future.

Bob LeVitus — author of Dr. Macintosh and Stupid Mac Tricks — takes over this month as Beating the System's regular columnist.
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As pretty as 24-bit color is, it can soon overwhelm your system. Here’s how to keep it under control.

By Thom Hogan

I can’t think of a single Mac user who hasn’t been seduced by the beauty and subtlety of 24-bit color. Most people take one look at a two-page color monitor displaying 24-bit color and immediately decide that this is the display to lust after, the one to put at the top of their wish list. It’s not just a luxury, either — 24-bit color is almost a necessity for anyone dealing with color photos or specifying colors in the Pantone or CMYK systems. Color can also enhance multimedia presentations and makes presentation products such as PowerPoint and Persuasion look their best. And 24-bit color isn’t all that expensive — really. You can buy a new display card that works with your Apple color monitor for less than $1,000.

So if you’re stepping into the world of 24-bit color, let me be the first to congratulate as well as warn you: You’ll be the envy of your Mac-using friends, but you’ll also find a lot of bothersome problems.

Turning It On and Off

Assuming that you’ve upgraded from 8-bit color (the quasi-standard of the Mac II realm), manipulating 24 bits of color means that your machine is doing a lot more work to put images onto the screen. Because all that work goes through the Mac’s central processor, your machine slows down — no matter what you’re doing. So, the first rule to learn once you’ve installed a 24-bit-color board in your system is: Don’t use it all the time.

For example, when you have 24-bit color active, whatever program you’re using may develop the annoying habit of flashing as you scroll or as the screen redraws. Frankly, I can’t stand the flash, so I turn 24-bit color off while working with programs that aren’t dependent on color, such as word processors or spreadsheets. As a side benefit, I also get faster scrolling and graphics drawing.

How do you turn 24-bit color off? If you think the only way is to pull down the Apple menu, choose the Control Panel, and go to the Monitors cdev, you’re wrong. Fortunately, there’s a much easier method. The second rule for using a 24-bit-color-system (indeed, any color system) is: Get a copy of Switch-A-Roo. Similar utilities are available (Screen Flipper, for example), but Switch-A-Roo is my favorite. It’s simple, and it’s free (you can get it from Zmac and other freeware sources) — what more can you ask for? Switch-A-Roo is an Fkey that lets you configure Command-Shift-9 as a toggle between two video parameters (see Figure 1). For example, now that I have a 24-bit-color board installed, I generally set the toggle between 24-bit and 8-bit color. Switching to the lower color resolution results in faster screen updates (and gets rid of those annoying screen flashes). And to be perfectly honest, I rarely use my system’s 24-bit-color capabilities. Only when I’m manipulating color or touching up color transitions in a graphic — with Adobe Photoshop, for example — do I turn on 24-bit color.
Is Your Disk Big Enough?

If you use 24-bit color a lot (to create or manipulate graphic images, for example), you’re going to discover another little rule of the high-resolution world: Your hard disk is never big enough.

Because the size of scanned or painted 24-bit-color images can be stupendous, you need to prepare your system to deal with large files. There are several ways to do this:

- Use a removable-media drive.
- Buy a high-speed, high-capacity hard-disk drive.
- Compress your images on-disk.
- All of the above.

I use removable-cartridge drives for large graphic images. Even though my 42-megabyte cartridges don’t hold many high-resolution images each, I prefer not to have images cluttering up my regular hard disk. A simple labeling-and-shelving system makes it easy for me to find the image I’m looking for, and I tend to group related images on cartridges. Because I have a dual-drive Bernoulli box, I can copy these images quickly (it takes just a couple of minutes to copy a 42-megabyte cartridge from one drive to another), and I simply send the copy to the client or service bureau. One warning: This is an expensive way to deal with the problem of large 24-bit images — even with the discount prices now available, removable cartridges cost about $75 apiece.

The second solution is to buy the biggest, fastest, meanest hard drive you can find. I strongly suggest that if you select this route, you think seriously about stretching your budget as far as it will go. A 200-megabyte drive probably isn’t enough if you’re doing a lot of work with 24-bit color. Indeed, I’d look long and hard at those still-very-expensive optical-cartridge drives: They have removable cartridges, and some are fast enough to be tolerable as a regular drive — nice if you’re working with hundreds of high-resolution images. In short, money shouldn’t be the object here: Get the fastest, highest-capacity drive you can afford.

Another potential solution is image compression. Several products — Colorsqueeze from Kodak and Storm Technology’s PicturePress, for example — have been developed to work exclusively with color images. These products distort the image quality in order to compress it. JPEG compression can result in slight image-quality loss, depending on the level of compression you require, but this is usually not noticeable except at very high levels of compression. These compression products are pretty impressive, letting you reduce a 7-megabyte picture down to an image that’s far less than 100K!

The problem with any of these image
compression programs is that they require an extra step when you’re loading or saving images, and the software can take a while to perform its magic. If compression intrigues you, keep your eyes open, because several hardware compression products will soon appear. It’s quite possible that these will be fast enough to warrant a serious look by anyone using 24-bit color.

Probably the best solution for dealing with huge files is to combine the methods I have outlined above. For example, it makes sense to compress images when you archive them onto a removable cartridge. Compression is still a bit too slow to justify doing it as you’re working on an image, however. Instead, compress the image when you’re finished working with it or need to send it to a service bureau. Use compression as an archiving technique that saves space on your hard disk or when sending files across a network or via modem. (For more on dealing with huge files, see “Too Big to Fit on a Floppy?” February ’91, page 232.)

Can You Make It Faster?

How about QuickDraw accelerators? These accelerator cards improve your Mac’s processing speed by routing QuickDraw calls away from the Mac’s CPU. If you frequently work with 24-bit color, you might want to consider them carefully, because a good accelerator can come close to eradicating the speed lag 24-bit color adds to your system’s screen drawing. The time to consider accelerators, however, is before you buy your 24-bit board. Apple, RasterOps, Radius, and SuperMac have acceleration products. Each company has taken a slightly different tack, and you’re probably best off if you purchase a video board and an accelerator from the same company.

Despite the claims various companies make, most of these accelerators do about the same thing: They make working with 24-bit color faster than working with 8-bit color. Because of the way the company’s designs differ, you’ll find that certain accelerators do better with certain software products. Your best bet is to take the software you use most to a store that will let you try out the accelerators you’re considering. If you use a wide range of software products in 24-bit color, you’ll probably find that the accelerators all have about the same effect. The accelerators provide only a modest improvement in 8-bit-color mode all the time. Apple’s 24-bit accelerated color board, the Macintosh Display Card 8+24 GC, is the exception: At least in the limited time I used it, it seemed to be significantly faster in 8-bit-color mode than the Radius and RasterOps accelerators I’ve used more extensively.

Accelerators have their disadvantages. If you don’t have a II, IIX, or IIfx chassis, a 24-bit-color card and an accelerator will certainly put you near the limits of your computer’s power supply. Things are improving on this front as new technology comes to play, but if all the slots in your Mac are filled or you have a hard drive that draws substantial power, you may have problems. Moreover, the large power draw of these boards results in extra heat — so make sure your machine is well ventilated and the fan is not clogged with dust.

Expect to find some of your software acting idiosyncratically if you install an accelerator. Early versions of Adobe Illustrator were notorious for not working with new color hardware released by third parties. Fortunately, Adobe has fixed those problems in later releases, but you’ll still occasionally find a software product that objects to what 24-bit-color is doing in the background. That’s another reason to have Switch-A-Roo handy. Many of the programs that react violently to 24-bit color run fine when you switch to 8-bit mode.

What You See Ain’t What You Get

And then there’s the issue of color matching. The problems inherent in color calibration are almost overwhelming: Color varies across a monitor, lighting can affect your perception of color, you can make only an approximate match between colors on-screen and colors from a color printer, the color-separation and printing process you use directly affects the color rendition, and on and on. Even those people I’ve talked to who use calibration systems such as TekColor from Tektronix or Radius’ PrecisionColor Calibrator say that although these systems help, they don’t.
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In Living Color

Once you've acquired a 24-bit-color board, you'll probably spend a fair portion of your computing time in 24-bit color. The old standard, 8-bit color, will begin to look about as sophisticated as a coloring book with a limited palette of crayons, and if you're working with photographic images, the detail and subtlety of 24-bit color will be hard to resist.

Nevertheless, I'm a pragmatist and I think you should be too. Besides the tips I've just provided, let me leave you with one more thing to consider: More is not always better. Consider that multimedia presentation you're putting together. Yes, it would be great to use photos as backgrounds when you play back your presentation on a 35-inch Mitsubishi monitor, but if the audience has to wait for those detailed images to load, which can take seconds on even the fastest Mac, you risk losing a sense of pace or, worse still, losing the audience. Although the people I know who are working in multimedia have installed 24-bit color in their machines, the two best presentations I've seen were done in 8-bit color. They were fast, they had snap, the colors were selected carefully to add life to the images, and the audience didn't have time to notice that the color wasn't the most subtle in the world.

If you do run out and buy a 24-bit color card, make sure you turn the added-color capabilities off occasionally and see what you can do with the lower-resolution settings. You might be pleasantly surprised.

Contributing editor Thom Hogan has handed over the reins of Macreations to his partner and is now an evangelist with GO Corp.
Moving to HyperCard 2.0

Here's a compendium of gotchas that can turn HyperCard 1.2 stacks into mush under 2.0—and how to fix them.

By Danny Goodman

Major upgrades to programming platforms can be messy, and the shift to HyperCard 2.0 has been no exception. Not only did the product's internal design change but so did the responsibility for its development and marketing—from Apple to Claris, which was then reabsorbed into Apple. Add to this jumble a new marketing strategy that makes HyperCard available in three ways: a version bundled with the Mac that includes a stripped-down Home stack, a couple of demo stacks, and a voice-recording stack; a $49 upgrade consisting of five disks and an updated HyperTalk reference guidebook; and a $199 Development Kit, which has everything in the $49 upgrade plus a weighty set of manuals for HyperCard beginners.

However you view Claris' marketing strategy, those of us with HyperCard 1.2 stacks have a much more important chore to take care of: making those stacks work properly once we've converted them to HyperCard 2.0. This upgrade and earlier versions aren't 100-percent compatible, so problems may crop up with some stacks. Here are the most common problems you'll encounter when running old stacks under the new version of HyperCard and some tips on what to do about them.

Cleaning Up Your Expressions

Nothing is more puzzling than getting a HyperCard 2.0 script error on a line of HyperTalk that executed without the slightest hiccup under HyperCard 1.2. A common cause is that the new HyperTalk compiler is not as lenient as the old HyperTalk interpreter when it comes to sloppy expressions. Two examples illustrate the point:

First, if a local variable (one that applies only within the handler in which it occurs) contains more than one line of information, HyperTalk 1.2 tries to make a valid expression out of the first text it finds in the variable. So if the first line of a variable named stackData holds the name of a stack and the second line contains, say, a number, HyperCard 1.2 allows the command go to stack stackData without a hitch. HyperCard 2.0 won't do this much work for you; you have to be more specific, as in go to stack (line 1 of stackData).

Another example: Suppose you're assembling a list of user parameters from fields on a preferences card. Under HyperCard 1.2, the handler (a handler is HyperTalk code that acts in response to a single message) in Example 1 works fine: It assembles a list by accumulating the contents of each field in a return-delimited list in the userPrefs global variable. HyperTalk 2.0, however, evaluates the & concatenation differently, making the return character part of the field's name. Because there is no card field with a name ending in a return character, you get the script error "No such card." To get around this, use parentheses (see Example 2) to help HyperTalk evaluate the expressions in the way you want.

There is no end to the number of expression-
This September, the MacUser Labs thoroughly examines 7 inexpensive QuickDraw personal printers — including the new Apples — for speed, image quality and ease of use.

The Labs also explores multi-user printing, testing 13 PostScript network printers over a Localltalk network for — what else? Speed, image quality, and ease of use. Plus new printers on the horizon.

10 Base T — the new finalized Ethernet wiring standard — is finally unrolling. The experts at MacUser test 40 cards with all different types of Macs, and show how to connect any Mac over ethernet. Upgrade your knowledge every month in MacUser.

AD CLOSE: Tuesday, June 25, 1991
Example 1: HyperCard 1.2

on mouseUp
    global userPrefs
    put empty into userPrefs
    put card field "Last User" of card "Preferences" & return → after userPrefs
    put card field "High Score" of card "Preferences" & return → after userPrefs
    put card field "Last Update" of card "Preferences" & return → after userPrefs
end mouseUp

Example 2: HyperCard 2.0

on mouseUp
    global userPrefs
    put empty into userPrefs
    put (card field "Last User" of card "Preferences") & return → after userPrefs
    put (card field "High Score" of card "Preferences") & return → after userPrefs
    put (card field "Last Update" of card "Preferences") & return → after userPrefs
end mouseUp

Example 3: HyperCard 1.2

on mouseUp
    set editBkgnd to true
doMenu "New Button"
    set loc of last background button to 30,50
    set name of last background button to "Click Me"
choose browse tool
end mouseUp

doesn't have the Compact Stack menu item. Because compacting is dependent on the data structure of a stack, HyperCard 2.0 cannot compact a 1.2-generation stack until the stack's data structure has been converted to the 2.0 format. After you've converted the stack to 2.0, the Compact Stack menu item returns and the stack's compact routine should run fine.

Finding 'Missing' Text

Some users have fretted over the apparent disappearance of text in fields after converting a stack to 2.0. Figure 1a shows text in a HyperCard 1.2 field. To encourage users to keep entries in this field to a maximum of four characters, the script author carefully sized the field so that the rectangular border allowed just a few pixels of white space to the right of the last character.

When this stack is converted to HyperCard 2.0, however, it looks as though the last character has been cut off (see Figure 1b). The full text is still there — it's just wrapped to the next line. If you widen the field a couple of pixels, all the characters will return to the first visible line (for best results, widen these fields after converting the stack). Although some word-wrapping oddities of HyperCard 1.x have been corrected in 2.0 (for example, parentheses and quotes now stay with their associated words), a field still requires several pixels of white space between any unused space so that it fits into the smallest possible space.

Although compacting regularly is highly recommended, a stack that has not yet been converted to HyperCard 2.0 simply doesn't have the Compact Stack menu item on the File menu. In its place is the Convert Stack menu item. Because compacting is dependent on the data structure of a stack, HyperCard 2.0 cannot compact a 1.2-generation stack until the stack's data structure has been converted to the 2.0 format. After you've converted the stack to 2.0, the Compact Stack menu item returns and the stack's compact routine should run fine.

System 7.0-Compatibility Chart Now On-Line

System 7.0 now has its own message section in Zmac’s MacUser Forum. Users and editors will be updating an on-line copy of a System 7.0-compatibility chart with information on what works and what doesn't under Apple's new System software. Don't waste time testing software on your own — join our expert on-line compatibility lab. Simply type GO ZMAC:MACUSER, and download the file CMPAT7.TXT from Library 1 (Special Reports).

How to Join Zmac

Here's how you can get access to Zmac:

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2. If you're not a CIS subscriber, you can sign up for Zmac by following these directions:
   1. Call (800) 635-6225 (voice) to find your local access number.
   2. Set up your modem and telecommunications software with the following standard Mac settings: 8 bits, one stop, and no parity.
   3. Dial your local access number. When connected, press Return. You'll see the following prompts on-screen. Your responses are printed in boldface type.
   4. You will then be prompted for additional information, including a credit card number for billing purposes. If you cannot bill to a credit card, call the CompuServe customer-support line listed below. Sign-up is free, but normal access time is billed at $12.50 per hour.
   5. Call CIS again with your user ID and password. A new password will arrive in the mail within ten days.

For more information, call CompuServe customer support at (800) 848-8990.

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POWER PROGRAMMING

Sound and Vision Problems

Depending on what kind of Mac you use, the speed of visual effects may differ under HyperCard 2.0. You can set a stack's visual effects to slow, very slow, fast, or very fast. Except for the very fast speed (which works as fast as your Mac's CPU chip does), these speeds have been normalized across all Macs in HyperCard 2.0, so that visual effects will have roughly the same impact when run on a Mac Classic as on a IIci. Because these speeds have been standardized to the slowest common denominator, if you use anything faster than, say, a Macintosh SE, you'll probably notice slower visual effects when the stack is converted to HyperCard 2.0 than you did under version 1.2.

However, you can speed up these effects so that they're closer to what you're used to. To do this, start by using the searchScript command from the Message Box to let a helpful utility handler in the Home stack find the locations of the Visual Effect command. Show the Message Box by pressing Command-M. Then type searchScript "visual", and press Return. If any object's script contains this command, the script-editor window will open to display the script. The script editor already knows what text you searched for with searchScript, so you can simply press Command-G to issue the Find Next command within that script. The search will find a line that looks something like this: visual effect wipe left (or whatever is being applied to the visual effect). To the end of the line, add fast or very fast, as in visual effect wipe left fast. Press Command-G in this script until you hear a beep, which means there are no more visual effect in the script. Press the Enter key to save the script change, and close the script window.

As for sound, if you're running System 6.0.7 or later, you must use HyperCard 2.0 to ensure trouble-free sounds when using the Play command. In addition, existing sound XCMDs (external commands), such as those provided in Farallon's HyperSound Toolkit, need to be upgraded to work successfully with HyperCard 2.0 (you need to get the upgrade from the company that created the sound). You may get some sound out of the old XCMDs but not consistently.

A note on XCMDs: Most existing XCMDs work in HyperCard 2.0 just fine. The ones that cause the most problems are those that create their own windows or are dependent on HyperCard 1.2 stack data structures. The former need to be redesigned around the new XCMD structure and libraries (both available from Claris); the latter need major overhauls.

Compiler Ills and Thrills

Under HyperCard 2.0, a handler is compiled before it runs (earlier versions did not include a compiler). The compiled...
Example 4: HyperCard 1.2

```plaintext
on mouseUp
  if fld 1 is "Yes" then
    -- 20
    -- lines
    -- of
    -- Yes
    -- Stuff
  else
    -- 30
    -- lines
    -- of
    -- No
    -- Stuff
  end if
end mouseUp
```

Example 5: HyperCard 2.0

```plaintext
on mouseUp -- compiles in either case
  if fld 1 is "Yes" then
    doYesStuff
  else
    doNoStuff
  end if
end mouseUp

on doYesStuff
  -- only this 20-line handler
  -- compiles when "Yes"
end doYesStuff

on doNoStuff
  -- only this 30-line handler
  -- compiles when "No"
end doNoStuff
```

Version stays in memory (it is not saved to disk) as long as HyperCard is still running and the memory isn’t needed for something else (painting tools or other compiled handlers, for example).

Very long handlers that operate normally under HyperCard 1.2 may overload the compiler under 2.0. The symptoms are frustrating, because you get script error messages that make absolutely no sense (for example, an offset function that claims to have too many arguments, when the script plainly shows two valid arguments). The problem is that the compiler has run out of internal working memory.

A National Search for computer based applications to help persons with physical or learning disabilities is being conducted by The Johns Hopkins University with grants from the National Science Foundation and MCI Communications Corporation.

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Think backup. And once you switch, think backup again.

You need Retrospect, a backup program that won an Eddy under System 6 and carries on the tradition into System 7. Retrospect is as familiar withAliases and the Extensions folder as it is with tape drives and SyQuest cartridges. And to backup networked Macintoshes to one storage device, there’s Retrospect Remote.

**Think Twice Before You Switch to 7**

Think backup. And once you switch, think backup again.

You need Retrospect, a backup program that won an Eddy under System 6 and carries on the tradition into System 7. Retrospect is as familiar withAliases and the Extensions folder as it is with tape drives and SyQuest cartridges. And to backup networked Macintoshes to one storage device, there’s Retrospect Remote.

**Retrospect & Retrospect Remote**

To Go Forward You Must Backup

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and chokes on the long handler. In the case of long handlers, the time required to compile is small but noticeable as a slight delay if you're used to 1.2 execution speeds. Also, once the handler has been compiled, it might occupy a comparatively large chunk of memory. To overcome this, you have to divide the long handler into smaller pieces. As painful as this may sound, the exercise is good practice for getting the best performance out of the HyperTalk 2.0 compiler.

Here's an example: If HyperCard 2.0 tried to run the mouseUp handler in Example 4, it would first try to compile the entire handler, even though it needs only the part of the if ... then construction that is valid at run time. If you divide the handler into three components, as in Example 5, the compiler has to do less work: It compiles the smaller mouseUp handler and just the one conditional handler it needs. As a result, compile time is reduced and the smaller compiled chunks are less likely to be pushed out of memory by another handler's compilation.

By limiting individual handlers to 35 or 40 lines of HyperTalk code, you quickly train yourself to modularize your scripting. If ... then branches are excellent candidates for breaking into separate handlers. Try to find names for these subhandlers that identify the action they perform so you can better understand the structure of complex scripts and find common code that can be shared and called by more than one handler.

Despite what seems to be a long list of incompatibilities (there are other, less common ones too), HyperCard 2.0 has retained a great deal of compatibility with earlier versions. Some features that weren't quite right in the very beginning had to be fixed eventually. We're just paying the price now rather than later.


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PageMaker

Getting the spacing consistent between several repetitive elements, such as photos and their captions, throughout a multipage publication can be a real chore — but not if you use this PageMaker trick:

1. When setting the style for a caption or other repeating text element, go to the Rules dialog box, which you access by selecting Paragraph on the Type menu. Check Rule Above Paragraph, and set Line Style to None on the pull-down menu (this gives you an invisible rule above the text).

2. Next go to Options, and type the desired number in the Top box for the amount of spacing you want between the text and the invisible rule. For example, if you're working in 12-point type, an 18-point space gives you 6 points between the text block and the rule — which translates to the bottom of the graphic element.

3. When you drag the text block to position it, the invisible rule above the text will enlarge the text box (shown as a dotted line), according to the amount of space you entered. Line up the top edge of the text box with the bottom edge of the graphic (see Figure 1). This will give you consistent spacing between all captions and related graphics.

This trick also works if the invisible rule is set below the text block (which lets you place the text above the graphic) or if the text block is rotated (for example, for a photo credit on the side of a photo).

Sam Mattes
Indianapolis, IN

Tip of the Month

Word 4.0

To use Word's indexing feature, you must mark each word that you want to index with \i in front of the word and \; after it. This is extremely time-consuming, especially if you want to index a word every time it appears in a document. Here's an easy way to add hidden \i characters around all occurrences of a given word in an open document:

1. Index the first instance of the word as you normally would. Choose Save As from the File menu.

2. In the Save As dialog box, click on File Format and choose Interchange Format (RTF). Click on OK.

3. Give the RTF document a name, and save it. You'll see a new version of the file with all kinds of strange control codes embedded in it (see Figure A).

4. Find the first instance of the word you indexed normally. It will be surrounded by codes that might look something like this: \i (\b\{word\}indexword\} 240\n). Select the word and all of this index code — which always starts with \i ( and ends with \i) — and copy the selection to the Clipboard. Next place your insertion point after this word and all the code that surrounds it.

5. Choose Change (Command-H) from the Utilities menu. Type the word you want to index into the Find What: box, and then paste the contents of the Clipboard into the Change To: box.

6. Click on Start Search (choose No when Word asks you if you want to continue the search from the beginning of the document). This will add the correct index codes at the beginning and end of each occurrence of the word you want to index. Repeat this process for all words you want to index.

When you're finished, save and close the RTF document. When you reopen the document, Word will ask, "Interpret RTF text?"; click on Yes. The document will then appear in normal format with all the relevant entries properly indexed. You can verify that all the words have been correctly labeled by choosing Preferences from the Edit menu and toggling the Show Hidden Text button on. You can then create an index for the document as normal, using the Index command, on the Utilities menu.

Christopher Hold
Victoria, British Columbia
Canada

Figure A: Adding formatting to words you want to index in Word 4.0 can be time-consuming, because you have to mark each word you want indexed (as on the second line of this figure). By creating an RTF version of your document (which creates codes such as those in the third line), you can add formatting to any given word with the Change command.
Figure 1: You no longer have to fiddle with page guides when you want to place a caption below a graphic in PageMaker, as in the example on the left. Using the Rule Above Paragraph option, you can enlarge the caption’s text box and use its upper edge as a guide for placing the caption (right).

**ImageWriter**

If your ImageWriter printer is more than two years old, it will benefit from a quick tune-up. All you need do is turn off the power, remove the ribbon, and clean the pin mechanism. Here’s how:

1. After removing the ribbon, locate the white plastic retaining clip, which is to the right of the printing mechanism. Gently pull the clip to the right so that you can lift the assembly up and out of the carriage.

2. Using a general-purpose cleaner on a cotton swab, carefully clean any ink residue from around the pins. On the underside of the unit is a small cutout that allows lubrication of the pins. You can add a small amount of lubricant (such as WD-40) here.

3. Gently replace the assembly and the ribbon. You’re now ready for another two years of printing.

James Dierberger
Hebron, CT

**MacWrite II**

I’ve taught English as a second language for many years and have discovered a simple way to use my Mac to make flash cards. All you need is a program that prints two columns on a page (or you can do it the hard way and use tabs). My instructions are for Claris’ MacWrite II, but sophisticated word processors — such as Word, WordPerfect, or Nisus — work just as well.

1. Create a format with two columns. Make sure that if the page were folded down the middle, the columns would be situated on either side of the crease.

2. Type in the words or phrases in your target language — let’s say Spanish — in the left-hand column.

3. Do a column break. Directly across from each Spanish word or expression, type the equivalent in English. Make sure that the equivalents are directly opposite each other, on the same imaginary horizontal line (see Figure 2).

4. Increase the space between the selections, either by double-spacing (pressing Return twice) or by increasing the line spacing. This step isn’t essential, but the results look better.

5. Print out the list. You’ll have a column of foreign words and phrases on the left and their equivalents in English on the right.
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The freedom to write and think is for all of us. Now, there is a new word processor that’s just right for us, too. It’s called MacWrite® II, and it’s made by Claris. MacWrite II makes it possible to share your ideas and thoughts with other computers and word processors. You’ll be free to open documents from over 50 word processors, on all kinds of computers, with all kinds of speech, and work on them without reformatting.

But there’s more you can do. (The feature is called XTND.) You can import graphics, not only from Macs, but many computers, guaranteed. And you can scale and crop them, one and all, in your MacWrite II document. In short, MacWrite II with XTND is a powerful word processor that lets you freely exchange text and graphics. You’ll find also that your MacWrite II lets you change fonts, styles, sizes and colors, as well as text with its find/change feature. And you can create custom styles and save them as stationery — with all formats preset. You’ll share your reports and letters quickly.

But what good is freedom of expression if you find your editing to be a hassle? That’s why the page layout and editing is fully WYSIWYG: the thoughts you see are the thoughts you get. This WYSIWYG feature, by the way, is found only with MacWrite II. It’s another way Claris simplifies word processing for you, whether you’re 52, 22, or 72. Called upon daily MacWrite II smooths your writing assignments and other chores. There’s MacWrite II spell checking, for example, and foreign dictionary programs that are optional, and a host of other features that come standard. (Like a thesaurus, and a mail merge feature you’ll discover saves lots of time.)

What it adds up to, you’ll find, is a simple and powerful tool designed for people. All the people. It is for writers, and it is for business people. And it is for those of us in between. The freedom to write is liberating. Now technology is, too.

CLARIS

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Questions, anyone? Here's where to get answers from the experts. Bob LeVitus is the author of the best-selling Dr. Macintosh. Andy Ihnato isn't. But he knows a lot about the Mac, and he's got a heck of an attitude. Together, they're ready to answer your questions about everything Macintosh.

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Don't want to wait for an answer? Post your question on Zmac, MacUser's on-line service, and get a reply from Bob, Andy, or one of the other MacUser experts.

By Bob LeVitus and Andy Ihnato

**Download Mac Files to PCs**

Andy: Before proceeding with this month's festivities, here's an update on a topic we discussed a few months ago. A reader asked if it was possible to download Mac files onto a PC and then transfer the files to a Mac via TOPS (see "Transferring Fonts from PCs to Macs" in our April '91 column, page 253). I said that it's generally necessary to un-MacBinary-ize the file after transfer, with a utility such as MacBinary to Mac. One of our alert readers - Bill Davies of MacNexus (the Macintosh users' group in Sacramento, California) - has another solution:

"Here's another workaround: Compress the files with StuffIt Classic or Compactor - anything that creates a SIT file (this means that self-extracting archives don't qualify, because they also create a resource fork containing the self-extractor code). A StuffIt or Compactor archive uploaded to a DOS machine works fine when you get it back to the Mac. At the very worst, if the header is screwed up and there is a generic document icon, the SIT suffix should be enough to clue most people to set the file type and creator to SIT! (using a utility such as DiskTop) if that information was lost in the transfer."

A keen idea, to be sure, and it should work with most BBS files (as a general rule, files are compressed before they're uploaded). For files without a SIT (StuffIt) or CPT (Compactor) filename extension, however, you probably have to un-MacBinary-ize the file as recommended in the April column.

**U.S. Government Forms on the Mac?**

Q. I need a program for filling out the U.S. government Standard Employment Form 171, which is required to apply for a government job. Is there a program for filling out this form? If the U.S. government allows programs such as MachInTax and TurboTax to use IRS tax forms, then surely it must be OK to duplicate the Standard Employment Form.

W. Robert Lowan

Springfield, VA

Bob: Get a copy of Claris' SmartForm Assistant, and Claris' customer support (408) 727-8227 can provide you with a copy of the U.S. Government Standard Employment Form 171 to use with it.

Andy: Given the state of the economy, I imagine that that template's in pretty high demand these days.

**Dead Mice Aren't Much Fun**

Q. One of the most irritating software crashes occurs when the mouse becomes paralyzed. The keyboard continues to work, the screen is still functioning (clocks and screen savers work fine), and you can continue to direct the Mac with keyboard commands, but the blinking cursor or arrow controlled by the mouse doesn't move.

Why does this happen? Is there any utility that can bring the mouse back to life?

Steve Charnovitz

Baileys Crossroads, VA

Andy: Several possible explanations come

Who ever said there was such a thing as a stupid question? OK, my chem professor did, but he said it only to me. The only stupid question is the question you don't ask. Here at Help Folder, we don't care how simply you think a question is - just send it in! (However, if it's such a simple question that you're embarrassed to even ask it, we can conceal your identity by creating the question to a deceased historical figure.)

Q. I'd like your opinion on a little gizmo I saw at an electronics fair last month. It was a tool like a big paper punch for cutting a hole in a regular-density (800K) diskette, allowing it to be formatted as a high-density (1.44 megabyte) disk.

The guy selling it said that all diskettes are the same except for the hole, and that I'm just throwing money away by buying "real" high-density disks. The tool cost $30, so I didn't buy it, but I'm curious nonetheless. Do these things actually work?

Colley Gibber 1671 - 1757

(English Poet Laureate, 1730 - 1757)

Andy: Did this booth also hawk miracle stain eradicators and eyeball whiteners? They work about as well as the disk nibbler you describe!

Technically it works. Cut a hole in a new 800K disk and put it into your drive, and your Mac will see that hole and format the disk for 1.44 megabytes of storage.

The problem is, you can bamboozle your Mac pretty easily, but Saint Feynman, patron saint of electromagnetism, isn't so gullible. The magnetic coating on a regular-density disk contains big, chunky particles that just can't reliably maintain a high-density data image. Although the disk might format and maybe you can put some data on it for a while, the disk will come when, after inserting that disk, you'll be greeted by a festive unreadable-message. Kiss your data bye-bye, son, and don't say I didn't warn you.

It doesn't end there either. Defective disk nibblers can leave sharp little bits of plastic inside the diskette, which then scratch your drive's read/write heads to the tune of $100. If you want to save dough, buy generic disks rather than name-brand ones (I've been using generics for years and haven't noticed any difference), and leave the disk nibblers alone.

MacUser July 1991 233
to mind, so let's start at the beginning. A lot depends on whether or not your Macintosh has ADB (Apple Desktop Bus) connectors for the mouse and the keyboard. Mouse deaths occur far more frequently on ADB machines, because the mouse is just a single element in a somewhat fragile chain of devices.

There are many ways for the mouse to get lost in the chain. You may have too many devices daisy-chained together; if you have more than three devices connected at once, there might not be enough juice in the bus to keep track of all those mice, trackballs, and keyboards. Or perhaps your mouse was disconnected from the bus and reconnected with the Mac still turned on — once an ADB device has been removed from the chain, the Mac usually can't find it when it's plugged in again. Or perhaps one of the ADB connectors on the chain is dirty. You can clean it (carefully) with isopropyl alcohol.

It's also possible that something has broken (most likely the mouse, the ADB connector, or the device it's plugged in to). Another possibility is that the program you're running isn't compatible with an INIT or cdev that works with your mouse, such as the Mouse cdev or the cdevs that come with some third-party pointing devices. If you have a Mac that doesn't use ADB (the Mac Plus or earlier), then the list of potential problems is somewhat narrower. Hardwarewise, it might be a dirty mouse connector or a loose connection in the mouse itself. In these cases, all you can really do (short of — *shudder* — taking the Mac to your dealer for a checkup) is clean the mouse connectors or borrow a pal's mouse and see if it works on your Mac. Some software can clobber the mouse on the Plus too. One such error is so common that Greg Dudek wrote a shareware Fkey for Mac Plus owners called Defrost that can (sometimes) bring your mouse back to life after it freezes on-screen.

If mouse-freezing is so common on your Mac that it really cramps your style, take some preventive measures. Install the Easy Access INIT that's part of Apple system software. Once it's installed, press Command-Shift-Clear at any time and Easy Access turns your numeric keypad into a mouse (the 8 key is up, 2 is down, and so on — the details are in your system-software manual). Easy Access works well enough for you to calmly save all your work if the mouse freezes, quit the current application, and politely restart your machine (see Figure 1).

**Bob:** I have only one thing to add (and I know we've said it before, but it bears repeating): *Never plug in or unplug an ADB device without first shutting down your Mac.* If you do, the mouse freezes might occur as a result of a damaged ADB chip. If that's the case, a trip to an Apple dealer for repair is necessary.

**Keeping a LaserWriter Running**

**Q:** I have a Mac SE, a LaserWriter IIISC, and a recently acquired external hard drive. The dealer told me that whenever I start up my system, I should turn on the hard drive first, the LaserWriter second, and finally the SE and that I should keep the LaserWriter running while I'm using the system.

**Is this correct?** Before I got the hard drive, I often used the SE without turning on the LaserWriter, and everything seemed to work fine. I am concerned about wasting energy, because I often have my computer on for several hours without printing anything. Can I turn the new system on and leave the LaserWriter off? And is it detrimental to switch the LaserWriter on and off several times in the course of a work session?

**Gloria Baciewicz**

**Tuscaloosa, AL**

**Bob:** Well, your dealer gave you an answer that's half right and half hogwash. The correct part is that you should turn on your external hard drive and allow the disk enough time to spin up to speed before turning on your Mac. The hogwash part is that you must always keep the LaserWriter running.

There is no good reason why your LaserWriter needs to be on when you are using the Mac. I never turn my laser printer on until I need it. Then, depending on whether I expect to do more printing, I either turn it off or leave it on. Some days it never gets turned on, and other days it's turned on and off several times.

**I don't think turning your printer on and off a few times a day can harm anything,** and it might even save a bit of energy.

**Andy:** Sure, if we're talking only two or three times a day, there's probably no problem,
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but I wouldn’t want to switch any piece of equipment on and off much more than that. Cycling a power supply (nerd-speak for “switching the thing on”) causes a certain amount of stress on any circuit, and if you really go overboard, you can shorten the life of the printer. Admittedly, we’re only talking about taking six months (at the most) off your printer’s eight-year life span, but it’s something to think about.

During two blissful weeks last October when I had a borrowed laser printer on my desk, I did pretty much as Bob does — switched it on just before printing and switched it off soon thereafter. I didn’t care so much about wasting energy; I did it to keep the fan from drowning out my Carl Stalling CD. Don’t issue the Print command until you turn the printer on, and wait for its “ready” light to come on, though.

Replacing Formats

Q. Is there any way to globally find and replace fonts or formats in Word 4.0? I want to be able to change underlined text in a file to italicized text.

Steven Johnson
Bronx, NY

Bob: Well, Word can almost do what you ask. There are two ways to do it, but neither is convenient. The first is to convert the document into RTF (rich text format). To do this, choose Save As from the File menu, click on the File Format button, and choose Interchange format (RTF). When you save the document, it appears on-screen complete with the formatting code. Because the code for underlined text is \ul and the code for italicized text is \i, you can globally change the formatting by using the Change command (Command-H). In the Find What box, type \ul; in the Change To box, type \i; and then close the document and save your changes. When you reopen the document and Word asks if you want to interpret RTF text, click on OK. All underlined text is now italicized in the new (untitled) document.

Figure 2: Global style changes are a breeze in MacWrite II. To change all underlined text to italic, just fill in the Find/Change dialog box as shown and click on the Change All button.

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The other way to do this is to use the obscure (at least I'd never heard of it before) Find Format command, described on page 60 of the Word manual. It lets you search for underlined text, but you have to change it to italic manually.

Here's how it works: To find each occurrence of underlined text, first select an underlined character. Invoke Find Format by pressing Command-Option-R, and the program finds and selects the next occurrence of underlined text. Change it to italic by choosing Italic from the Format menu (or type Command-Shift-I).

This procedure isn't global; however, it does what you want fairly easily. If global-format changing is important to you, you should know that other word processors do it faster and more easily. MacWrite II, for example, does it with a few simple selections in its Find/Change dialog box (see Figure 2), and FullWrite Professional works similarly.

Andy: Don't forget about Nisus, the Ninja word processor favored by folks who need to automate lots of repetitive editing and reformatting tasks.

Ask yourself how much pain Word's lack of a Change By Style feature causes you; if it's really affecting your quality of life, think about changing word-processing programs.

What to Do with 256K SIMMs

Q: I recently upgraded two Macintosh Pluses to 2.5 megabytes of RAM. This leaves four 256K SIMMs (removed from the Macs) sitting around without a home. My employer recently purchased a Macintosh SE/30 with 1 megabyte of RAM. Can I hand over the 256K SIMMs for the SE/30? I want to know whether the Mac Plus SIMMs are fast enough for the SE/30. One of the Mac Pluses was purchased in October 1989 and the other in the spring of 1990.

Richard Goodman
Los Angeles, CA

Andy: The SE/30 has no problem accepting 256K SIMMs, but they must be no slower than 120 nanoseconds. Check the numbers stenciled on the SIMMs you removed from the Pluses. Usually the last couple of digits are a clue about a SIMM's speed. The memory I removed from my Plus last year reads 424256-10, which should mean 256K, 100 nanoseconds. I'm willing to bet that the SIMMs you removed are fast enough, but you should double-check 'em just to be safe. You should also make sure that all four SIMMs have the same speed. If one pair is 120 nanoseconds and the other is 100 nanoseconds, you won't be able to use the four of them together in the SE/30 — at least not in the same memory bank.

Loose Juice

Q: I'd like to know about surge protectors before buying my first Mac. What's the best kind of surge protector to buy? I've noticed that prices range from less than $30 to more than $200. A technician at a repair shop said the best surge protectors use silicon diodes, which have a reaction time of

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5 billionths of a second and a clamp level of 220 volts. This technology apparently is superior to that of the standard MOVs (metal-oxide varistors) in all other surge protectors, which react too slowly and clamp at about 500 volts. What’s your opinion?

Robert Joy
Beaverton, OR

Andy: Surge protectors are designed to protect electrical equipment — such as your Macintosh — from sudden surges of electricity (see Figure 3). You might find one very useful if you’ve been experiencing power problems — if your power cuts off suddenly, for example, or if you have an old power system and have been experiencing sudden electricity cuts. With that said, I’m going to hand over the rest of this discussion to Lee Thé, a MacUser senior editor who knows his surge protectors.

Lee: Surge suppressors get hyped a lot. To avoid getting burned, make sure that both the packaging and the product carry the UL (Underwriters Laboratories) 1449 trademark (1449 refers to the UL surge-suppressor test). Counterfeit UL trademarks on some surge suppressors usually lack the 1449 designation. Also, look on the packaging for the designation “UL Listed 1449 Suppression Voltage L-N 400/L-G 400/N-G 400,” which means that the suppressor clamps at 400 volts when power surges across the line, neutral, and ground wires of...
the circuit. This is appropriate for Macs and their peripherals. The best UL rating, 330 volts, isn’t mandatory.

The response time needs to stay at less than one millisecond, and most — if not all — UL 1449 suppressors are this fast. Buying a faster suppressor like putting premium fuel into an automobile that’s rated for regular. Surge suppressors cost from $50 to $100 (depending on features), and you can find them in electronics stores.

No surge suppressor works against direct lightning strikes — for that, you need a surge arrester. Your local power company can probably install one on the line leading into your home or office for less than $300.

Preprinted Paper and the LaserWriter

Q. What are the rules about using preprinted paper, such as paper that is offset-printed or copied on a copying machine, in my LaserWriter IIRT? Is there a possibility that ink or copy toner can come off inside the printer and damage its internal parts? I understand that you shouldn’t use paper that has been printed with thermography (raised lettering), because the heat generated by the printer can melt the ink, which can cause problems. Is there anything else I should know?

Kevin Hawkins
Phoenix, AZ

Bob: I think I know the answer, but because a mistake can be costly, I asked Apple for its official position. Here’s what I was told:

"The reader is correct about paper that has been printed with thermography. Depending on the chemical makeup of the ink, when the paper runs through the printer’s fusing process, it tends to melt and can damage the fusing unit. It is better to be safe than sorry: Letterhead or other paper printed with thermography is not recommended with any laser printer."

There you have it. On the other hand, Apple says you can use most offset-printed, precopied, or colored paper in a laser printer. If you’re not sure whether you should use a certain paper, Apple recommends that you consider the following characteristics:

• Colored paper. Don’t use paper with a colored coating that was added after the paper was produced, because the pigments used on the paper might not be able to withstand the 392-degree temperature of the printer’s fusing process. (You should also keep in mind that colored paper should be the same quality as regular photocopy paper.)

• Offset-printed paper. To avoid problems with offset-printed paper, make sure the inks used are heat-resistant and will not melt, vaporize, or release hazardous emissions when subjected to the printer’s fusing process. Whoever did the original printing should be able to help you in finding out about this.

• Paper that has been run through a photocopier. Copiers use the same electro-photographic process as a laser printer does, so running copied paper through shouldn’t be a problem. Remember, however, that depending on the makeup of the copier’s toner and the LaserWriter’s cleaning process (which scrapes excess toner off the paper), you may get toner droppings in the bottom of your printer.

To be safe, Apple says, you should avoid using the following in your printer: glossy paper, heavily textured or embossed paper (laser printing doesn’t adhere as well to this kind of paper), carbonless or chemically coated paper, and paper and ink that are not compatible with the heat and pressure of the printer’s fusing process.

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**AD INDEX**

<table>
<thead>
<tr>
<th>RS#</th>
<th>ADVERTISER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>61</td>
<td>Abaton</td>
<td>43</td>
</tr>
<tr>
<td>154</td>
<td>Abaton</td>
<td>5</td>
</tr>
<tr>
<td>69</td>
<td>Advance Business Center</td>
<td>267</td>
</tr>
<tr>
<td>100</td>
<td>AEC Management Systems, Inc.</td>
<td>8-9</td>
</tr>
<tr>
<td>183</td>
<td>Aladdin Systems, Inc.</td>
<td>4</td>
</tr>
<tr>
<td>133</td>
<td>AllMed.</td>
<td>251</td>
</tr>
<tr>
<td>N/A</td>
<td>Alliance Peripheral Systems 270-271</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>ALSoft, Inc.</td>
<td>159</td>
</tr>
<tr>
<td>18</td>
<td>Alysa Corporation</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>America Online</td>
<td>50A/B</td>
</tr>
<tr>
<td>N/A</td>
<td>Apple</td>
<td>103</td>
</tr>
<tr>
<td>N/A</td>
<td>Apple</td>
<td>105</td>
</tr>
<tr>
<td>N/A</td>
<td>Apple</td>
<td>109</td>
</tr>
<tr>
<td>N/A</td>
<td>Apple</td>
<td>113</td>
</tr>
<tr>
<td>N/A</td>
<td>Applied Engineering</td>
<td>186</td>
</tr>
<tr>
<td>89</td>
<td>Articulate Systems, Inc.</td>
<td>28</td>
</tr>
<tr>
<td>37</td>
<td>AsaBEd.</td>
<td>22</td>
</tr>
<tr>
<td>134</td>
<td>Bistream</td>
<td>178</td>
</tr>
<tr>
<td>N/A</td>
<td>Bottom Line Distribution, Inc.</td>
<td>250</td>
</tr>
<tr>
<td>42</td>
<td>CalComp</td>
<td>88</td>
</tr>
<tr>
<td>43</td>
<td>CalComp</td>
<td>88</td>
</tr>
<tr>
<td>365</td>
<td>Calera Recognition Systems</td>
<td>65</td>
</tr>
<tr>
<td>270</td>
<td>Cambridge Computer (ER Direct)</td>
<td>261</td>
</tr>
<tr>
<td>72</td>
<td>Canon</td>
<td>230-231</td>
</tr>
<tr>
<td>420</td>
<td>Caravelle Networks</td>
<td>26</td>
</tr>
<tr>
<td>76</td>
<td>Casady &amp; Greene</td>
<td>239</td>
</tr>
<tr>
<td>147</td>
<td>CDA Computer Sales</td>
<td>161-163</td>
</tr>
<tr>
<td>151</td>
<td>Central Point Software</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>Claris</td>
<td>122-123</td>
</tr>
<tr>
<td>N/A</td>
<td>Claris</td>
<td>122-123</td>
</tr>
<tr>
<td>64</td>
<td>Computer Friends</td>
<td>220</td>
</tr>
<tr>
<td>353</td>
<td>Computer Video</td>
<td>273</td>
</tr>
<tr>
<td>63</td>
<td>Connectix Corporation</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>CoStar</td>
<td>184</td>
</tr>
<tr>
<td>N/A</td>
<td>CoStar</td>
<td>185</td>
</tr>
<tr>
<td>375</td>
<td>Curtis Manufacturing</td>
<td>12</td>
</tr>
<tr>
<td>41</td>
<td>Custom Applications, Inc.</td>
<td>18</td>
</tr>
<tr>
<td>25</td>
<td>Dantz Development Corp.</td>
<td>225</td>
</tr>
<tr>
<td>36</td>
<td>DataProducts Corp.</td>
<td>189-192</td>
</tr>
<tr>
<td>N/A</td>
<td>Dataproducts Corp.</td>
<td>189-192</td>
</tr>
<tr>
<td>122</td>
<td>DayStar Digital</td>
<td>196</td>
</tr>
<tr>
<td>159</td>
<td>Daystar Digital</td>
<td>196</td>
</tr>
<tr>
<td>163</td>
<td>DEC</td>
<td>64-55</td>
</tr>
<tr>
<td>185</td>
<td>Deneba Software</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>DGR Technologies</td>
<td>46</td>
</tr>
<tr>
<td>117</td>
<td>DigitalVision, Inc.</td>
<td>226</td>
</tr>
<tr>
<td>121</td>
<td>Diskette Connection</td>
<td>249</td>
</tr>
<tr>
<td>135</td>
<td>Dr. Mac</td>
<td>244-245</td>
</tr>
<tr>
<td>170</td>
<td>Echman</td>
<td>8-9</td>
</tr>
<tr>
<td>44</td>
<td>Engineered Software</td>
<td>220</td>
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<tr>
<td>78</td>
<td>Farallon</td>
<td>68</td>
</tr>
<tr>
<td>105</td>
<td>Fifth Generation Systems, Inc.</td>
<td>40</td>
</tr>
<tr>
<td>157</td>
<td>Fifth Generation Systems, Inc.</td>
<td>119</td>
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<tr>
<td>103</td>
<td>Fifth Generation Systems, Inc.</td>
<td>117</td>
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<tr>
<td>22</td>
<td>FIZ, Inc.</td>
<td>42</td>
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<tr>
<td>111</td>
<td>GCC Technologies</td>
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<tr>
<td>807</td>
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<td>13</td>
<td>Generic</td>
<td>78</td>
</tr>
<tr>
<td>19</td>
<td>GeoQuery Corporation</td>
<td>273</td>
</tr>
<tr>
<td>82</td>
<td>Graphsoft</td>
<td>195</td>
</tr>
<tr>
<td>N/A</td>
<td>Hard Drives International</td>
<td>255</td>
</tr>
<tr>
<td>47</td>
<td>Hardware Express</td>
<td>243</td>
</tr>
<tr>
<td>89</td>
<td>Hewlett-Packard</td>
<td>50A/B</td>
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<td>N/A</td>
<td>Iomega Corporation</td>
<td>39</td>
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<tr>
<td>91</td>
<td>Information Foundation</td>
<td>272</td>
</tr>
<tr>
<td>130</td>
<td>Innovative Design Data</td>
<td>44</td>
</tr>
<tr>
<td>131</td>
<td>Innovative Data Design</td>
<td>44</td>
</tr>
<tr>
<td>132</td>
<td>Insignia Solutions, Inc.</td>
<td>212</td>
</tr>
</tbody>
</table>

**ADVERTISER PAGE**

- 358 | Jasmine Technologies | 216 |
- 387 | Kensington | 107 |
- 388 | Kensington | 269 |
- 415 | La Cie Limited | 108-109 |
- 414 | La Cie Limited | 228 |
- 171 | LaserMaster Corporation | 211 |
- 176 | Liberty Systems | 194 |
- 139 | Mac & More, Inc. | N/A  |
- 151 | MacAvenue | 151-154 |
- 77  | MacCenter    | 269  |
- 31  | MacTel Technology Corp. | 240-245 |
- 198 | MacTown     | 249  |
- 153 | MacWarehouse | 199-197 |
- 121 | Multi-User, Inc. | N/A  |
- 367 | Ontrack Computer Systems, Inc. | 226  |
- 116 | Pacific Data Products | 207  |
- 71  | Paracom Software | 24   |
- 74  | PC Magazine  | 238  |
- 139 | Peachtree Software | 92   |
- 173 | PLI          | 201  |
- 172 | PLI          | 182  |
- 66  | Presentation Technologies | 214  |
- 68  | Proxima       | 86-87 |
- 361 | QMS, Inc.    | 71   |
- 362 | QMS, Inc.    | 73   |
- 363 | QMS, Inc.    | 75   |
- 364 | QMS, Inc.    | 77   |
- N/A | RasterOps    | 137  |
- 45  | Salient Software | 84   |
- 164 | Sigma Designs | 11   |
- 368 | Silicon Beach | 188  |
- 168 | Software That Fits | 258-263 |
- 85  | Sophisticated Circuits | 202  |
- 197 | Symantec Corporation | N/A  |
- 197 | Symantec Corporation | N/A  |
- 99  | Symantec Corporation | 93   |
- 117 | T&I Makeover | 245  |
- 84  | Technology Works | 7    |
- 417 | Tektronix      | 204  |
- 375 | Texas Instruments | 236-237 |
- 128 | Third Wave Computing | 257  |
- 211 | Timeworks, Inc. | 182  |
- 132 | Total Systems | 289  |
- 175 | Truevision    | 135  |
- 191 | U.S. Computer Merchants | 266  |
- N/A | Wholesale 54 | 268  |
- 356 | XANTE Corporation | 85   |
- 400 | Zmage         | 223  |
1. Please indicate which of the following computers you currently use in your company or organization: (Check all that apply)
   a) Mac Plus
   b) Mac SE
   c) Mac II

2. For how many microcomputers do you buy products?
   a) 1-4
   b) 5-49
   c) 50+

3. Your primary job function is:
   (Check one)
   a) Administrative/General Management
   b) MIS/Communications Systems, Programming
   c) Engineering/R&D
   d) Finance/Accounting
   e) Marketing/Sales
   f) Computer Dealer/VAR

4. For which of the following products are you involved in selecting brands/models to be bought by your company or organization? (Check all that apply)
   a) Accounting
   b) Spreadsheets/Financial Planners
   c) Project Managers
   d) Word Processors
   e) Database Managers
   f) Graphics
   g) CAD/CAM
   h) Communications
   i) Administrative/General Management
   j) MIS/Communications Systems, Programming
   k) Engineering/R&D
   l) Finance/Accounting
   m) Marketing/Sales
   n) Computer Dealer/VAR

5. Are you involved in the purchasing of microcomputer equipment at your company? (Check one)
   a) Yes
   b) No

6. If so, what function do you serve in the buying process? (Check one)
   a) Evaluations/Specification
   b) Recommendation
   c) Buyer/Purchaser

7. 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)
   a) Accounting
   b) Spreadsheets/Financial Planners
   c) Project Managers
   d) Word Processors
   e) Database Managers
   f) Graphics
   g) CAD/CAM
   h) Communications
   i) Administrative/General Management
   j) MIS/Communications Systems, Programming
   k) Engineering/R&D
   l) Finance/Accounting
   m) Marketing/Sales
   n) Computer Dealer/VAR

8. If so, what function do you serve in the buying process? (Check one)
   a) Evaluations/Specification
   b) Recommendation
   c) Buyer/Purchaser

9. What other information would you like to receive from MacUser Magazine?

10. Please indicate which of the following products are advertised in the MacUser Magazine?
    a) Word Processors
    b) Graphics
    c) CAD/CAM
    d) Communications
    e) Other

11. If you would like more information about a product advertised in the MacUser Magazine, please fill in your name and circle the numbers on the card that correspond to the ads or articles you would like more information about. (Numbers for advertised products are repeated in the Advertiser Index as well.)
### Affordable Macintosh Systems

<table>
<thead>
<tr>
<th>System</th>
<th>Description</th>
<th>Price</th>
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<tbody>
<tr>
<td>Mac LC System</td>
<td>Macintosh LC CPU, 40Mb hard drive, 2Mb RAM, Standard keyboard, Apple 12&quot; RGB color monitor</td>
<td>$2349</td>
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<tr>
<td>Mac IIFX System</td>
<td>Macintosh IIFX CPU, 8Mb RAM, 210Mb hard drive, MacPro Extended keyboard, Radius 19&quot; TPD</td>
<td>$7777</td>
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<tr>
<td>Mac IIci System</td>
<td>Macintosh IIci CPU, Quantum 170Mb hard drive, 5Mb RAM MacPro Extended keyboard, Seiko highres color monitor</td>
<td>$5395</td>
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<tr>
<td>Mac Classic</td>
<td>Mac Classic CPU, 2Mb RAM, 40Mb hard drive, mouse</td>
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### Solutions that Make Sense

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<tr>
<td><em>New Service</em> Mac IIci System</td>
<td>Macintosh IIci CPU, Quantum 170Mb hard drive, 5Mb RAM MacPro Extended keyboard, Seiko highres color monitor</td>
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<tr>
<td>Mac IISi System</td>
<td>Macintosh IISi CPU, 105Mb hard drive, MacPro Extended keyboard, NEC color monitor</td>
<td>$3895</td>
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<tr>
<td>Mac Classic</td>
<td>Mac Classic CPU, 2Mb RAM, 40Mb hard drive, mouse</td>
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### PRICEBUSTERS

<table>
<thead>
<tr>
<th>Product</th>
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<tr>
<td>Seiko Color monitor</td>
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<td>NEC Silentwriter M.90</td>
<td>$1589</td>
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<td>TI Microlaser PS35</td>
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<td>MicroTek 300Zs</td>
<td>$1699</td>
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<tr>
<td>H.P. Desk Writer</td>
<td>$659</td>
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</tbody>
</table>

*We carry many thousands of hardware products for the Macintosh. If you don't see it here, call us for a price.*

**Terms:** We accept Visa, MasterCard, and Discover & AmEx. Orders prepaid by Cashier’s Check may deduct 1% from above prices. Returns not subject to restocking fee. Shipping not included.

Please circle 47 on reader service card.
**Software**

**ABRACADATA**
- Design your own Home Landscape, Architecture or Interiors...

**ADOB SYSTEMS**
- *Adobe Illustrator 3.0 with ATM... $348*
- *Adobe Type Manager... $62*
- *Adobe TypeSet 1 or 2... $62*
- *Adobe Type Align... $65*
- *StreamLine 2.0... $19*
- *Photoshop... $335*
- *Entire font library available CALL Type On Call... $58*

**CUTTING EDGE**
- *92 MB Quantum LPS... $459*
- *106 MB Quantum LPS... $691*

**ALDUS**
- *PageMaker... 499*
- *Freehand 2.0... 388*
- *Persuasion... 319*
- *Shortcut... 45*
- *Shift Deluxe 2.0... 62*
- *ASD... 150*
- *FileGuard 2.5... 137*
- *ASHLER... 599*
- *AshtonTate... 21*
- *FullWrite... 135*
- *Full Impact... 135*
- *EVERY... 165*
- *MacLabelPro... 47*
- *Full Line of Labels Available CALL BRODERBUND TypeSyleyr... 117*

**CAIIE**
- *OmniPage... 599*
- *FullWrite... 599*
- *MacDraw II... 599*
- *MacDraw It... 599*
- *ClarisCad... 599*
- *SmartFont Designer... 279*

**CE SOFTWARE**
- *Quickcall 10 User... 296*
- *Quickcall 50... 984*
- *DiskTop 4.0... 64*

**CLARIS**
- *MacWrite II... 139*
- *FileMaker Pro... 299*
- *MacDraw II... 295*
- *MacWrite It... 295*
- *ClarisCd... 559*
- *SmartFont Designer... 279*

**CERES**
- *Inspiration... 115*

**CE SOFTWARE**
- *Quickcall 10 User... 296*
- *Quickcall 50... 984*
- *DiskTop 4.0... 64*

**ADOB TYPE ON CALL**
- *Type on Call is the most automatic, affordable way to select any Adobe Font family you need. Just call to unlock any typeface with instant access. With this purchase you will receive Adobe Type Manager(ATM) along with 13 typefaces plus 2 Adobe Font packages from our top selling list... $558*

**FREE SOFTWARE**
- *WhiteLight... 81*
- *HayesBox... 82*
- *HyperPress... 199*
- *Link... 199*

**ICON SIMULATIONS**
- *On Cue... 34*
- *TMON... 56*

**IMAGE EXPRESS**
- *Business Forms... 145*
- *Flyers... 145*
- *5 Pack-Set... 68*

**INSIGNIA**
- *MacDraft 2.1... 299*

**CUTTING EDGE**
- *92 MB Quantum LPS... $459*
- *106 MB Quantum LPS... $691*

**FILEGRAPHICS**
- *Type on Call... 119*

**MAGNA**
- *Tokenizer... 119*
- *Tokenizer... 119*

**MANAPRO**
- *General Ledger Pro... 799*

**MICROCOM**
- *Carbon Copy Mac... 115*
- *Vires... 199*

**MICROFRONTIER**
- *Enhance... 189*

**MICROSOFT**
- *Word 4.0... 240*
- *Excel 4.0... 240*

**MULTI-AD SERVICES**
- *Multi-Ad Creator... $449*
- *Multi-Ad Search... 108*

**ODESTA CORPORATION**
- *Double Helix... 365*
- *Data Desk... 365*
- *OCP... 98*

**PFRAHAM**
- *Model Shop... 369*
- *Printmaker... 429*
- *Printflow... 429*

**PRESENTER PROFESSIONAL WITH MACRENDERMAN**
- *$2599*

**ROBOSOFT**
- *Multi-Ad Creator... $449*

**MULTI-AD SEARCH**
- *$168*

**OCTAVE**
- *Multi-Ad Search... 108*

**PEACHTREE SOFTWARE**
- *Adobe Illustrator 3.0... $348*
- *Adobe Photoshop... $355*

**DELTA POINT**
- *DeltaGraph... 475*

**SERIALS**
- *Disk Doubler... 42*

**SYSTEMS COMPATIBILITY**
- *StrataVision 3D... 348*

**SUPERMAC**
- *MacWrite II... 139*
- *FileMaker Pro... 299*
- *MacDraw It... 295*
- *ClarisCad... 559*
- *SmartFont Designer... 279*

**SUPERMAC**
- *MacWrite II... 139*
- *FileMaker Pro... 299*
- *MacDraw It... 295*
- *ClarisCad... 559*
- *SmartFont Designer... 279*

**TOPSICLES.COM**
- *Multi-Ad Creator... $449*

**VIVID GRAPHICS**
- *Multi-Ad Search... 108*

**WAVESOFT**
- *Multi-Ad Search... 108*

**VERITAS**
- *Multi-Ad Search... 108*

**VICTORIAN**
- *Multi-Ad Search... 108*

**WABCO**
- *Multi-Ad Search... 108*

**WIZARD**
- *Multi-Ad Search... 108*

**XEROX**
- *Multi-Ad Search... 108*

**YODA**
- *Multi-Ad Search... 108*

**ZEDCOR**
- *Multi-Ad Search... 108*
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ANIMAS TECHNOLGY

- Hours: Mon-Fri 9:30-11 EST
- All prices & policies subject to change without notice.
- Same day shipping.
- $3.50 for California residents. 
- Visa, Mastercard & Amex accepted.
- California residents add 7% sales tax.

IDEAFISHER ........................................... $422
250 Grey Scale Scanner +Free Int. Fax ... 1893
300 Color & Grayscale Scanner ... $1699
Silent Printer ... $2295
ABC/M (Super Strength Bags) ...$215
Extended Carry Case for SE ... $76
Carry Case for Mac I/II/II+ ... $195
Dual Covers and other bags ... CALL

ARTEFACTS
True Color Hand Scanner ... $562
ARTICULATE SYSTEMS
Voice Navigator II ... $569
Voice Line ... $179

AT&T TECHNOLOGY
Mac I/II Cache Card ... $239

CAERE
The Tyrite ... $469

COMPATIBLE SYSTEMS
Ether Route ... $1054
Ether Plus ... $358
Ether II ... $259

MARSTEK-800/MAC-64 (600dpi) $2299
Scan directly from an Enhanced Mac with the 600 dpi hand scanner. With 64 gray scales, you'll be amazed at how fine your image can be.

Policies
* Visa, Mastercard & Amex accepted.
* Credit card is not charged until order is shipped.
* California residents add 7% sales tax.
* Hours: Mon-Fri 9:30-11 EST
* Sat 11-6 EST
* Call (818) 504-6547, FAX (818) 501-3760
* Compatibility not guaranteed.
* All prices & policies subject to change without notice.

Shipping
- UPS Overnight continental US.
- Hardware over 10 lbs will be shipped ground.
- Same day shipping.

Returns
- Call for R.A. number before return
- Restocking fee may apply.

Money Back Guarantee
- Most products have a 30-day money back guarantee. Please inquire when you order.

Hardware

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250 Grey Scale Scanner +Free Int. Fax ... 1893
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Silent Printer ... $2295
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Money Back Guarantee
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### Mac Products USA 1-800-MAC-DISK

**The Magic 88 Removable**

Over 88MB storage from our Magic SyQuest 45R bundled with the Sigma Designs Double-Up NuBus Compression Board and Disk Doubler software. Instantly compress files to 10 times smaller. Works with any Macintosh drive.

#### Hard Drives and Storage

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<thead>
<tr>
<th>Drive Type</th>
<th>Capacity</th>
<th>Price</th>
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<td>MagicDrive 3.5</td>
<td>1.44K</td>
<td>$219</td>
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<td>Bernoulli Transportable 44 MB</td>
<td>$96</td>
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<td>Dayna Single Drive 1.4 MB</td>
<td>$445</td>
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<td>PineCone R90 Optical</td>
<td>$269</td>
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<td>PLI Infinity Turbo 88</td>
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<td>Micronet 88 MB Removable</td>
<td>$1149</td>
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#### Modems & Fax Modems

<table>
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<th>Price</th>
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<tr>
<td>Aton 24/96 FaxModem</td>
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<td>DayneFax 24/96</td>
<td>$289</td>
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<tr>
<td>DayneFax 24/96 Plus</td>
<td>$389</td>
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<td>Newvorth Novellink</td>
<td>$699</td>
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<tr>
<td>US Robotics Courier HST 14.4</td>
<td>$699</td>
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#### Video Solutions

<table>
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<tr>
<th>Video Solution</th>
<th>Price</th>
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<tr>
<td>Regami 20&quot; Tritron RGB monitor</td>
<td>$2099</td>
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<td>Ektron 20&quot; Tritron</td>
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<td>MotionMaster II</td>
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#### Networking & Connectivity

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<td>Asante 10T Hub</td>
<td>$939</td>
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<td>DaynaPort E/ LC, SI, SE</td>
<td>$289</td>
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<td>Newvorth Novellink 1</td>
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<td>Shiva FastPath</td>
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<td>Sonic Ethernet Tel T6 SE, HI, LSCI, HI</td>
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#### Accelerators

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<th>Accelerator</th>
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<tbody>
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<td>Magic RailGun 030</td>
<td>$1099</td>
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#### Printers

<table>
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<th>Printer Type</th>
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<tr>
<td>Laser Writer NT micro</td>
<td>$1539</td>
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<td>Laser Writer PS</td>
<td>$1829</td>
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<td>LaserWriter PowerCenter HCl 40 MB</td>
<td>$1199</td>
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<td>Radius Radius 1360</td>
<td>$2599</td>
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#### Macintosh CPU's & Accessories

<table>
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<tr>
<th>Accessory</th>
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<tbody>
<tr>
<td>Macinthon Price 36 Month Lease</td>
<td>$285</td>
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<tr>
<td>MagicView 19&quot; Hi-Wide color card</td>
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<td>MagicView 19&quot; Hi-Wide color card II</td>
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<td>MotionMaster II</td>
<td>$1299</td>
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#### Networking & Connectivity

<table>
<thead>
<tr>
<th>Networking Device</th>
<th>Price</th>
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<tbody>
<tr>
<td>Asante 10T Hub</td>
<td>$939</td>
</tr>
<tr>
<td>DaynaPort E/ LC, SI, SE</td>
<td>$289</td>
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<tr>
<td>Newvorth Novellink 1</td>
<td>$279</td>
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<tr>
<td>Shiva FastPath</td>
<td>$2099</td>
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<tr>
<td>Sonic Ethernet Tel T6 SE, HI, LSCI, HI</td>
<td>$235</td>
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#### Accelerators

<table>
<thead>
<tr>
<th>Accelerator</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>Magic RailGun 030</td>
<td>$1099</td>
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#### Printers

<table>
<thead>
<tr>
<th>Printer Type</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>Laser Writer NT micro</td>
<td>$1539</td>
</tr>
<tr>
<td>Laser Writer PS</td>
<td>$1829</td>
</tr>
<tr>
<td>LaserWriter PowerCenter HCl 40 MB</td>
<td>$1199</td>
</tr>
<tr>
<td>Radius Radius 1360</td>
<td>$2599</td>
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</table>

#### Macintosh CPU's & Accessories

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Price</th>
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<tr>
<td>Macinthon Price 36 Month Lease</td>
<td>$285</td>
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<tr>
<td>MagicView 19&quot; Hi-Wide color card</td>
<td>$1499</td>
</tr>
<tr>
<td>MagicView 19&quot; Hi-Wide color card II</td>
<td>$269</td>
</tr>
<tr>
<td>MagicView 19&quot; Hi-Wide color card II</td>
<td>$499</td>
</tr>
</tbody>
</table>

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  - Radius Radius 1360 | $2599
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  - MagicView 19" Hi-Wide color card | $1499
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<tr>
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<th>Price</th>
<th>Features</th>
</tr>
</thead>
</table>
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<th>Internal</th>
<th>External</th>
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<tbody>
<tr>
<td>Seagate 204Mb 15ms</td>
<td>$899</td>
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<td>Seagate 426Mb 14ms</td>
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5.25" Drives

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<tr>
<td>Wren 337Mb 14ms</td>
<td>$1,299</td>
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<td>Wren Runner 337Mb 10.7ms</td>
<td>$1,599</td>
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<td>Wren Runner 676Mb 11.9ms</td>
<td>$2,249</td>
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<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>
<th>Internal</th>
<th>External</th>
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</thead>
<tbody>
<tr>
<td>Quantum 40 19ms</td>
<td>$299</td>
<td>$399</td>
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<tr>
<td>Quantum 105 19ms</td>
<td>$399</td>
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<tr>
<td>Quantum 210 15ms</td>
<td>$789</td>
<td>$889</td>
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<table>
<thead>
<tr>
<th>Mbytes</th>
<th>Mechanism</th>
<th>Access</th>
<th>Int.</th>
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NEW! 1.3 Gig 4mm DAT 
$1495
Includes Retrospect software, 1 cartridge & cables.

Removable SyQuest 
$479
25ms. Includes 45Mb cartridge. Extra Cartridge $79

CD/ROM
$649
External optical storage unit.
Includes Toshiba mechanism.

Memory Upgrades
$846
1Mb* (1x8-80ns) 
$249
4Mb* (4x8-80ns)

For Mac II, IIC, IIGS, SE, SE/30, Plus, Classic & IIsi.

150Mb Teac Tape Backup (w/tape) 
$599
Ext. Incl. Express Tape software. Extra Tape $49

*2 Year Replacement Policy
The Most Affordable DATdrive on the Market, now only $1495.

Third Wave's DATdrive™ with Retrospect—backup an entire network on a single DAT cartridge. Now available with 2 gigabytes of storage.

**SyQuest, Tape, DAT, Optical**

<table>
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<th>Internal EX</th>
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*Low power internal drives that meet Classic, HiSi & LC power specs.

**Seagate MacWren Drives**

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*Highest capacity internal drives for Mac ca. c6, SE and SE/30. These also work in the II and IIgs.

**UltraCombo**

| 300/45R | $9900 |
| 300/150| $9900 |
| 400/DAT| $9900 |
| 400/150| $9900 |
| 400/DAT| $9900 |
| 500/DAT| $9900 |
| 500/150| $9900 |
| 600/DAT| $9900 |
| 600/150| $9900 |
| 700/DAT| $9900 |
| 700/150| $9900 |

*Over 30 combinations available.

**SyQuest, Tape, DAT, Optical**

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**Combo Drives**

| 105/45R | $1050 |
| 170/150| $1420 |
| 170/DAT| $2400 |
| 210/DAT| $2500 |
| 425/45R| $2040 |
| 425/DAT| $3340 |

**Media**

| Tex CT600H (60mb) | $17 |
| Tex CT600N (150mb) | $24 |
| 4mm DAT Tape | $19 |

**Macworld finds our drives quietest.**

"The quietest of the 64 drives tested..."—Macworld, March 1991.

**XAPSHOT brings 24 bit images to the Mac.**

XAPSHOT allows you to import high quality still video images to your Mac using a frame grabber. It stores up to 50 images on 3" disckettes and can be connected to your TV for previewing. Great for video, slide graphics and print work.

**SIMM pack for the Classic**

Board only (0 mb) $45
(0 mb) with drive bracket* 63
(0 mb) w/40mb Maxtor 313
(0 mb) w/80mb Maxtor 445
*Remove SIMMs & drive from HiSi, install in Classic.

**LC VRAM SIMM & 2 mb SIMM now available.**

**SIMMs—lowest prices, no CFCs**

Third Wave, an environmentally conscious company, manufactures a full line of 1, 2 and 4 mb SIMMs without releasing harmful CFCs into the atmosphere. Call for manufacturer direct prices on SIMMs for all Macs, NTX printers, IBM (158, 486 and PS2) and STFPs.

LC VRAM $109

**XAPSHOT**

Call 800/284-0486

Please circle 128 on reader service card.
I’ve been in this business for six years, and I’ve NEVER been this excited about a printer!

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:

- 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. Characters are built 4 to 5 times faster.
- COMPRESSION. Reduce transmission time and save disk space by automatically compressing at rates up to 25-to-1 without any decrease in quality.

Features available through software applications:

- 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."

President
Software & Hardware That Fits

Introducing...
The first Adobe PostScript Level 2 printer on the market!

What’s so great about PostScript Level 2, anyway?

It’s very, very fast (see chart on next page). Type characters are built 4 to 5 times faster, and text quality at small point sizes is greatly improved.

And why should I replace my old PostScript Level 1 printer now?

Existing PS Level 1 printers are on their way out. Buying a PostScript Level 1 printer today is like buying a MacPlus today — great in its time, but new technology has made it an inferior choice.

Don’t get stuck with a PS Level 1 printer that uses outdated technology and won’t meet the requirements of future software applications.

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 RT Laser includes 35 resident Adobe PostScript typefaces. Compact design (only 33.5 lbs.; measures 13.4"W x 14.2"D x 10.9"H).

What?”

Tired of hopping up and down to change the paper in your printer?

Now you can stay seated while you specify up to 4 paper changes!

Save your energy for thinking instead of switching paper in your printer trays. Print a two-page letter (at 9 pages per minute!) with letterhead from tray one and plain paper from the manual feeder — all in one easy operation, without getting up from your chair. Add our optional second tray and envelope feeder, and you can specify up to 4 paper changes without moving anything but your mouse.

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 RT Laser includes 35 resident Adobe PostScript typefaces. Compact design (only 33.5 lbs.; measures 13.4"W x 14.2"D x 10.9"H).

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610 South Frazier • P.O. Box 3106 • Conroe, TX 77301
THE NETWORKING CORNER

Everybody talks networks. But when it comes right down to it, finding someone who actually knows networks is another story...and we know networks!

We run our entire business on Macs, and we've had to deal with networking issues for more than five years. We use Farallon, Shiva, Dayna, and Asante networking products in our day-to-day operations, and we know from experience how they work.

We can tell you firsthand how a twisted pair Ethernet network is configured and interfaced with a LocalTalk network.

If you have a sticky network issue, our sales consultants will team up with one of our technical specialists to find a custom solution for you. Try us!

ASANTE

<table>
<thead>
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CAYMAN SYSTEMS

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DAYNA COMMUNICATIONS

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<tr>
<td>Farallon Cable Kits</td>
<td>Call</td>
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</table>

1 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."

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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.

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- Backed by our famous 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.

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600ZS Color Scanner includes Adobe Photoshop—full version, with 24-bit color editing and color separation capabilities

Scanmaker 600ZS Color Scanner. A low-cost, high-resolution color scanner capable of scanning 16 million colors at up to 600 dots per inch. Outstanding image quality in a compact, flatbed design.
- 16.8 million colors
- 3 scanning passes (red, green and blue filters)
- 14 brightness settings for each color plane
- Scanning speed 150 seconds (letter size)

SAVE! Only $1469

Scanmaker 600GS Grayscale Scanner. 8-bit grayscale scanning of halftones, line art, and mixed at up to 600 dots per inch for extra-crisp image quality. Flatbed design.
- Up to 256 shades of gray
- 1 scanning pass (gray filter)
- 14 independent brightness and contrast settings

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Leading-edge technology provides superior performance! Daystar delivers the fastest accelerators in the business. Easy to install. One year warranty and toll-free technical support.

"...the Daystar board just screamed."
— MacUser, Feb. '89

Mac II, Mac IIX, Mac Icix
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- 25 w/68882........................................... 1205
- 40 Mhz................................................. 1355
- 40 w/68882........................................... 1565
- 50 Mhz................................................. 1845
- 50 w/68888........................................... 2125

Mac Icix
- 40 MHz................................................. 925
- 40 w/68882........................................... 1135
- 50 MHz................................................. 1635
- 50 w/68882........................................... 1915
- Fast Cache Icix..................................... 269
- RAM Powercard.................................... 709
- SCSI Powercard.................................... 1060
- 1 Megabyte SIMMS.................................. Call
- 4 Megabyte SIMMS.................................. Call
- Classic Memory..................................... Call

Ask about our no-hassle upgrade program for the Mac Icix.

We can schedule a swap-out of your mother board with the Daystar accelerator that's already installed. Double or triple your speed with no down time. Now that's service you won't find anywhere else!

POWERFUL, AFFORDABLE LASER PRINTING...

from TI's compact microLaser PostScript printers.

300 dpi with HP LaserJet Series II emulation standard. 1.5 Mb RAM upgradable to 4.5 Mb RAM. Optional accessories: 2nd paper tray, separate envelope tray!

TI microLaser™
XL PS 17, 16 pages per minute; 35 resident fonts; 25,000 pages per month duty cycle. Call for best price!

$1299

TI microLaser™
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- Backed by a ONE-YEAR WARRANTY with an optional two-year add-on.
- Backed by our famous 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.
MONITORS w/Cards

Sony Trinitron 1304 14" w/8-bit......... 1108
Magnavox 14" w/8-bit.................. 918
NEC MacSync 14" w/8-bit.............. 828

MONITORS w/Cards

$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 gray scale capability, and flat CRT (P4 phosphorus, polished screen). One-year warranty.

CPU Monitor Price
Mac SE Mono $995
Mac II, IICx, IIC, Ilx, IIX, SE/30 GS 256 $1479
Mac IIfs Mono $1059
Mac Portable Mono $1249

RealTech Full Page Display

At this price, you can’t afford not to have one of these incredible eyesavers!
Quality, flicker-free images at a price that lets you experience the convenience of large-screen viewing.
• 15" portrait display
• 870 x 640 resolution, 80 dpi
• Vertical refresh rate of 74 Hz
• Full gray scale capability
• Flat CRT, P4 phosphorus, polished screen
• One-year warranty

CPU Monitor Price
Mac II, IIfx, IIf, Ilx, IIX, SE/30 GS 256 $1079
Mac II, IIfx, IIF, IIX GS 16 $495
Mac Portable Mono $849

OTHER MONITORS AVAILABLE!

Please call for prices.

RasterOps ClearVue/GS

Unmatched image quality!
Flicker-free images in 256 shades of gray for accurate proofing. Includes Virtual Desktop and Pan/Zoom features for maximum productivity! 1024 x 768 resolution; 19" display, 72 dpi. Paper-white phosphor. Integrated tilt & swivel base. 75 Hz vertical refresh rate.

RasterOps ClearVue (Mac II).......... 1129
ClearVue XL 21" System............. 1595
SE/30 24-bit 14" Trinitron........... 1249
14" Trinitron 24-bit................. 1179
19" Trinitron 8L..................... 3390
19" Trinitron 24L.................... 4690
ClearVue Classic 21" System........ 1395
ClearVue SE w/16MHz&68000 Accel.... 1295
ClearVue Pro Video 32............... 1395

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Ikegami 19" Trinitron Color Systems!
Ikegami is the undisputed champ in color reproduction. Comes with an integrated tilt/swivel stand, and auto and manual degaussing. Full antiglare coating, 75 Hz vertical refresh rate, and flicker-free images reduce eye strain and improve user comfort. Comes with a high resolution 1024 x 768 video card.
The right solution for every budget!

System Colors Price
Entry Level 256 $2569
Professional 256 $2895
Master’s 16 Million $3495

Selko 14" Trinitron
High-resolution Trinitron tube makes it possible to view 16 million shades of color! 640 x 480 resolution, 72 dpi. 14" display has integrated tilt & swivel base. 43% brighter than the leading competitor!

$619
Our dedicated, highly-trained service technicians are some of the finest in the country.

**Systems**

- **Mac Classic**, 2.5 Mb RAM, 30 Mb Apple, Apple Keyboard: $1395
- **Mac IIci B&W Full-Page System**, 3 Mb RAM, 40 Mb Hard Drive, Mac 101 Keyboard, Felix: $3649

We specialize in high-end graphics systems.

**Mac Ilfx** with 8 Mb RAM, RasterOps 24-bit Video Card, Ikegami Trinitron 19" Color Monitor, RasterOps Video Accelerator with 4 Mb RAM, 650 Mb Internal Hard Drive, Datadesk Mac 101 Keyboard, MicroTek 3002S 24-bit Color Scanner, QMS ColorScript 100 Thermal Color Printer with 5 Mb RAM: $22,545

**Mac IIci 14" Trinitron System**, 5 Mb RAM, 105 Mb Quantum, Datadesk Switchboard: $4169

**Mac IIci B&W 21" Dual-Page System**, 4 Mb RAM, 105 Mb Quantum, Mac 101 Keyboard: $5499

**Mac IIfx**, w/1 Floppy Drive, 8 Mb RAM, 325 Mb Internal Hard Drive, Ikegami 24-bit 19" Color Monitor and Video Card, Datadesk, Mac 101 Keyboard: $11,159

**Mac IIci 14" Trinitron System**, 4 Mb RAM, 105 Mb Quantum, Mac 101 Keyboard: $5139

1-800-972-3018

FAX: 1-409-539-4141  Call: 1-409-760-2400

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Reliable drives backed by a 2-year warranty.

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- 105Q ............................................. 425
- 170Q ............................................. 745
- 210Q ............................................. 835

External Hard Drives
- 105Q ............................................. 510
- 170Q ............................................. 830
- 210Q ............................................. 920

APPLIED ENGINEERING
HD Superdive 1.44 ................................ 225
QuadraLink ...................................... 199
Cache-In (Ill Cache Card) .................. 189
DataLink Mods
- Ex 2400 Modem ................................ 165
- Ex 2400 w/MNP-5 .......................... 199
- Ex 2400 w/MNP-5 & Fax .................. 235
- LC w/MNP-5 & Fax .......................... 235
- MacPortable w/MNP-5 & Fax ........... 199

Large-Capacity Storage Devices
All of our high-quality drives come with a one-year warranty; an optional second year is available.

If a drive fails within 90 days, send it back. Within 48 hours of receiving your unit, we'll ship you a replacement drive overnight—at our expense. You may extend this replacement policy to a full year for the modest cost of $169.

PERIPHERAL LAND
1.44 Mb Floppy ..................................... 329
Infinity Turbo 88 ............................... Call
Infinity Dual Turbo 40 ...................... 1850

PERIPHERAL LAND
Peripheral Land, recognized leader in removable cartridge drives, introduces the latest in Syquest technology—the Infinity Turbo 88. Call for prices.

WACOM TABLETS
Electrostatic 12 x 12 ..................... 879
Electrostatic 12 x 17 ..................... 1289
Electrostatic 15 x 15 ..................... 1289
Standard 12 x 12 ......................... 709
Standard 12 x 17 ......................... 1199
Standard 12 x 18 ......................... 1199
Standard 15 x 15 ......................... 1199

WACOM TABLETS
Standard 18 x 25 ......................... 3199
Standard 6 x 9 .............................. 559
Menu Panel 12 x 12 ..................... 839
Menu Panel 12 x 17 ..................... 1249
Menu Panel 12 x 18 ..................... 1249
Menu Panel 15 x 15 ..................... 1249
Choice of stylus or 4-button cursor.

Affordable options to enhance your system.

UNINTERRUPTIBLE POWER SUPPLIES
450 AT ........................................... 329
AP 110 SE ...................................... 229
AP 360 SX ...................................... 259
MinuteMan 300 .............................. 429
MinuteMan 600 .............................. 695

UNINTERRUPTIBLE POWER SUPPLIES

TARGUS PREMIUM CASES
IW II Case ....................................... 49
Mac Plus Case ................................. 59
SE Extended KB Case ..................... 75

TARGUS PREMIUM CASES

EMAC 150T Tape Back-up $665

ACC & OTHER PERIPHERALS
Kurta 12 x 12 Tablet ..................... 399
Kurta 17 x 12 Tablet ..................... 659
MacFlip (80 diskettes) ............... 18
Mac 101E Keyboard ...................... 139
MacPro Plus Keyboard .................... 139
DataDisk SwitchBoard ................... 159

EMAC 150T Tape Back-up

SATISFACTION GUARANTEED!

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.

"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...an 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."

Several members of our management team (l to r): Barbara, Jim, Lew, Real.
Contact the professionals at MacTel Technology.
We handle only the best in Macintosh hardware, systems and peripherals. Names like Apple, Nikon, Radius, RasterOps, Wacom, Sharp and our own, top-quality Index brand.
We provide services such as international sales, service and banking; and qualified, reliable technical support (before and after the sale). It's no wonder if the vast majority of our business is repeat business.

### Quantum Drives Index 3.5" NO LONGER AVAILABLE

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In keeping with our commitment to provide you with a complete line of high quality economical products, MacTel is proud to offer you a complete line of Hard Drives. We carry only the finest mechanisms available in the market so that you are assured of reliable performance day-in, and day-out...

### 1 Year Warranty!

* Fits only Mac II, Mac IIx & Mac IIfx. All INDEX external Harddrives are supplied with universal power supplies, for world-wide adaptability. Backmatic V2 and AutoSave II are registered trademarks.

### MacTel Removable Drive

2 Years Warranty

The MacTel 45R with Syquest mechanism was rated 4 mice by MacUser magazine.

MacTel 45R* (w/1 cartridge) .... $ 499
Syquest 45 Mb cartridge ... $ 69

* includes Backmatic & AutoSave

Another Quality MacTel Product.

### MacTel Tape Back Up

The MacTel Tape Back Up system with Archive mechanism offers you up to an incredible 2 Gb storage per tape to serve as a back up for the largest server system out there.

**2 GB DAT DRIVE** ....... $ 1799

Price includes 1 tape and retrospect V1.2

1 Year Warranty

--

MacTel carries hundreds of professional Mac peripherals (not listed) and the entire Macintosh line.

* CALL OR FAX FOR A COMPLETE CATALOG.
When purchasing Systems, compare the options and features. VisionPRO Color Graphic cards are manufactured under license for MacTel Technology and support Macintosh graphical needs now and in the future.

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- **8-Bit Business System**
  - 8 Bit Video Card non Upgradable, 20" Trinitron - 75 Hz
  - $2795

- **8-Bit SystemPRO 20”**
  - VisionPRO* VideoCard, 20" Trinitron - 75 Hz
  - $3249

- **8-Bit SystemPRO SONY 19”**
  - VisionPRO* VideoCard, 19” Sony Trinitron (GDM-950) - 75 Hz
  - $3625

- **24-Bit VisionPRO Interface Upgrade Kit w/ purchase of any systemPRO**
  - $600

*All VisionPRO interface cards have multi-monitor support (Sony 19” and 20”), support Block Mode transfer & acceleration, Upgradable 8-bit to 24-bit cards. Pan/Zoom 3X & 4X and virtual desktop. Business system video card offers Pan/Zoom 2X & 4X and virtual desktop.

**Monitors**

- Apple 13” RGB
  - $749

- Hitachi 14” MVX
  - $575

**Video Interface/Cards**

- **8-Bit Vision ST 813**
  - $275

- **24-Bit Vision ST 2413**
  - $375

Vision ST Upgrade Kit (8-24 Bit)
  - $135

VisionPRO 8-24 Bit Upgrade Kit
  - $700

**Macintosh CPU’s and Systems**

- Mac Classic (I/O loaded)
- Mac II St
- “NEW” Booklet Mac Portable
- Mac SE/30
- Mac II Cl
- Mac II FX
- LaserWriter II NT, NTX and Personal LaserWriter

**Ordering Information**

Hours of operation: Monday to Friday - 8:00 AM to 6:00 PM CST
Saturday - 9:00 AM to 4:00 PM

1 • 800 • 950 • 8411

MacNet: MacTel • Europe: 0041/46-054020 • France: 0033/88-77-83-20 • Switzerland: 042/36 44 33 • Germany: 0722/233 047

Please circle 31 on reader service card.
Texas Instruments PS17 & PS35 Microlaser Printer
1.5 Meg of RAM, 17 or 35 typefaces available, 6 pages per minute, Letter, legal, and transparencies. PS17 Retail $1,299, Our Price $1,599
AppleTalk Interface Included!

QMS PS410 PostScript Laser Printer
This Adobe PostScript Printer comes complete with two megabytes of memory expandable to six megabytes, 45 resident typefaces, toner cartridge, and output tray. Winner of the 1991 MacUser Editor's Choice award. Retail $2,795, Our Price $1,949

NEC SilentWriter Model 90 Laser Printer
PostScript without the high price. Compact, easy to use laser printer. Comes complete with 35 resident fonts and a universal input tray for letter, legal, envelopes, transparencies, and labels. Retail $2,695, Our Price $1,599

AppleTalk Interface Included!

SyQuest 44 Removable Hard Disk Drive
The SyQuest 44 megabyte removable hard disk drive is perfect for running as a stand alone hard disk drive, or as a method of backing up your files. This unit comes with software and cables. Cartridge extra. Retail $799, Our Price $399

SIMM Sale
$47

E-Machines T-16 Color Monitor System
Five mouse rating by MacUser Magazine, the T-16 16" color monitor system gives you an affordable alternative to Apple's 13" display. Receive $500 dollars off our already low price when you trade in your Apple 13" color monitor. Call for details! Retail $2,995, Our Price $1,995

Magnavox Professional 14" Color Monitor
Two year warranty! The Magnavox Professional has superb resolution, and a glossy CRT face for crystal clear images. Comes complete with cable and tilt-swivel base. Retail $699, Our Price $499

Sigma Designs L-View Multimode Monitor
Winner of the 1991 MacUser's Editor's Choice award, the Sigma Designs L-View Multimode 19" Monitor system can display text in 36, 46, 60, 72, 92, and 120 DPI. Retail $1,999, Our Price $1,325

Hewlett Packard DeskWriter
The HP DeskWriter is a 300 DPI ink jet printer that fits neatly on your desktop. Works with software that you already have, such as word processing, desktop publishing, spreadsheet, graphics, and more! Retail $699, Our Price $679

Sigma Designs PageView GS Monitor
The PageView GS plugs into the video port of the Apple Macintosh IIC or IIE, and can display up to 16 grayscale levels. This low emission monitor has an 80 DPI resolution and a 75 Hz refresh rate. Retail $699, Our Price $599

Sigma Designs PageView GS Monitor
The PageView GS plugs into the video port of the Apple Macintosh IIC or IIE, and can display up to 16 grayscale levels. This low emission monitor has an 80 DPI resolution and a 75 Hz refresh rate. Retail $699, Our Price $599

Microtek 300Z Color Scanner
Up to 16.8 million colors can be recognized by this scanner. This scanner comes complete with cables and software. This month we have this scanner specially priced! Retail $2,695, Our Price $1,669

1-800-888-8779
24 Hour Fax Line 602-897-1921
4747 East Elliot Road, #29-461 • Phoenix, AZ 85044
All prices subject to change without notice. All products subject to availability.
Please circle 191 on reader service card.
**Super Savers!**

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Price</th>
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**Accessories**

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**Advantage Business Center**

23520 Telford, #3 • Torrance, CA 90505
(213) 325-1422 • FAX (213) 325-4073
(800) 274-7747

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External drives include:
- zero-footprint solid metal case
- dual SCSI ports for daisy-chaining
- external LED
- SCSI cable
- power cable
- ONTRACK formatting/partitioning software

Internal drives include:
- mounting brackets
- SCSI cable
- ONTRACK formatting/partitioning software

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<th>Drive Type</th>
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Toll-free in U.S. and Canada

800-473-0054

Mailing Address:
520 S. 52nd St., Ste 204
Tempe, AZ 85281
FAX (602) 350-1191

Policy: Prices, terms & availability subject to change without notice. All products carry a manufacturer's warranty. No returns on open box software. TERMS: No charge for MasterCard/VISA. Shipping: UPS or FedEx only. APO/FPO orders accepted. PO's accepted, some restrictions apply. DCA equipment immediately repossessed upon return. Product must be undamaged & in original packaging and condition. Personal checks will delay shipping 14 days.
**MAXTOR 15 to 17ms Access**

<table>
<thead>
<tr>
<th>MB</th>
<th>Internal</th>
<th>External</th>
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<tbody>
<tr>
<td>40</td>
<td>Low Profile, fits LC Classic &amp; SI $259</td>
<td>$349</td>
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<td>80</td>
<td>Low Profile, fits LC Classic &amp; SI $319</td>
<td>409</td>
</tr>
<tr>
<td>200</td>
<td>LXT-213 3.5 in. HH $699</td>
<td>799</td>
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<td>1.2G</td>
<td>Panther 5.25 in. FH $2649</td>
<td>2849</td>
</tr>
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</table>

- **30 day Money-back Guarantee** • All Drive products carry a 30 day Money-back guarantee. The cost of shipping is your only risk.
- **Disk-for-Disk Replacement Warranty** • Quantum, Maxtor, ARDAT and Syquest Drives carry a two year "parts & labor" disk-for-disk replacement warranty. WREN, Teac, WangDAT, CD-ROM's and Syquest Cartridges carry a one year "parts & labor" disk-for-disk replacement warranty.
- **Includes Necessary Brackets** • All Hard Drives include all brackets, cables and cords and LED's required for operation.
- **Hard Drives Come Pre-formatted** • All Hard Drives come pre-formatted with Apple's latest stable System software, 18.8MB of Publicly Distributable software from the B'MUG Library, and the 'ALLIANCE POWER TOOLS' SCSI formatter/hard Partitioner.
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**Quantum 10 to 12ms Access**

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**WREN 10.7 to16ms Access**

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**CD ROM**

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</tr>
<tr>
<td>120</td>
<td>499</td>
<td></td>
</tr>
</tbody>
</table>

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### HARDWARE 275-285
- ACCELERATOR BOARDS ........................................ 275
- BAR CODE .................................................. 275
- CD-ROM ..................................................... 275
- COMPUTER SYSTEMS ........................................ 275-277
- DATA ACQUISITION ........................................... 277
- DATA RECOVERY SERVICES ................................. 277-278
- DISK DRIVES ................................................ 278-280
- DISKETTES .................................................. 280
- GENERAL .................................................... 280-282
- INSURANCE .................................................. 282
- MEMORY UPGRADES ......................................... 282-283
- PERIPHERALS ............................................... 283-284
- PRINTERS .................................................... 285
- SCANNERS ................................................... 285

### SOFTWARE 285-289
- ACCOUNTING ................................................ 285
- BAR CODE ................................................... 285
- BUSINESS .................................................... 285
- CD-ROM ...................................................... 285-286
- DESKTOP PUBLISHING ...................................... 286
- EDUCATIONAL ............................................... 286
- EMULATION .................................................. 287
- ENGINEERING .............................................. 287
- ENTERTAINMENT/GAMES ................................... 287
- FINANCIAL ................................................... 287
- FONTS ......................................................... 287
- GENEALOGY .................................................. 287
- GRAPHICS .................................................... 287-288
- HEALTH ...................................................... 288
- LANGUAGE TOOLS ......................................... 288
- LOTTERY ..................................................... 288
- MUSIC/MIDI ................................................ 288
- PRINT DRIVERS SPOOLERS .................................. 288
- PUBLIC DOMAIN ............................................ 289
- SHAREWARE ................................................ 289
- STACKWARE ................................................ 289

### MISCELLANEOUS 289-291
- ACCESSORIES ............................................... 289
- DATA CONVERSION SERVICES ............................... 289
- DESKTOP PUBLISHING SERVICES ......................... 290
- DISKETTE COPY SERVICES ................................ 290
- FURNITURE .................................................. 290
- INSURANCE .................................................. 290
- MULTIMEDIA ................................................ 290
- SERVICES .................................................... 290
- SLIDE IMAGING SERVICES .................................. 291
- SOFTWARE CONSULTING ................................... 291
- SUPPLIES .................................................... 291

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### Fujitsu 3.5" Drives

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<th>Capacity</th>
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<td>$438</td>
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<td>$448</td>
<td>$528</td>
</tr>
<tr>
<td>185 MB</td>
<td>$598</td>
<td>$678</td>
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**3 Year Warranty, 50,000 Hours MTBF**

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<td>680 MB</td>
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</tr>
<tr>
<td>1.2 Gig</td>
<td>$2598</td>
<td>$2698</td>
</tr>
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*Mean Time Between Failure is the average life expectancy of a drive.

24 hour factory replacement available for 5.25" drives for additional fee.

### Fujitsu 5.25" Drives

<table>
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<th>Capacity</th>
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<tr>
<td>1.2 Gig</td>
<td>$2598</td>
<td>$2698</td>
</tr>
</tbody>
</table>

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*Fast network and unattended backup capabilities*

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### Ricoch Optical

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### WREN! DRIVES

<table>
<thead>
<tr>
<th>Type</th>
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### Quantum Drives

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<td>$488</td>
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<tr>
<td>JX 450</td>
<td>COMMERCIAL COLOR SCANNER</td>
<td>$4,295</td>
</tr>
<tr>
<td>JX 300</td>
<td>COLOR SCANNER</td>
<td>$1,795</td>
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<tr>
<td>JX 730</td>
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MacUser July 1991 291
Rose-Colored Glasses

Everything looks rosy for Apple. System 7.0 seems to work and may completely fend off Windows. The lawsuit against Microsoft still looks good as I write this. Apple stock is in the stratosphere. The Classic and the LC enjoy continued success.

All this good news is supported by a recent study from Ingram Labs. It says that Macs are actually better deals than Compaq or IBM PCs if they’re set to do real-world tasks. Wowie! Champagne corks are popping in Cupertino!

Ingram Labs took a slew of Compaq and IBM PCs running Windows and had them run the same kind of software that runs on the Mac — stuff like PageMaker. In all categories (based on relative CPU speed and chip type, matching a 68020 with a 286 and a 68030 with a 386/486), the Macs were faster than the PCs and turned out to be cheaper too! And the differences between the PCs and the Macs weren’t even close. It was a slaughter, with the PCs costing nearly twice as much to deliver the same performance.

What a crock. Although Apple is pleased as punch, the study is seriously flawed. First of all, everyone in the world knows that the IBM and Compaq products are twice as expensive as the nearly exact same machines produced by the likes of CompuAdd, Gateway 2000, Zeos, Dell, Northgate, and dozens of other direct sellers. So the price/performance differential isn’t as great as the report would have you believe. In fact, if you know how to shop in the PC world, you can probably beat Apple’s prices in every category.

But this isn’t where the real difference lies. I’m not even going to argue the idea that PCs with Windows are similar to Macs. They aren’t. I may be a prejudiced user and a professional nay-sayer, but it’s hard to honestly suggest that Windows is even close to the Apple OS in functionality.

I always tell Windows users that when they can install a program or printer or whatever into their system merely by clicking on an icon and dragging it into the system folder, then (and only then) will they have achieved something worth bragging about. At this point, they aren’t even close.

Even more interesting is that the Apple system is so forgiving. There is no way you can junk up a PC with needless garbage and have the machine function. With the Mac, if you look into anyone’s System Folder, you end up finding all sorts of junk (memos even!) that shouldn’t be in there. Somehow they got included by accident or through carelessness.

Simply put, the Apple OS is built with GUI in mind and is probably the best operating system ever built for the personal computer. The coders who Steve Jobs whipped into programming this thing and the people who maintain it should get some sort of medal.

But for sheer speed, the Mac with all its whiz-bangery still can’t outperform the PC, because most PC users stick with the high-performance, albeit archaic, command-line interface. You tell the machine what to do, and off it goes. This is why Intel chips appear to outperform Motorola’s in real-world tasks. In theory the chips are closely matched, but Motorola-based systems always have a pile of overhead — either the Mac OS or UNIX — to bog them down.

The personal-computer revolution evolved from a bare-bones rocket-sled mentality. Apple DOS (on the Apple II), CP/M, and Northstar DOS were the original operating systems. They were lean and mean program loaders and control programs that made sure keyboards and printers worked properly and that a disk could be read. Nothing fancy. The operating system was there just to help programs talk to users. Programs were the be-all, end-all. This hasn’t changed one bit in 15 years. MS-DOS is merely a clone of CP/M. Programs still matter more than the OS.

Along came the Lisa — then the Mac — with a new paradigm straight from the heart of the Xerox Star computer. The new paradigm was the desktop. It was alien to the primary trend in desktop/personal computers: minimalism.

I have yet to see any indication that this has changed. The flop of OS/2 offers some proof that the trend remains. Until Windows 3.0, it looked bad for Windows too. Since the Windows 3.0 rollout, interest in complex environments has perked up a bit, but there is no proof that it will last. Windows applications are slow in coming, and who’s making money? Just Microsoft.

So everything looks good for the Mac, does it? The Mac is better? Well, maybe we should be honest and look at the Mac versus a PC clone running raw DOS and see what we think. I think Apple is beaten in each category if we look at raw performance and price/performance. The Ingram Labs report may help stave off Windows — but not the plain-vanilla PCs of the world.
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