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Cover Story

Heavyweight Hard Drives
By Mark Hill
We tested 37 gigabyte drives, including 4 disk arrays, ranging in capacity from 800 to 2,500 megabytes and in price from $1,449 to $8,655 on the street. Our conclusion? If you need one, there's never been a better time to buy.

Center-Stage Software
By Shelley Cryan
Sure, today's presentation programs are big on glitz, but a good presentation program enables you to organize your thoughts clearly, integrate text and graphics seamlessly, and ignore the production details. CA-Cricket Presents, MORE, Persuasion, and PowerPoint make their case.

Silver Screens
By Owen W. Linzmayer
Color is nice, but is it really worth the extra money? Not only are these monochrome and gray-scale monitors cheaper than their color counterparts but they also perform and display better. We tested 23 of the best black-and-white and gray-scale display systems, with screens ranging in size from 15 to 21 inches.

Sharing Schedules
By Eric Taub
Coordinating people's busy schedules is the problem. The answer is group schedulers — if they do the job. With 11 to choose from, each touting varying degrees of synchronization and groupware savviness, you should be able to find one that works for you.
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1967 - 1989

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**About MacUser**

**Keeping Pace**

"This is bound to be the most pirated piece of software since ATM." The speaker is MacUser's printer expert, Tony Bojorquez, and the software he so dubiously honors is Adobe Systems' freshly released PostScript Level 2 printer driver. (For those of you who prefer the MacUser-endorsed legal route, versions of the new driver will be available from both Adobe Systems and Apple Computer for less than $30.)

Tony was the project leader for this month's sneak preview of the long-awaited product. After 62 grueling hours of testing, the results are in: PostScript printers can print twice as fast with the new driver. Can is the operative word here. For the complete PostScript Level 2 driver lowdown and the fruit of Tony's labors, see "Drive My Printer," page 167.

Doubling print speed is good news, but a two-year wait for a driver? What was Adobe thinking? Maybe it was distracted. The company also recently released an upgrade (version 2.5) to Photoshop (see page 56) and the ATM-supplanting Super-ATM (see page 62), which boasts a special font-substitution feature based on Adobe's nifty multiple-master technology. Or maybe Adobe was preoccupied with another eagerly awaited product: Acrobat, the cross-platform document viewer that, according to the company, will signal the advent of universal electronic publishing. Adobe says Acrobat will be available this year.

Tony, wiping the sweat from his brow, hopes this new cross-platform gymnast doesn't bring about the fabled paperless office and put him out of a job. Not to worry, Tony.

Meanwhile back on solid ground, this issue of MacUser is chock-full of news and reviews of real, existing products and developments, such as these:

The latest QuickTime release from Apple, featuring a faster frame rate and smoother motion; lower prices on CPU upgrades; and the first fruit of Apple's Personal Interactive Electronics Division: The PowerCD, a multiformat (audio-CD, CD-ROM, Photo CD) drive for less than $500 (see page 51).

Cross-platform file-compatible presentation software (see page 122).

Monochrome and gray-scale monitors that perform and display better than their color counterparts (see page 130).

Also this month, we take a look at the state of the art in hard-disk drives. Among the 1- and 2-gigabyte drives we tested are four disk arrays, sometimes called RAID devices, which can give you twice the speed of a single hard drive (see page 92).

Now, says Tony, if we could just find a way to speed up the testing of the things.

— Nancy Groth
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Dear Mr. Sculley...

In March we asked, "If John Sculley should leave, who should take the helm of Apple, and why?" followed in April by "What should Apple do to keep its competitive edge over Microsoft and its Windows?" No one suggested killing two birds with one stone — Bill Gates takes over Apple, for instance — but the nomination of Guy Kawasaki to replace Sculley proves that old habits die hard. "Guy has the vision, the brains, the background, the energy, the wit, and the love of Macintosh that make him the perfect candidate," writes Ross T. Carter, of Frankfort, Kentucky. On the other end of the spectrum, Rick Schneblin, of Redlands, California, proposes conservative commentator Rush Limbaugh for several reasons, including his salesmanship. "Sales skyrocket of any product he casually mentions (CompuServe, Snapple, and Gurgling Cods). He is an incredible, practical thinker. Silent- or underdog-majority opinion is important to him (goodbye uppy who cares-what-you-think Apple). "Gurgling Cods?"

The debate about competitive strategies was a bit more contentious. "I disagree with your premise that Apple still has a competitive edge over Microsoft and Windows," writes John D. Harrington, of Oceanside, California. Rephrasing the question, John says that to regain its competitive edge, "Apple must improve the price/performance ratio of its computer systems, make computers that are more expandable, and license its ROM chips to get more Macs into the market."

Gregory S. Balow, of Durand, Wisconsin, disagrees: "Do you really think Apple needs a competitive edge over Microsoft and Windows? I think Apple is way out in front of the competition."

Disagreeing with that, Cheryl Linker, of Chicago, asks: "Why should Apple be competitive? Why can't Apple work with other companies and share information and new developments? That way new software will come out at the same time as the machines come out with new systems."

From San Jose, California, Terence Curtis offers this suggestion: "Apple should do something unique to any electronic-product sales plan — design a computer in such a fashion that you would be able to continually upgrade and expand. You mean, like save the Ilvxl from obsolescence? "Otherwise," Terence concludes, "Apple should team up with Coke and Levi Strauss."

Finally, Scot Spencer, of Louisville, Kentucky, cuts to the chase: "Apple should come up with something new, period."
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actual shipping of the IIvx.” Didn’t you get any early Centris models to review? When consumers are about to spend thousands of dollars, information about new products should be timely. An early mention could have helped many who put money down on the IIvx. I could have canceled my order while waiting for the IIvx to ship and gotten a full refund.

How about becoming more of a consumer watchdog in your reviews than a slide-show Barker pushing the latest and greatest? People depend on the information you publish to make well-informed choices. In the December issue, you call the IIvx a “desktop dynamo,” but in April it is no more than a “lessor cousin” to the Centris. When you hype products, only to dump on them later, MacUser is treating consumers no better than Apple does.

Susanna F. Shoham
Brookline, MA

Unfortunately, we didn’t have access to any Centris models when I was writing the IIvx story (heck, we barely had access to a working IIvx!). As for “hinting” about new products, well, there’s a problem. Apple won’t give us advance access to its products unless we promise not to print information on those products until after they’ve been announced. And without advance access, you’d be reading about a new product months after its introduction. Catch-22. — RI

Road Service
I found another great way to use my MacUser magazine. When our city received 9 inches of snow, my car was stuck in the parking lot. I tried rock- ing my car back and forth to get unstuck, but to no avail. I remembered the magazine in my back seat, tucked it under one rear tire, and successfully backed out!

Lorraine Doss
Louisville, KY

All Revved Up
“Supercharging Your Mac: 100 Accelerated Systems,” by Shelly Brisbin (April ’93, page 118), really points the way for owners of older Macs to go with the flow. Well done! I recently purchased and installed a 68030 accelerator from Mobius. Not only does the board and accompanying software do all that they’re supposed to do but Mobius sales, tech support, and even the manual have also been outstanding.

Tim Garner
Fairfax, VA

In “Supercharging Your Mac,” Shelly Brisbin states that low-cost cards from certain manufacturers, including DayStar, merely convert the LC to an LC II. The statement seems clear and definitive: In essence, these cards purport to do the same thing that the Apple LC II upgrade performs. But the graph appearing on page 125 seems to contradict the text. The Bottom Line pick shows an increase in speed of better than 100 percent for the DayStar product, which is certainly more than an LC II, whose speed is reflected in the graph on the last line. My befuddlement led me to call DayStar, whose personnel confirmed the relative accuracy of the test reported in the graph, not the text.

I also wonder why the author failed to mention the LC III upgrade available from Apple for $599. It would seem to be extremely relevant for LC and LC II owners and would certainly be a viable option as far as speed, price, and even memory are concerned.

Larry D. Lewis
Atlanta, GA

I am in the process of buying an accelerator for my Mac IICi and was excited to see Shelly Brisbin’s April article. However, I’m disappointed that your information wasn’t more up-to-date. The entire DayStar Digital line had major price reductions advertised in your March issue. These changes render your Bottom Line picks useless for making purchasing decisions.

I understand that publishing such an article requires much prior planning, but I found no mention in a sidebar that things had changed since this review had taken place. I guess this is the silly nature of publishing, where a current magazine— that is, the April issue — is received in the first week in March and has reviews of products released in February but prereleased via nondisclosure agreements several weeks to months ahead of that.

Robert J. Boock
Deerwood, MD

As discussed in our lab report, three CPU upgrades replace the Macintosh LC’s 68020 processor with a 16-megahertz 68030: the Equalizer LC (DayStar Digital), the Enterprise Intensifier (Total Systems), and the Extender (Extreme Systems). Because the main benefit of these products is not increased speed but, rather, access to virtual memory

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CIRCLE 196 ON READER SERVICE CARD.
and 32-bit addressing, we did not include them in our price/performance charts. Other DayStar, Total Systems, and Extreme Systems products that do accelerate the LC were included in the chart.

At the time we finished our lab report, Apple had not announced the LC III or an upgrade for LC and LC II owners. Obviously, the upgrade changes the price/performance equation for LC owners. Similarly, several price changes to 68030 accelerators, including DayStar's LC were included in the chart. However, you can still use the charts' performance component by comparing current prices with the raw-performance information provided. — SB

**Buffoon Help Defined**

I received my latest issue of MacUser; glanced at The Mac Workshop; and turned to the back, where I found "Buffoon Help" (April '93, page 330). Where was John Dvorak? I'm mad! I loved his column! He was sometimes misguided, true, but he was at least always funny. I looked at your explanation. Those people who object to Dvorak should not look at his column. At least let those of us who like him read it.

James Hunt
Austin, TX

Boo to the decision to drop Dvorak, especially if the motivation was nothing more than the taste, social value, and intelligibility of Dvorak's column. For many years, Dvorak has provided a cryptic but important viewpoint representing the millions of PC users who aren't gagging over the Mac and think Apple Computer has become a little "Big-Brotherish" since 1984. If you are going to dump Dvorak, please replace him with someone else who can help Mac enthusiasts fathom the unfathomable: how someone can have a Mac and a PC on a desk at the same time and still use the PC.

Eric H. Carter
Provo, Utah

Thank you for replacing Dvorak's column with something readable. Here's another definition to add to Buffoon Help: Dvorak: a keyboard layout or a buffoon columnist confined to PC Magazine.

David Thompson
Seattle, WA

Hooray, you finally got rid of Dvorak... Not! I wonder how many letters you got from people who fell for it (hmm). It was hilarious, John. The dead giveaway was on page 6. Next year be more careful.

Paul Schreiber
Grade 9
Burlington, Ontario
Canada

**Enter the Internet**

"Out on the Internet" (April '93, page 209) should have mentioned the wealth of information about access providers on America Online and CompuServe. The best Internet access point for those who don't live in the few cities with a local dial-up provider is Delphi. In addition to being a full-service provider like AOL and CIS, Delphi offers full Internet access for as little as a dollar per hour through SprintNet. You can even have a free five-hour tryout (see the ad on page 308 of the April '93 issue).

Bill Kaupc
Ithaca, NY

**Share it Again, Sam**

John Rizzo and Jeff Davis produced a good basic primer ("Passport to the Future: CD-ROM Drives," March '93, page 124) with just enough tech to carry the reader further. The article included a sidebar on network sharing of CD-ROMs but presents only two methods of sharing: file sharing and using AppleShare servers. There is another choice: CasaBlanca Works' DriveShare. DriveShare users are able to easily share many removable devices over a network without the limitations of file sharing or the AppleShare server maintenance.

John Catalano, President
CasaBlanca Works, Inc.
Greenbrae, CA

**Surrealistic Illio**

In James Bradbury's Personal Macintosh column (April '93, page 219), I noticed a slight error. In referring to the surrealist artist Magritte, Mr. Bradbury cites him as Henri. His name was actually René-François-Ghislain Magritte. A Belgian artist who lived between 1898 and 1967, he was greatly noted for his paradoxical and puzzling surrealist works and was the subject of a recent exhibition at the Metropolitan Museum of Art in New York City. In referring to Magritte as Henri, Mr. Bradbury may have confused his name with another definition to add to Buffoon Help: Dvorak: a keyboard layout or a buffoon columnist confined to PC Magazine.

David Thompson
Seattle, WA

We want you to use a security program that's really, really good!

So we made ultraSHIELD really, really affordable.

Enter the Internet

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CIRCLE 83 ON READER SERVICE CARD.
Letters

I have confused him with another noted artist, Henri Matisse.
Zachary A. Curha
Garden City, CA

And Matisse had a retrospective at the Museum of Modern Art in New York at approximately the same time. (See, MacUser's got culture too.) Stay tuned: In the next issue, we'll confuse Manet with Monet. —JB

Call Waiting

In "The Electronic Magazine" (April '93, page 8), Nancy Groth states that there are 300,000 readers of the magazine who don't know about ZiffNet/Mac. Anyone who reads the magazine regularly would have to be pretty oblivious not to have learned about the electronic version. Let me suggest that the lower-than-hoped-for usage and awareness of ZiffNet/Mac are probably not due to readers' being unaware of the service but due to the bountiful expense medium chosen to make it available. As Mac users, you folks should understand that statement. There is no way anyone in their right mind would sign on to CompuServe for the fun of it!
Bob Perdian
Los Altos, CA

JD, Phone Home

I owe John Dvorak an apology. Until today I had never managed to read his column in its entirety. Somewhere along the way, the words on the page would just run together. I also have a short attention span. I won't go so far as to say that I thought his articles were dumb, just that my funny bone wasn't tickled.
I have a houseguest now, and I read him the first two paragraphs from the March issue ("Weird Signs," page 340). His attention did not stray, so I continued my tirade. After I'd completed the entire article, I commented on the truth of Dvorak's "events." My guest's eyes flew wide open, "You mean we were almost hit by a meteor?"
Mr. Dvorak, I concede to your superior intelligence and humorous good taste. Just don't come over.
Barbi Jo Campbell
Dorado, PR

Subliminal Messages

Is there really such a thing as a "dyesubliminal" printer (March '93, page 228), or as I suspect, did someone just put too much faith in the spelling checker? It sounds rather like the kind of thing you get when you have a bad AppleTalk connection and the devices flicker in and out of the Chooser so fast that you can never be quite certain if you really saw them or not.
Angus McIntyre
Belgium

Dye-subliminal printers (dumb mistake) allow you to print pages (not our fault) through mind control (marketing error). Instead of specious colors (we're smarter than that), you just think of the color you want (they mean to say), and it magically appears on the page (dye-subliminal printers). For more information, see "Picture Perfect: Continuous-Tone Printers," May '93, page 150. —PP

Corrections

In "3.5 Magneto-Optical Drives" (April '93, page 162), a portion of the chart that appears on page 167 is incorrect. It should have appeared as follows:

<table>
<thead>
<tr>
<th>Drive manufacturer/formating software</th>
<th>Cartridges formatted by the drives from the manufacturers listed, using the bundled driver software</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DDF (Disk Duplicator 2.02)</td>
</tr>
<tr>
<td></td>
<td>TwoPlus Commander 2.1.2</td>
</tr>
<tr>
<td></td>
<td>Third Wave/HD Printer PE 3.1.2</td>
</tr>
<tr>
<td></td>
<td>TeleSport (v 3.1)</td>
</tr>
<tr>
<td></td>
<td>Anubis 2.4</td>
</tr>
<tr>
<td></td>
<td>Fornet 5.1.4</td>
</tr>
<tr>
<td>Drive manufacturer/formating software</td>
<td>Cartridges formatted by the drives from the manufacturers listed, using the bundled driver software</td>
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<td></td>
<td>DDF (Disk Duplicator 2.02)</td>
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<td>Third Wave/HD Printer PE 3.1.2</td>
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<tr>
<td></td>
<td>TeleSport (v 3.1)</td>
</tr>
<tr>
<td></td>
<td>Anubis 2.4</td>
</tr>
<tr>
<td></td>
<td>Fornet 5.1.4</td>
</tr>
</tbody>
</table>
THE BOTTOM LINE

The HP ScanJet IIc sets a new standard for affordable color scanners. Its engine is fast and well-engineered, and HP's innovative color-calibration software makes hassle-free, "true"-color scans a reality. Prices at less than $2,000, the HP ScanJet IIc is a best buy in its class.

TOP-NOTCH HARDWARE TEAMED WITH INNOVATIVE SOFTWARE MAKES HP'S NEW COLOR SCANNER A WINNER.

The HP ScanJet IIc uses a one-pass scanning method that makes it one of the fastest color scanners we've seen. It also provides time-saving color previews that dynamically display any changes you make to the scan, such as exposure, hue, and saturation modification.

HP combines its excellent color-calibration technology with one of the best scanning engines we've seen. Our tests for resolution, consistent tracking of the scan head, and color accuracy showed the HP ScanJet IIc to be a top performer. In addition, scanning at

WINNER

1992 DIAMOND AWARDS

For an all-around scanner offering high-quality color and black-and-white images, true 400-dpi resolution, and good basic scanning software, HP's ScanJet IIc can't be beat.

"We were extremely impressed."
To test the HP ScanJet I1c, we used the same set of tests we used for our most recent color-scanner lab report. The results showed HP's new scanner to be the best in its class in both hardware and software. The ScanJet impresses from the moment you open the box. Other scanners use a removable screw that locks the scan head for shipping, but HP uses a locking lever that's built into the scanner itself. There's no screw to lose, and the lever is so easy to use that you'll find yourself locking the scan head more often, thereby increasing its life span.

Macworld awarded both the HP ScanJet I1c and I1p their World Class Award, and named the HP ScanJet I1c as the Best Color Scanner for 1992, and the HP ScanJet I1p as the Best Black & White/Gray-Scale Scanner. While MacWeek gave their prestigious Diamond Award to the HP ScanJet I1c.

Speed. Simplicity. And accuracy were all applauded. It's no wonder. HP's single-pass scanning delivers both lightning-fast speed and precise color registration. TWAIN support allows scanning without having to switch between applications. And HP AccuPage technology with 400-dpi resolution can tackle the toughest OCR challenges. What's more, capabilities this advanced have never been this affordable. List price on the HP ScanJet I1c is just $1,599. The HP ScanJet I1p is just $879. And right now, the HP ScanJet I1c includes Adobe® Photoshop LE.

Impressed? Don't just take our word for it, or even the Mac press's. Attend one of our scanning seminars that will be held April through September, 1993. To find out more about the HP ScanJet I1c and I1p or seminars in your area, call 1-800-SCANJET, Ext. 7364. And judge for yourself.
Introducing new Ethernet solutions from the only complete Macintosh networking family. As Apple Computer releases more and more Macs, only Asante is keeping pace with Ethernet solutions for all of them.

Introducing the MacCon+™ LC III Ethernet adapter for the brand new Macintosh LC III and Color Classic. It's a high-performance card that plugs into the LC III's 32-bit expansion slot for simple Thin and 10BaseT Ethernet connectivity. This adapter is also backward compatible with earlier models in the LC family, and the Performa 400.

Only Asante has an Ethernet adapter for every Apple. The MacCon+ LC III is just the latest innovation from the only networking company with an Ethernet solution for every Apple CPU. Asante's family tree includes the FriendlyNet™ line of external adapters that connect Macs with built-in Ethernet, such as the Centris 610, 650, and the Quadra 800, to Thick, Thin and 10BaseT networks. We also offer the new Mini EN/SC, the smallest and lightest SCSI-to-Ethernet adapter in the world. It's the perfect space-saving networking solution for any Macintosh without available expansion slots, and was specifically designed for portable use with the PowerBook line.

So if you have Apples that are ripe for high-speed networking, and you want to get all your Ethernet solutions from a single source, call Asante, the only company capable of networking the entire orchard, at 800.662.9686, extension 202.
Mixed Messages

Is there a conspiracy theorist in the house?

Shut the door. Pull the shades. Draw the blinds. Batten down the hatches. If you don't have any hatches, at least take your phone off the hook. And watch out for mysterious men in sunglasses playing with Scrabble tiles. The techno-conspirators are among us!

When the techno-espionage movie Sneakers came out, the techno-conspiracy theorists came out of the woodwork — at least judging from my recent mail.

Techno-conspiracy theorists differ from standard-issue conspiracy theorists only in the tools they use — and in the tools they're convinced "they" are using. Your normal garden-variety conspiracy theorist knows that President Clinton was elected because the letters in his name have the same numerological value as Millard Fillmore's. But a techno-conspiracy theorist believes that President Clinton was elected because his name has the same numerological value as the version of System 7 Tune-Up that was current on election day.

You can find proof that the Trilateral Commission secretly controls the world (through its agents the pope and the Queen of England) simply by examining the back of a $1 bill, or so say the conspiracy seekers of yesteryear. Today's Trilateral techno-conspiracy acitists seek their proof in Lotus 1-2-3's Balloon Help messages.

And all conspiracy theorists worth their salt know that the Apollo moon landings were all hoaxes: You can easily see this by playing the moon-walk videotapes backward. But it takes a QuickTime-wielding techno-conspiracy theorist to unravel the specifics, clearly proving that the whole space program is nothing more than a beta-test boondoggle for Adobe Premiere.

Yes, today's hard-core conspiracy theorist has a brand-new bag of tricks to help find meaning in the most trivial trivia.

Which leads, of course, to Microsoft.

If ever there were a subject ripe for conspiracy theorists, it's the astonishing control that Microsoft holds on the microcomputer marketplace.

The daily business press is full of reports of Microsoft conspiracy theories and counter-conspiracy alliances, the latest being:

- A reported plan whereby Apple and Novell will join forces to combat MS-DOS and Windows by merging aspects of the Mac OS with Novell's DR DOS.
- An alternative to Microsoft's OLE object-management standard (programmerspeak for making applications work better together), reportedly slated to be announced by Apple, IBM, and Novell any day now.
- An announcement from Borland and WordPerfect regarding plans for the two companies to cross-fertilize their sales and development efforts — coming just one or two steps short of merging with one another in response to competitive pressures from the Microsoft monolith.

But I didn't take the conspiracy theorists seriously until I got a floppy disk in the mail, in an unmarked envelope with no return address. No cover letter. No operating instructions. No ransom note. Not even a postmark.

On the disk was a neat little piece of shareware called Karma Manager. Karma Manager is a simple package (available on ZiffNet/Mac, by the way) written by Chuck Grissom that generates anagrams — words and phrases that are made by rearranging the letters of the original word or phrase.

I thought I'd just play around a little bit for some harmless fun at the expense of MacUser's columnists. Karma Manager revealed, for example, that you can rearrange the letters in Anti-Editor John C. Dvorak to produce drank a jive orthodontist.

Gibberish, right? Until I discovered that Andy Ihnatko transforms into akin to handy. Or that the anagrammatical mantra for Michael Swaine is I slew a machine or hi, manic weasel — take your pick. And Karma Manager revealed Michael's literary style by revealing that each wan simile brought his malice anew.

So far, it was all innocent fun, revealing nothing more profound than the richness of those 26 wacky letters we like to call the alphabet. That is, until I started feeding Karma Manager a few names of Mac products and companies. That's when things started getting spooky.

One Dull Machine

Karma Manager delivered a mixed verdict on the Macintosh Centris. It was blasted about the Centris' design (schematic nonstir) and downright critical of its repairability (technician's storm), but it revealed the Centris to be the ideal machine for presentation graphics (what with its ability to produce omniscient charts). Applauding its industrial design (especially its chic ornaments) and

MacUser July 1993 21
the rarely addressed issue of a computer's aroma (his romantic scent or mortician's stench — take your pick), Karma Manager concluded that the Centris is under-priced (instinct: more cash).

The Macintosh LC, in contrast, is no

slim catch, although it represents lost chic, man. How about the long-awaited, much-hyped Apple Newton? Sorry: We not pen pal.

Obviously, Karma Manager has the potential to simplify the process of reviewing products. Why bother with exhaustive lab-based benchmark tests when, with a few clicks and a keystroke or two, you can determine that the latest version of Novell NetWare is a new, lean revolt?

In fact, Karma Manager was practically jumping out of its screen to do MacUser's review of the new version of Aldus PageMaker: Lame upgrade? Ask. (It also had a special request for Aldus'

Not every comment from Karma Manager is particularly lucid — or even printable.

PR Firm: Next time you send out promotional goodies — please, a dark mug.)

Karma Manager can also help cut the time-consuming tasks of writing and editing down to size. Grooping for a column headline? Easy: One dull machine. Nothing like the old luminance, eh?

Of course, not every comment from Karma Manager is particularly lucid — or even printable. So what if Adobe Systems can sedate my boss — it's also the source of mossy debates. Is Apple Computer really nothing but a perceptual mop? And Karma Manager's opinion about Apple's advertising slogan "The Power to Be Your Best" is both baffling and unsuitable for a family magazine (I will say that it involves a shrubbery).

Scout, Firm

But it was only when I began exploring the hidden meanings pertaining to a certain software company in the Pacific Northwest that the power of these scrambled messages became clear. Sure, it's no surprise that they want you to believe that Microsoft is comfort. But Microsoft is no static form — it's secretly bragging about its control over pricing in the marketplace: I form cost.

And, frankly, who would be surprised to discover that Bill Gates is least glib (although some would say his gall bites when he begs it all — especially when it comes to matters of law, where his legal bits emerge).

But type in the words Microsoft Windows, and here's what comes out:

Wisdom — or swift con?

Uncanny, huh? The free world can only hope that John (no such jelly) Sculley has been brushing up on his Scrabble.
Pinnacle Micro introduces the first affordable, recordable CD-ROM drive for MAC and PC computers. The RCD-202 System comes complete with an easy-to-use software program that allows you to produce data or audio CD's within minutes. Now you have the ability to create your own CD's for low cost data distribution, backup or even master your own disk for mass duplication. For more information on how you can master this new recordable CD-ROM technology call:

800•553•7070
Now you can get out of trouble before you get into it.

• • • !

Owning most utility software is like belonging to the Auto Club.

If your system crashes, or if you have an accident with your data, they can come to your rescue.

But before you get back up and running, you have to spend a lot of time waiting by the side of the road.

Which is why Public Utilities, the ingenious new package from the creators of Suitcase, is the utility every Macintosh has been waiting for.

Instead of getting you back up and running, Public Utilities concentrates on keeping you up and running.

How?

By automatically finding and fixing potential disk and data problems before they leave you stranded.

You see, Public Utilities quietly performs a detailed diagnostic scan of your disk whenever your Mac is idle.

If anything is amiss, it politely lets you know and prompts you to run the appropriate repair program. All you have to do is point, click and carry on with your work.

Now, it doesn’t take an MIS type to know that Public Utilities can raise productivity and lower support costs.

But if you are an MIS type, you’ll be delighted to know that, in addition to protecting your people from disaster, Public Utilities also reminds them to do prudent things like perform backups and optimize their hard disks.

It even launches the requisite software, at the stroke of a key.

Of course, even Public Utilities can’t prevent people from deleting files or reformatting their hard disks.

But it can bail them out of more difficult situations than any other utility software.

And unlike other programs, it won’t let them get into difficult situations in the first place.

That’s because we left out Sector Editors and other such high end, high risk things. And put in plenty of online, System 7 savvy HELP.

There’s more. So pick up the phone. Call 800-666-2904.

We’ll tell you about our one-year money-back guarantee. And our vaunted 24-hour customer support.

Which is what you use to get out of trouble after you get into it.

$59 Upgrade!

* Through Sept 30, you can upgrade to

* Public Utilities from Norton Utilities, Scan II, MacTools or 911 for just $59. For details, the name of your nearest dealer or to order direct, call 800-666-2904 today!
Hey, want to buy a used Mac? Here's how to kick the tires and get a great deal.

Last month, I covered what to do when faced with the thorny situation of having to convert your Mac into cold, hard cash. Last month I cared about and catered to you, the computer seller. But hey, if our elected officials can do a complete flip-flop once their palms slap Bible leather, I can too, and so this month I care only about you, the individual shopping for used equipment. Call me fickle.

Let's start with the most basic question of all: Where should you buy a used Mac? Buyers of used equipment have the same options that I discussed last month for sellers, but what's good for the seller ain't always so hot for the buyer. Take those locally published want-ad magazines, for instance. Last month I said they were great for you sellers out there, but this month I'm not so enthusiastic. See, the problem with them from the buyer's point of view is that the ads are placed by individuals who remember exactly what they paid for their Macs, down to the penny. Therefore, the "Computers" section tends to be jam-packed with ads like "Macintosh Plus: Orig. paid $2,500, will sacrifice for $2,000." Lightning does strike every now and then, though, so it's worth spending 10 or 15 minutes at the newsstand scanning the listings when the shopkeeper isn't looking.

Ads found at user-group meetings and on bulletin boards are actually a lot better for buyers than for sellers, because in both places there are lots of other users snooping in on the transaction. If someone were to leave a message advertising a $2,000 Mac Plus on a public forum, chances are someone else would leave a rather to-the-point reply asking the sender what color the sky was on that person's home planet. Also, if potential sellers attend meetings or log on regularly, they're elevated in my eyes to friend-of-afriend status, in that knowingly ripping you off would bring a whole wheelbarrowful of socially awkward situations. Friend-of-a-friend status isn't legally binding, of course, but it's a point in your favor.

What about used-Mac commercial dealers, such as Pre-Owned Electronics, of Waltham, Massachusetts (800-274-5343 or 617-275-4600), and Shreve Systems, of Shreveport, Louisiana (800-227-3971 or 318-424-9777)? Well, sorry to disappoint you, but both of these companies and other reputable outfits like them are actually excellent sources. They offer most of the safety and convenience of buying new equipment; some even offer their own warranties. The only drawback of these dealers is that their prices are, by and large, reasonable.

Unreasonably Low Prices

As I hinted earlier, although it's possible to hit the jackpot every now and then and locate someone offering vengeance pricing on an ex-spouse's Mac — those kinds of bargains turn up only after a lot of patience and digging. You just have to keep haunting BBSs and newsstands as part of your regular routine until you hit pay dirt. But do add one more publication to your hunt group: the business section of a well-regarded nearby city newspaper. Almost annually, usually around Presidents' Day, you'll find small ads for the clearance sales of large computer stores. These are usually two-day blowouts in which they rent space in an obscure industrial park and pile in all the out-of-date, refurbished, or demo merchandise that has been accumulating since the last clearance sale. The merchandise is generally fairly current and in good shape, and usually the goal of the event is not so much to rake in the bucks as to get rid of the stuff. That they're renting office space just for the sale is a tip-off that they're getting desperate; if you offer 50 percent of the ticketed price, there's actually a good chance that the salesperson will merely shrug and reach for the receipt book.

But the key to finding dirt-cheap Macs lies in digging up the right kind of seller — specifically, one who couldn't care less whether a Mac sells for four thousand dollars or four cents. Pick up the phone, and call the main switchboards of any monopolistic corporations or universities in your area. In the former case, ask for the phone number of its surplus-equipment office; in the latter, get the director of campus computing. Chances are, a series of such phone calls will put you in touch with some tired bureaucrats who occasionally are stuck with a mound of (relatively) old equipment that they're so desperate to get rid of that they may be open to a comically low bid. This is especially true for surplus-equipment offices of large companies; often these workers don't know a $4,000 Mac IIc from a $200 IBM PC clone and their chief goal is to clear the warehouse before that transfer shipment of old swivel chairs from the Framingham office arrives. A much simpler way to find such salvage...
ANDY IHNATKO

Finally, a brief word on What Is a Fair Price. The rule of thumb I outlined last month will give you a pretty good estimate, but that shouldn’t prevent you from checking the prices for an identical or similar Mac purchased new (yeah, yeah — but please, ridicule such basic advice and then heed it instead of crying in your beer because you only ridiculed it), asking others in user-group meetings and on-line services for their opinions on a given offer (this might even shake loose a better offer than the one you’re contemplating), and picking up a copy of that previously abused want-ad magazine and checking the prices anyway. If nothing else, the magazine, with a few choice items circled in red, is a good prop to take with you when you examine a potential purchase, and it can be used to dicker the price down a bit.

**Evaluating the Livestock**

Buying used equipment is much simpler than selling it, chiefly because you don’t have to worry so much about fraud. Really, you only have to ensure that you’re getting what you’re supposed to be getting, because in almost all used-Mac transactions, all sales are absolutely final.

OK. First, don’t leave home without some sort of snooping software on an 800K disk. Don’t trust the Finder to tell you about memory and drive configuration: A disreputable seller can goose em up with virtual memory and driver-based drive compression. At a minimum, bring a copy of MacEnvy (downloadable from any on-line service), which gives you a detailed catalog of the configuration and features of any Mac. Also, if you have access to a spiffier hardware-diagnostic utility, such as MicroMAT’s MacEKG or Maxa’s Snooper, run a full complement of tests.

Things to check for: Listen for odd noises from the hard drive; anything beyond a tolerable whine is abnormal. Examine the entire screen for dead pixels. Look at files’ creation and modification dates; if a preponderance of them dates back to 1904, you could have dead PRAM on your hands and will wind up needing a new logic board.

Be sure to examine the case too. Tool marks around the seams indicate that someone with the motor skills of Magilla Gorilla has probably been messing around inside. Also, check to see that the case’s mottled surface is intact. A smooth surface indicates that it’s been recently scrubbed with an abrasive, which isn’t bad in itself but indicates that the machine may have been so badly mistreated that it needed a harsh cleaning to make it presentable.

If it’s at all possible, crack open the case and take a look inside. Look for any screws with stripped heads (another sign of indecent hands operating therein), and closely examine the circuit board for any signs of manual soldering or installation of odd components. You want no part of a Mac whose motherboard was soldered back together by the aforementioned lout or one that has been modified in a way Apple wouldn’t cotton to (such as a Fiji that has had a faster oscillator crystal installed to speed it up).

Finally, operate the machine for a good, solid hour to give any hardware problems the opportunity to bubble up to the surface, and then pop the lid again and take a whiff of the insides. After an initial break-in period, no 100-percent-healthy Mac should smell unpleasant when it’s hot. No burning-plastic smell, no ozone, no problem.

**Wrapping It Up**

One final bit of unpleasantness: If you do decide to purchase that sucker, get a receipt that specifies the hardware and its exact configuration (a signed printout of a MacEnvy report will handle that), all serial numbers, the selling price, and the date and time of sale. If you’re dealing with a company, this has probably already been taken care of, but if you’re dealing with an average schmoe, try to weasel a buckaroo into the receipt at the end of the transaction. A phrase on the receipt along the lines of “if the hardware proves to be defective within 48 hours, deal’s off” — along with another one detailing how you’re going to use the machine in that period of time — is a safety net almost any legitimate seller will grant you. If not, look out for those two magic words: as is. They mean that if the whole Mac goes kaboodle as soon as you get it into your car, well, that’s life, kiddo.
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It takes real teamwork to get any job done these days, especially if you’re dealing with incompatible Macintosh and PC files. That’s why DataViz has teamed up with Apple to add even more utility to MacLinkPlus. It’s the most muscle ever assembled to overcome your toughest file translation problems between Macs and PCs.

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If you’re looking for the best in Mac-PC file translation, put MacLinkPlus on your team today. Call 1-800-733-0030, and look forward to some smooth sailing.

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The one drive to have when you’re having more than one.

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They’re blindingly fast, and they’re unerringly reliable. And no matter what capacity you choose them in—from 100 MBs to 4 gigabytes—the new SledgeHammer™ Arrays from FWB are the first and only drives that offer any Macintosh both speed and security in a single RAID® system.

When you need the high performance demanded by applications such as color prepress or multimedia, simply configure your SledgeHammer for data striping, which virtually doubles the unit’s speed by splitting the data onto two drives. And when you need fault-tolerant networking, just set the array for disk mirroring, in which the same data is written to two identical drives; if one fails, the other takes over on the fly.

When you need both at the same time, just configure different partitions within the drive exactly the way you want them, using FWB’s exclusive MatrixArray™ technology.

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So if you’re thinking about getting other high-capacity drives, think twice. Because there’s only one drive you really need to have.
To stay alive, Apple needs to let freedom ring.

Apple's Berlin Wall

Apple's starting to act more and more like the former Soviet Union in its death throes.

Remember Mikhail Gorbachev's failed attempt to hold on to central control for the Party? Remember his fatally hesitant embrace of the free-enterprise system?

Enter Morris Taradalsky, charged with bringing enterprise computing to Apple.

What's enterprise computing? For Apple, it's all those big multiplatform sites that currently prefer, by a factor of 10, Microsoft's system software running on Intel's microprocessors. It's a new name for a market Apple has repeatedly failed to break into.

Taradalsky's Enterprise Systems Division recently announced its first three products (see "Multiuser Macs," June '93, page 36). These dedicated servers are good machines, and the top-of-the-line Apple Workgroup Server 95 is competitive with anything else out there. With proper pricing, these products should please the Mac users who have been waiting for Apple to deliver a dedicated server for — how long? "Apple has been promising a file server for some time . . ." (MacUser, October '85). Right.

But at the risk of alienating readers, I must delicately inquire: What does pleasing current Mac users have to do with breaking into new markets? After all, for Apple, that's what enterprise computing is all about. Wouldn't you think that an Enterprise Systems Division would be a little bit concerned about getting Macs into non-Mac sites?

Nyet, comrade. The ESD's servers are designed for what Taradalsky calls "Mac mostly" sites. It's a cute little term for a cute little market, but enterprise computing is not Mac mostly. Thus these servers can't be part of a realistic enterprise-computing strategy.

But facts like that foul the party line. A realistic enterprise-computing strategy for Apple means playing on its court. Apple doesn't play well on other kids' courts. It likes to own the ball, the net, and the driveway. Like the Communist party in the former Soviet Union, Apple plays only when it gets to make the rules.

Although Apple has prospered behind its wall of proprietary technology, the big game is outside the wall. Yes, I know there are several people inside the wall who have heard of Microsoft and Intel. And Apple's VITAL conference in April showed that the company is listening to information-systems managers. (VITAL is an acronym that Apple expects me to tell you — with a straight face — stands for Virtually Integrated Technical Architecture Lifecycle. It is a plan for the technical management of enterprise-wide multiplatform information systems according to rules defined by — the Central Committee. I mean, Apple Computer.)

Then, too, there's nothing technically daunting about enterprise systems; Apple can do enterprise computing with one hand tied behind its back (which is, by an odd coincidence, exactly what the Intel architecture requires). Apple's difficulties vis-a-vis enterprise computing are all in its head, just a little problem of denial. I have no doubt that Apple will field some truly enterprise systems real soon. But real soon may be too late.

Apple is covering all the bases — and palms and laps and coffee tables and other horizontal surfaces — in its search for new markets, but to remain a player in the '90s, it needs to cover some more desktops. And unless Apple can break in to enterprise computing, it won't close the desktop gap.

It's the kind of situation for which nature invented the panic reaction. Bizarre scenarios are not to be discounted. Apple could drag out that Intel 486 implementation of System 7 it's been working on, drop it into a box with the MS-DOS clone it's been testing, and try to compete with MS-DOS and Windows on "their" hardware.

Would that be a good enterprise systems strategy? I seriously doubt it, although it would be an interesting experiment. The extent to which DOS/Windows dominance is really Intel-microprocessor dominance has never been convincingly put to the test. A 486 port would factor Intel out of the equation, showing what Microsoft is really worth.

But Apple has no time for experiments. Recently, two large enterprise customers defected from the Apple camp. What Apple needs to do — and do now — is to demonstrate to large-volume customers that Macs are a viable choice for more than the desktop-publishing, sales, and design departments. And to do that, it needs to embrace non-Apple standards such as SNMP (Simple Network Management Protocol), for network management.

Gorbachev held on to central control too long. Apple might still have a chance to be a player in the big game, if it would Just Do It.

Mr. Taradalsky, tear down that wall.
When WordPerfect® set out to give Macintosh users the ultimate works package, we didn’t head for the drawing board. We headed for the most powerful works program in the industry – Beagleworks™. A program widely considered to be the top integrated package you can buy.

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Seamless is the best way to describe using WordPerfect Works.

Thanks to a breakthrough technology called In-Context Editing that optimizes System 7’s Publish and Subscribe feature, you can get into any of its modules (word processing, database, spreadsheet, chart, draw and paint) without leaving your current document. Double-click on an item, and the menu and tool bar change automatically to correspond to the program you’re using.
Text runaround, multiple section layouts and custom type styles help give WordPerfect Works the best desktop publishing capabilities of any word processor.

Even in System 6, you can edit information in a new document and have both the original and the new linked document instantly updated.

And when it comes to the other applications in WordPerfect Works, there are no weak links. In the spreadsheet, there’s an automatic sum tool and in-cell editing. In both the paint and draw modules, you get 128 custom fill patterns and 256 custom colors. The communications module gives you editable log-on scripts.

And one look at the screen on this page and you’ll see what sets the word processor apart: multiple columns, irregular text wrap (something many desktop publishing programs can’t do), and more.

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Pick up the Norton Essentials for PowerBook at your local dealer today or dial FAST FAX 1-800-554-4403* for complete specs. Because after all, there's really not much you can do with your PowerBook once the battery calls it quits. Except maybe arm curls.

System 7 is the operating system of choice for more than 6 million Macintosh users, who tell us it's the most powerful, easiest-to-use operating system they've ever worked with. But don't take their word for it. Read through our collection of 30 tips and techniques and see for yourself how this award-winning system software from Apple Computer can simplify mousework on your Mac.

If you're a System 6 user, you may be surprised at how much System 7 can do for you and how easy it is to upgrade. Whether you're an individual Mac user or part of a workgroup, System 7 will make you more productive. Look for the next to features that will be of particular interest to you.

If you're already a System 7 user, keep reading! You'll learn what's new in version 7.1 and maybe even discover a few features and shortcuts.

This is the second in a series of articles from Apple Computer designed to help you get the most out of System 7. In the May issue of MacUser, we focused on personal productivity. In this issue, we'll demonstrate how System 7 can help you work more effectively in groups and make life easier for network administrators.

30 Ways to Work Faster and Smarter with Your Macintosh

Easier collaboration • Faster file access • No-fuss networking • Multitasking power • File sharing • Security options
1 Instant Access to Applications

One of the most powerful and versatile features of System 7 is the alias, a duplicate file icon that lets your files, folders, and disks appear to be in several places at once.

Because aliases are small (about 2K each), you can make several for frequently used files and distribute them in different places—on the desktop, in the Apple menu, or in different folders. Each alias serves as a pointer to the original file. Double-click an alias of Photoshop, for example, and System 7 will launch the original program, which may be stored, along with its support files, three levels deep in your Applications folder.

For an instant productivity boost, make aliases of all your applications and put them in a single folder on your desktop. Now you can open any program instantly by double-clicking or by dragging a document over the icon.

This drag-and-drop file launching (another System 7 feature) is also an ideal way to find a program that can open a file which displays the “Application can’t be found” alert when you double-click it.

To quickly create a folder of aliased applications, select the System 7 Find command (File menu) and click the More Choices button. In the resulting dialog box, change the pop-up menus to read “kind contains application” and click the checkbox labeled “all at once.” Click the Find button and System 7 will locate and select all of your applications simultaneously.

With the applications selected, choose Make Alias (File menu) to create aliases for every program. The aliases are now selected; drag them to a new folder on your hard disk, and you’re ready for action.

2 Organizing Your Desktop

System 7 has a more robust Clean Up command that makes it easier to organize your icons. At the desktop level, for example, holding down the Option key and selecting Clean Up All from the Special menu will arrange all icons on the desktop in a neat column at the upper right corner of the screen.

You can combine the Clean Up command with View menu options to simultaneously straighten up a window and organize files in the order you prefer—by name, size, kind, label, or date. For example, choose By Name from the View menu. Then switch to an icon view, hold down the Option key, and select Clean Up by Name. To sort only a few icons, select them, hold down the Shift key, and choose Clean Up Selection.

3 Working While You Copy Files

Because System 7 supports multitasking, you can work in an application while System 7 copies files in the background—a great strategy if you’re archiving files to a backup disk.

The application must be open before you begin copying files. You then choose it from the Applications menu or click in one of its windows to activate it and continue working.

System 7 can also handle other time-consuming chores in the background, including printing, faxing, and downloading files from on-line services.

4 Opening the System File

Under System 7, you can open the System file by double-clicking its icon. The System file will open into a window, as if it were a folder, and display its contents as individual file icons.

You can install or remove items by dragging them in and out of the window—a much simpler system than the Font/DA Mover of System 6.

Under System 6, both fonts and desk accessories were installed in the System file. In System 7.1, however, the System file stores only sounds and keyboard resources. Fonts now reside in their own folder, and desk accessories are stand-alone applications.

Fast Fact: You can hear a sound (Quack!) by double-clicking its icon.
5 Instant Access to Network Volumes

If you frequently access an AppleShare server or shared folder over the network, you can bypass the Chooser’s multistep connection procedures by making an alias of the AppleShare volume while it’s mounted on your desktop.

Once you’ve done this, simply double-click the alias whenever you want to use the server or shared folder. System 7 will automatically connect you, prompt you for the password (if required), and place the volume on your desktop—all without using the Chooser.

You can keep the alias anywhere you like. Put it in the Apple Menu Items folder, for example, and you can open the server or shared folder directly from the Apple menu.

7 Mouseless Maneuvers

Did you know you can use the numeric keypad rather than the mouse to control the cursor? A little-known feature of the Easy Access control panel, Mouse Keys is handy for precise movements—perhaps to fine-tune a graphic by nudging it a pixel at a time—or if you’re simply more comfortable using a keyboard than a mouse.

To turn on Mouse Keys, make sure Easy Access is installed, then press Command-Shift-Clear. The 5 on the numeric keypad will now work like the mouse button; press it once to click and twice to double-click. Use the eight keys surrounding the 5 to move the cursor (for example, the 4 and 6 keys will move it to the left and right). To mimic a click-and-drag sequence, tap the 0 key twice to lock down the mouse button and then press a directional key. Press the decimal-point key twice to release the mouse button.

Fast Fact: If your “real” mouse freezes up, you can use Mouse Keys to save your work, quit the program, and restart the Mac.

6 Drop Boxes

System 7 file sharing is a tremendous productivity booster for workgroups. By sharing a folder on your hard disk, you allow other network users to drop off or pick up files at their convenience. Their level of access—that is, whether they can make changes to files or even view them—is determined by the access privileges you assign to the folder.

You can create a folder that’s accessible by everyone on the network, allowing them to add, delete, move, rename, and copy files—just as if the folder were on their own hard disks. Just select the folder and choose the Sharing command (File menu). In the Sharing dialog box, click the checkboxes labeled “Share this item and its contents” and “Can’t be moved, renamed, or deleted,” which prevents users from altering the folder. Also check all of the boxes to the right of Everyone.

Everyone on the network can now use this folder, assuming you’ve turned on guest access for your Mac. To do so, open the Users & Groups control panel and double-click the Guest icon. In the resulting dialog box, click the checkbox labeled “Allow guests to connect.”

Perhaps you’d prefer the privacy of a Drop Box, a folder that lets users add files but prevents them from viewing or removing the contents. To make a Drop Box, uncheck the “See Files” and “See Folders” boxes for User/Group and Everyone in the folder’s Sharing dialog box. (Be sure to leave “Make Changes” checked.)

An Out Box, on the other hand, lets users see and copy files but doesn’t allow them to add or change files. To define an Out Box, check all of the privileges except “Make Changes.”
8 Customizing Dates and Numbers

System 7.1 has two new control panels that let you change the way dates, times, and numbers appear in the Finder and in many applications. The Date & Time control panel lets you alter the date and time (surprise) as well as the formats for these items.

For example, you could opt to show the day of the week in dates, leave off the 19 in 1993, or use a 24-hour clock. The Alarm Clock and General Control panels will reflect these changes, as will applications (such as Microsoft Word) that let you automatically insert the date and time.

The Numbers control panel lets you customize the display of numbers and currency, which comes in handy if you work with people in countries where numbers in the thousands are separated by periods rather than commas. Again, your changes will appear in programs, such as spreadsheets, that let you automatically format numbers.

9 A Smarter Desktop

System 7 provides many improvements to Finder windows that make navigating the desktop much easier. Here are three you’re sure to appreciate:

Holding down the mouse button and dragging to the edge of a window makes the window automatically scroll. This comes in handy when you’re dragging files to a folder that isn’t currently visible or drawing a large selection marquee.

Clicking the zoom box now opens a window just wide enough for you to see all of its contents, instead of filling the entire screen—a major improvement if you have a 21-inch monitor!

Moving and copying files between windows is much easier, because clicking a file icon in a background window doesn’t activate that window unless you release the mouse button while the cursor is still in the window. This is a major improvement over System 6, where a background window jumped to the front as soon as you clicked in it, often obscuring the destination window or icon.

**Fast Fact:** If you select some files and then realize that you need to scroll another window to bring the destination folder into view, you can switch to the background window without deselecting the files in the active window. Just hold down the Command key when you click the background window and the files will remain highlighted.

### System 7 vs. Windows: You Decide

System 7 provides powerful features that help you work quickly and efficiently, whether on your own or in a workgroup. For example, the Macintosh is the only family of personal computers that provides built-in networking and file-sharing features as standard equipment.

How do the networking capabilities of System 7 stack up against those of Windows 3.1? See for yourself.

#### Joining a Network

Right out of the box, the Mac is ready to be networked—it comes with a physical connection (LocalTalk) and a communications protocol (AppleTalk). Higher-end Macs, such as the Macintosh Quadra 950, even have Ethernet connections.

Networking your Mac couldn’t be simpler: Plug a network cable into the printer port, then open the Chooser and click the radio button that turns on AppleTalk. That’s it. The Mac can now talk to any device on the network, from the local printer and your coworkers’ computers to file servers and mainframes.

A PC running Windows doesn’t have built-in networking capabilities. To add it to a network, you must first open the computer case and install a network interface card, making sure to properly configure any jumpers or dip switches. You then install the appropriate driver software and configure the network parameters. Next, you run Windows Setup to load the driver for the installed network software. Finally, you reboot the computer. If you’re a network administrator, you must perform these same steps for every PC added to the network.

#### Sharing Files

System 7 offers built-in file-sharing capabilities. This means you can make files on your Mac available to other users on a network without using any special software, interface cards, or a dedicated file server. To turn on file sharing, you simply click the Start button in the Sharing Setup control panel, then decide which folders you want to share and who will have access to them. Other users can access your shared folders by selecting them in the Chooser.
10 Updating Files Automatically

Do you handle projects that require data from other people or departments? If so, the publish and subscribe capabilities of System 7 can make it easier to gather information and keep it up to date.

Perhaps you're working on a presentation in DeltaGraph Professional 2.0. To complete it, you need a logo from the art department, sales projections from the sales team, and a text summary from marketing.

And, of course, everyone is revising their contribution up to the moment the presentation is due.

No problem. You can create live links between your presentation and your colleagues' data via publish and subscribe. For example, the sales team can chart its data in Lotus 1-2-3 and use the program's Create Publisher command to make the chart available to other applications on the network via a special file called an edition. Within DeltaGraph Professional, you use the Subscribe To command to select this edition file and place a copy of the chart in your document.

A similar process allows you to incorporate the current logo design from the art department, which uses Photoshop, and the most recent prose from marketing, which uses MacWrite Pro.

As each department updates its work, the revisions are sent automatically over the network and reflected in your DeltaGraph Professional presentation, ensuring that your presentation is always accurate and up to date.

Fast Fact: Like all files, edition files must be placed on a server or in a shared folder in order to be accessed by other users on the network.

With Windows 3.1, it's not that easy. Assuming you've already installed network interface cards, you still must buy, install, and configure file-sharing software for every computer. If you purchase Microsoft Windows for Workgroups, for example, you have to provide such information as the type of network card in the PC, printer type, and the printer's port connection in order to set up the software. To avoid conflicts with other cards installed in your PC, you also need to provide the IRQ, base I/O port, and base memory address for the network card. Finally, you tell Windows for Workgroups which directory (folder) you want to share with other users. And remember, this sequence must be repeated for each PC on the network.

Keeping Track of Applications

On the Mac, you don't have to keep track of documents and applications because the system knows the location of every file, even over a network. Say, for example, your workgroup shares a file server and someone moves the Excel application or renames its folder. No problem—your Mac will still find and launch Excel whenever you double-click a spreadsheet file.

This scenario is a problem for Windows users, however. Suppose a directory on the PC file server contains Excel and your spreadsheet, and you created an icon in Program Manager (by dragging the file from File Manager into Program Manager) to represent your spreadsheet file. Normally, when you double-click this icon, Windows launch Excel and opens the spreadsheet. But if someone moves Excel or renames its directory, the icon will no longer be able to find the program because its pathname has changed, and you won't be able to access the spreadsheet.

To restore the connection, you must determine Excel's new pathname and update the icon's Command Line and Working Directory. Double-clicking the icon still won't open the spreadsheet, however, unless you also use the Associate command to tell the File Manager the new pathname. Furthermore, you're not the only one with a problem. Every user on the network will have to perform these same steps to relink their spreadsheet files with Excel.

If you write memos, reports, or presentations that others must review, you'll appreciate the file-sharing capabilities built into System 7. File sharing lets you make selected folders on your hard disk available to other users on your network, providing an easy way to exchange files and collaborate with coworkers.

Say, for example, you have created a report in Microsoft Word 5.1 that requires feedback from four colleagues. Your schedules don't permit face-to-face discussion, so you place...
appear on the desktop, and one mouse click opens any item. This instant access can be invaluable when you’re in an important meeting or on the road—no more hunting through files and folders to get to the applications and documents you need.

The oversized one-click buttons also make easier targets if you’re trying to open files while riding in a car or squeezed into the middle seat on a transcontinental flight—or if you haven’t quite mastered the PowerBook trackball.

At Ease makes it easier and safer to share the contents of your Mac with kids, coworkers, and novice mousers. But At Ease holds a special attraction for owners of the PowerBook and other memory-constrained Mac models: It uses 200K less RAM than the Finder, freeing more memory for your applications.

When you run At Ease, the desktop consists of two screens(105,699),(898,947) of icons, one for applications and one for documents. You decide which programs and documents should appear on the desktop, and one mouse click opens any item. This instant access can be invaluable when you’re in an important meeting or on the road—no more hunting through files and folders to get to the applications and documents you need.

The oversized one-click buttons also make easier targets if you’re trying to open files while riding in a car or squeezed into the middle seat on a transcontinental flight—or if you haven’t quite mastered the PowerBook trackball.

Fast Fact: Whenever possible, put aliases in the Apple Menu Items folder so you can keep the original files in more convenient folders along with their related files.
14 File Sharing Shortcuts
QuickKeys 2.1.3, the popular macro utility from CE Software, includes a set of predefined shortcuts, called System 7 Specials, that give you faster, more precise control over file sharing, balloon help, and application switching.

Start FileSharing and Stop FileSharing, for example, let you turn file sharing on and off with a single keystroke rather than going through the Sharing Setup control panel. This is especially useful if you regularly switch file sharing on and off—for example, turning it on only when someone needs to get a file, then off again once they’ve obtained it.

Or perhaps you want to leave file sharing off entirely during the day, but turn it on at night so you can retrieve files when you call in using AppleTalk Remote Access. Just use the QuickKeys Timer Options to set the shortcuts to run automatically, turning file sharing on at 5 p.m. and off at 8 a.m.

17 Refining Your File Searches
The System 7 Find command can locate files based on a variety of criteria, including size, kind, label, creation or modification date, and comments. You can combine these criteria to refine your searches and quickly locate just the file(s) you need.

Say, for example, you want to perform a simple backup of all documents that have been modified since May 11. First, select the Find command (Command-F) and click the

15 Map Magic
You may think the Map control panel presents a rather prosaic way to determine the local time for any point on the globe, but have you tried these tricks?

If you have a color monitor, get rid of that boring black-and-white map. Open the Scrapbook desk accessory and copy the color map it contains. Then open the Map and choose Paste. Cool, huh? You can scroll around the world by clicking in the Map and dragging outside its boundaries.

Try typing mid as a location and clicking the Find button. You can globe-trot alphabetically through the Map’s stored cities by repeatedly Option-clicking Find. (The next stop after Middle Of Nowhere is Minneapolis.) To add a city to the Map, type its name, click on its location, and click the Add City button.

The Map’s mileage display normally shows the distance between the last location you clicked and your current one. If you’d prefer to always see the distance between your hometown and other points, click on your town, then click the Set button.

Similarly, “Time Zone” shows the time difference between your current location and Greenwich mean time. If you’d rather see the time difference between your previous and current locations, click the words “Time Zone” to switch the display to “Time Differ.”
More Choices button. Change the pop-up menus to read “kind contains document” and click the check-box labeled “all at once.” Click the Find button, and System 7 will locate and select all documents on your hard disk.

With the documents selected, return to the More Choices dialog box and change the pop-up menus to read “date modified is after 5/11/93.” Next, change the Search pop-up menu to “the selected items.” Then do another Find. System 7 will search only within the previously found files and eliminate those that don’t meet the new criteria. Now all you have to do is copy the selected files to a backup disk.

Finding Files on Floppies—Fast

Aliases provide a clever way to quickly locate files on removable media such as floppy disks, CD-ROM discs, or SyQuest cartridges. Just make aliases of the files on the disks (cartridges, discs) and store them in a folder on your hard disk. When you need a file stored on a floppy, double-click the appropriate alias. System 7 will ask for the disk—by name (for example, Liam Company Project)—that contains the original file. No longer do you have to root through piles of disks, trying to remember which one contains the file you need.

This strategy also works well if you use a file-compression utility, such as Compact Pro, to compress older files and then archive them to floppy disks. First copy the files onto the backup disk. Give each disk a unique name, such as Archive12. Then make aliases of the files on the floppies and copy the aliases back to your hard disk. Label the disks and store them in a safe place. You can now free up space on your hard disk by deleting the original files.

Playing Mac Movies on PCs

QuickTime is now available for PCs running Windows as well as for the Mac. With a couple of minor adjustments, you can play the same movies on both platforms.

To make a movie playable on a PC, open it on the Mac with the Movie Converter utility (part of the QuickTime Starter Kit) and choose Save As (File menu). In the resulting dialog box, click the radio button labeled “Make movie self-contained,” to instruct the utility to sever any links to other movies after incorporating the relevant video into the current movie. Also click the checkbox labeled “Play able on non-Apple computers” to save the movie in a PC-compatible file format.

Once you’ve saved the movie, it will be playable on PCs without further translation or file conversion. Before transferring the movie to a PC, remember to assign it a filename of no more than eight characters, plus the extension .MOV—for example, MYMOVIE.MOV.
How to do an honest day's work by using an alias.

Finding information fast with System 7.

System 7 software comes with an array of new tools that makes accessing information on your Macintosh easier and quicker than ever.

To begin with, you can create an 'alias.' Designed to help you better organize your hard disk, aliases are not full-fledged copies of files but, rather, small 2K "pointers" to files, folders and applications, which you can put in as many places on your Mac as needed. When you click on an alias, you actually open the original—no matter where it's located.

The new Find feature lets you search for files, folders and applications, and then actually brings them right to the front of your desktop for you.

And with Outline View, simply clicking on the triangle to the left of the folder icon creates a menu list of its contents. So you never fill up your computer screen with multiple windows trying to find that buried file.

Of course, these are just a few of the ways System 7 can help make you more productive.

They're also just a few of the many reasons why 5 million Macintosh users are now working with System 7, as well as with the more than 6,000 applications available that run on it.

For the name of the Apple software reseller nearest you, call 1-800-732-3131, ext. 500. Or, if you're a current System 7 user, get the System 7 Update Kit by calling 1-800-769-APPL, ext. 250.

And let System 7 give you the power to find what you have always been looking for. The power to be your best. Apple.

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21 Enhancing Linked Data

The publish and subscribe capabilities in System 7 let you incorporate “live” text and graphics from other programs into your documents. When the original information changes, your documents are updated automatically.

Although all programs that support publish and subscribe let you position and resize subscribed material, Deneba’s Canvas 3 goes further. Through its adornment features, you can enhance subscribed text by changing the font, point size, style, justification, and color. With subscribed graphics, you can change attributes such as color, pen size, fill and pen patterns, and rotation angle.

These adornments are retained when the subscribed text and graphics are updated. You can also return a subscribed object to its original condition with the Remove Effects command.

22 Rebuilding Your Desktop

At least once a month, you should rebuild the invisible Desktop files that System 7 uses to track files. This

Workgroups of the Future

Apple continues to place the latest technologies in the hands of both users and network administrators, providing easier, more flexible ways to accomplish your goals. Two of the newest system extensions, the Apple Open Collaborative Environment (AOCE) and AppleScript, will simplify collaborative computing and allow you to automate routine tasks, integrate your applications, and customize the desktop. AppleScript is available now; AOCE will be available later in 1993.

Getting the Message

AOCE addresses the growing need to communicate with colleagues through a variety of electronic means, including fax, electronic mail, voicemail, and on-line services. Because each system has a different interface, you may spend a lot of time retrieving, handling, and replying to messages.

AOCE saves you time and energy by combining all of these communications systems into a single easy-to-use interface. A desktop mailbox receives and stores all forms of correspondence, and a personal directory stores data about other users, such as their preferred method of contact.

You simply create a document and address it. AOCE, together with third-party software, handles the transmission—whether it’s sending a fax from your Mac, exchanging E-mail over the local network, or dialing up an on-line service via modem. AOCE also provides digital signatures, which let you attach electronic approvals to documents, and authentication services, which ensure that messages are private and secure.

Software developers are incorporating AOCE technology into applications ranging from calendaring utilities to spreadsheets, allowing you to send formatted text, pictures, sound, and movies from within your favorite programs. A Send command will eventually be as common as the Print command is today.

“No Hands” Computing

You can streamline routine computing tasks even further by combining AOCE’s capabilities with those of AppleScript, Apple’s powerful yet easy-to-use scripting language. You could, for example, create a script (a series of commands) that automatically answers, forwards, files, or deletes incoming messages based on their subject matter.

AppleScript lets you tailor the computing environment to your needs. You can write scripts that automate routine tasks (such as file backups), perform unattended processing (spreadsheet calculations, perhaps), and automatically gather information from various sources (E-mail or database records). AppleScript also simplifies network administration, allowing you to automate disk backups and software updates.

For even greater power, you can use AppleScript to integrate the functions of several applications into a single, seamless working environment. This is especially useful to VARs, system integrators, in-house developers, and consultants because it makes it easier to create custom solutions for clients. By writing scripts, they can turn off-the-shelf applications, such as accounting and forms packages, into front ends for comprehensive workgroup systems such as small-business accounting or sales-order processing.

To facilitate user scripting, developers are building AppleScript capabilities into their software. Scriptable applications, such as Microsoft Excel 4.0, can run pre-existing scripts; recordable applications, such as StuffIt Deluxe 3.0.5, can create their own. Apple will also roll a run-time version of AppleScript, which lets users create and run scripts, into a future release of the system software.
How to pull together 3 months of research in under a minute.

File sharing makes it easy for Macintosh users to exchange information and work together over a network. So, for example, you could pull this "FY '93 Market Trends Analysis" chart from your colleague's computer and incorporate it into your "B & K Worldwide Sales Report" in a matter of seconds.

With System 7 software and its built-in file sharing, putting together a presentation on your Macintosh has never been easier or quicker. Even when the research you need for it is in someone else's computer.

Now, despite the fact that you and your colleagues may have different schedules, you can still collaborate on a project over your network. Because file sharing enables you to work with files on each other's computers.

You simply give your associates access to any designated file or folder on your Macintosh, and they can work with your data from their computers.

So let's say, for instance, that your boss walks into your office and asks to see where you're at with your quarterly research summary. But the June findings happen to be on your partner's Mac, and she's out to lunch.

No problem. With file sharing, you can access your partner's data in moments. Of course, this is just one of the many ways System 7 can help make you more productive.

It's also just one of the many reasons why 5 million Macintosh users are now working with System 7, as well as with the more than 6,000 applications available that run on it.

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And see how easily System 7 can give you the power to pull your work together fast. 'The power to be your best.'
simple procedure fixes any internal Desktop problems and speeds basic operations such as starting up the Mac, copying files, and switching to the Finder. In addition, if you install a new application or upgrade an existing one, you may have to rebuild your Desktop to see the correct icons for the program and its documents.

To rebuild the Desktop when you restart the Mac, hold down the Command and Option keys after the extensions finish loading but before the menu bar and desktop appear. Click OK when asked if you want to rebuild the Desktop.

Did you know you can rebuild the Desktop without rebooting the Mac? In the Finder, with no applications running, press Command-Option-Escape. Click the Force Quit button in the resulting dialog box, then hold down the Option and Command keys. If your keyboard doesn’t have an Escape key, use the ~ (tilde) key instead.

24 Creating an Upgrade Server

If you’re a network administrator, you know how hard it is to keep users current with the latest releases of system software. You may, in fact, be avoiding the move to System 7 because you don’t want to visit each user’s Mac or loan out your master set of System 7 disks.

Fortunately, there’s a simpler solution: an upgrade server. This setup allows users to install their own system software over the network instead of using floppy disks. Plus, as each system release appears, you need only install it in one location to make it available to everyone on the network.

To set up a System 7 upgrade server, create a folder on your AppleShare server (or on a shared disk) and name it something like Network Installs. Insert the Install Me First disk from your System 7.1 MultiPack into the Mac and drag its icon onto the server’s hard disk to copy the disk’s contents into a folder named Install Me First. (For System 7 packages without this disk, start with the Install disk.) Move the new folder into the Network Installs folder and eject the disk. Follow this same procedure with the Install, Install 2, Printing, Fonts, and Tidbits disks.

The Network Installs folder should now contain six folders, one for each installation disk. Move the Installer and Install Script files from the Install Me First folder to the main Network Installs folder. Finally, set the access privileges for the Network Installs folder so that everyone on the network can use it.

Congratulations! Your users now have a one-stop source for system software upgrades, and your life just got much easier.

23 Express Yourself with Zeal

If you’re designing a logo or presentation and plain text seems too, well, plain, dress up your act with Zeal, Apple’s new TrueType symbol font. Zeal’s 256 characters include symbols that are both practical and fun, such as recycling and recreation icons, horoscope signs, arrows, map symbols, and clocks depicting each hour of the day.

You can put Zeal to work in dozens of creative ways, from borders and bullet points to ornaments and logos. And you don’t have to think small. Zeal lets you make a really big impression—on signs, posters, even T-shirts—because TrueType, Apple’s scalable font technology, ensures smooth, crisp-looking characters at any point size, both on-screen and on paper.

Zeal is one of 43 TrueType fonts in the Apple Font Pack, a collection of high-quality text, display, and symbol fonts that help you create better-looking documents.

25 Opening MS-DOS Documents

The Macintosh PC Exchange extension from Apple lets you open and work with MS-DOS and Windows files on your Mac. Although MS-DOS files can be opened from within Mac applications, double-clicking a MS-DOS file’s icon usually won’t open it because the document doesn’t know which Mac application to use.
How to make sure your pies are always fresh.

System 7 lets you create "live links" between documents from different applications with a tool called Publish and Subscribe. By "Publishing" a chart from one document, you can "Subscribe To" it and place it in any number of other documents. When you update the original, all the other charts linked to it are updated automatically.

From your word processing document, select "Subscribe To" in the Edit menu, and you've placed a copy of the chart in your sales summary. When you make changes to the original chart, this new one will be updated automatically to reflect the changes.

Up-to-date documents with System 7.

With System 7's software and a built-in tool called Publish and Subscribe, keeping reports and documents up to date is as easy as, well, you know what.

For instance, let's say you're working on a sales report in Microsoft Word. Let's also say that you've created a pie chart in a Lotus 1-2-3 spreadsheet showing your company's most recent sales results, and you want to include this chart in your final report.

Experience tells you, however, that these sales figures will continue to change right up to the very last minute.

No problem. With the Publish and Subscribe feature, you can publish the pie chart from your spreadsheet and then subscribe to it from within your word processing document.

This creates a "live link" between the two. Now, each time you revise the sales figures in your Lotus spreadsheet, the pie chart will automatically reflect the changes. So your final report will always be revised and up to date.

Of course, this is just one of the many ways System 7 can help make you more productive.

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Opening Files at Startup
Do you use certain programs or documents all the time? If you put their aliases in the Startup Items folder, System 7 will open them automatically at startup time. (By using aliases, you can store the original items in more convenient locations.)

Want your Mac to play a favorite sound when you turn it on? Drag the appropriate sound file into the Startup Items folder.

How about a Quick-Time movie? Rename the movie Startup Movie and put it in the Startup Items folder. Now it will play each time you start the Mac.

Fast Fact: If for some reason you don’t want the startup items to load, hold down the Shift key as soon as the extensions have finished loading but just before the desktop appears.

Improving Your Views
Are you tired of long filenames overlapping in icon views? Wish you could see comments in Finder windows when you view files by Name or Date? Then you’ll appreciate the Views control panel, which lets you tidy up icon views and make list views more informative.

For icon views, you can select a staggered icon grid to keep filenames from overlapping and/or insist that icons always snap to a grid (normal or staggered). For list views, you can choose the information you want displayed with each file, including size, kind, label, version, and comments. You can also opt to show file icons in list views, as well as disk information (“34.5 MB in disk, 3.4 MB remaining”), a feature lamentably missing from System 6.

Last, but not least, you can change the font and point size used to display text, such as icon names and list views, in the Finder.

Fetching Files
By now you know that aliases are one of the most powerful features of System 7, allowing you to organize your hard disk however you want while providing instant access to files, even if you move or rename them.

But did you know that applications also can use aliases to track files? Aldus Fetch, a mixed-media cataloging program, is one of several applications that uses the alias capabilities of System 7 to locate and retrieve files.

Fetch stores an alias for every image cataloged in its database. When you ask Fetch to retrieve a particular image, it hands the alias to System 7 and asks it to locate and open the original file. Depending on the file’s location, you may be prompted to insert a CD-ROM disc, mount a file server, or even dial up a remote network.
Making the Move to System 7

Still running System 6.x software? Upgrading to System 7 is easier than you may think. And once you discover how much more productive you are under System 7, you’ll be glad you made the move. Here are answers to some commonly asked questions about switching to System 7.

• System 7.1 is the current version of the Macintosh system software. Released in October 1992, System 7.1 is shipped with all Macintosh CPUs worldwide.

• System 7.1 requires a hard disk, and we recommend 4 megabytes of RAM. System 7.1 is shipped on 1.4-megabyte floppy disks, but if you don’t have a SuperDrive, you can exchange the high-density disks for 800K disks by calling Apple at 800-769-APPL.

• Individual users can upgrade with the System 7.1 Personal Upgrade Kit ($99*). To upgrade up to 10 users, you need the System 7.1 MultiPack ($499*). Both are available from many mail-order and retail outlets; call 800-731-3131, Ext. 500, for the reseller nearest you.

• Installing System 7.1 requires just one click of the mouse; the Installer program does the rest. In addition to placing the System 7.1 files in their correct locations on your hard disk, the Installer deletes outdated system files and moves third-party extensions, control panels, and fonts into the appropriate folders.

• Boot your Mac from the System 7.1 Install disk before performing the installation. If you want to run the Installer from your hard disk, turn off your extensions (INITs) first. You don’t have to remove your applications prior to installing System 7.1.

• Before installing System 7.1, run Compatibility Checker 2.0, which is included in the upgrade kits. This diagnostic tool analyzes your extensions, control panels, and applications, flagging those that should be upgraded. It can automatically move incompatible extensions to a special folder, allowing you to run System 7.1 without mishap. Compatibility Checker 2.0 is also available from on-line services and Mac user groups. On ZiffNet/Mac (the on-line connection to MacUser, hosted on ComputeServe), you’ll find it in Library 14 of the Download & Tech Support Forum (GO ZMC:DOWNTECH). The filename is CCHECK.SIT.

If You Already Use System 7.0...

Users of System 7.0 and 7.0.1 can move to System 7.1 by purchasing the System 7.1 Update Kit ($34.95*), available from mail-order and retail outlets or directly from Apple (800-769-APPL, Ext. 250). System 7.1 is a minor update. You should get it if you want the enhancements listed below or haven’t acquired the System 7 Tune-Up.

What’s new in System 7.1? The Fonts folder provides easy installation and centralized storage of TrueType, PostScript, and bit-mapped fonts, and file sharing has improved security settings. Tune-Up has been integrated into the system software, and the QuickTime 1.5 extension is included with the update.

* manufacturer’s suggested retail price.

29 Snapping Screen Shots

Need to capture your desktop for posterity? Press Command-Shift-3 to get a color snapshot of the entire screen, including the menu bar and all open windows on the desktop. There’s even a camera-shutter sound effect.

You can take as many pictures as you like. Each screen shot is saved to disk as a sequentially numbered PICT file. Double-clicking one of these files will open it in TeachText 7.x for viewing and printing. If you want to edit the image, you can open it from within a graphics program such as Photoshop, DeskPaint, or Canvas.

30 Easy Network Access

There are probably a few folks, such as clients or visitors, who need to use your network occasionally but don’t want to learn networking procedures. No problem.

Simply make a shared folder for each person and place in it whatever files you want them to be able to access, including aliases of documents stored elsewhere on the network. Give each person a floppy disk that contains an alias of his or her folder.

Now all these novice users have to do is insert the disk into any Mac on the network and double-click the folder’s alias. Voilà—they have instant access to their own shared folder.
Take Off with System 7 and Save!

Apple wants everyone who uses a Macintosh computer to experience the power unleashed by its award-winning System 7 software. So, between now and June 30, you can save from $5 to $20 on 55 of your favorite Macintosh programs when you buy System 7.

For example, purchase After Dark with System 7, and you'll get a check for $5 from Berkeley Systems. Buy ClarisWorks with System 7, and you'll receive $10 from Claris. Or buy any of the other listed programs along with System 7, mail in your rebate coupon, and you'll receive a check for the specified amount.

So get ready to take off!

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For more details on this exciting rebate offer, contact one of the companies listed below.

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Circle 159 on reader service card.
A little more QuickTime and a first piece of PIE: Apple continues to tweak QuickTime; the latest incremental rev is version 1.6. Users should see about a 10-percent improvement in speed overall, which means a slightly faster frame rate and, thus, smoother motion.

QuickTime sound has also been improved. The new Sound Manager included with version 1.6 lets you incorporate 16-bit (audio-CD quality) sound samples into your movies in either of two ways: software only or with additional hardware. If you don’t have a 16-bit audio card, such as Digidesign’s Audiomedia board, the Sound Manager will dither your 16-bit sample down to 8 bits for the Mac’s internal audio circuitry. If you have the additional hardware, it will automatically route the sound sample to the card.

Apple’s PIE (Personal Interactive Electronics) Division has finished baking its first goodie, and much to no one’s surprise, it isn’t the Newton. Instead, it’s the PowerCD, a more-than-3-pound, transportable (if not maximally portable), multi-format (audio-CD, CD-ROM, and Photo CD), less-than-$500 drive that looks like a prop from a Batman movie.

The PowerCD’s biggest cachet is its support for NTSC video output, so you can just plug it in to your TV set and start looking at your Photo CD images.

But much like those of Apple’s Select laser printers, the PowerCD’s features are singularly odd. For example, you can separate the drive mechanism (that’s the Frisbee-like part) from the base, but you can’t do anything with it. All the data ports and power ports are in the base. The base houses batteries — eight penlights (AA) — but Apple estimates that the batteries will last only about an hour and a half for data use — comparable audio-CD players run four times as long on half as many batteries.

The PowerCD comes with a wireless remote control that has enough buttons to intimidate even the VCR-literate.

To top it off, the PowerCD is a slow drive: 150K per second, even though Apple has been pushing 300K per second as the standard since QuickTime 1.5, because the slower speed was unacceptable for QuickTime playback!

So what’s PIE’s explanation for the PowerCD? It bought it from Philips.

**Up to Date . . .**

Following a “technology agreement,” Objective Software’s SpreadBase 1.1 data-analysis tool will now be able to access SQL databases directly through Brio Technology’s DataPrism 2.1. The products will be available as a bundle at a cost of $695. 415-306-7404.

**Upgrades down in price:** Apple Computer has lowered the prices on several Mac logic-board upgrades. The Quadra 700 upgrade kit for the IIfx and IIfc went from $3,129 to $1,999. The Quadra 950 upgrade for Quadra 900 owners is $1,899 (formerly $2,679). And the IIfx upgrade (for the II and IIf) went from $2,319 to $1,799. 408-996-1010.

By Russell Ito
Highly Presentable Printing

You can spend lots of time creating dazzling images for your color presentation, but will your printer do them justice? If it's Kodak's new ColorEase PS continuous-tone thermal-dye-transfer printer, the answer is yes. With three color passes (cyan, magenta, and yellow) at 300-dpi resolution, the ColorEase PS can print photographic-quality transparencies (and prints), using more than 16 million colors.

Aimed at the color-presentation market, the ColorEase PS prints transparencies optimized for the light-source location of the projector you're planning to use.

It also has plenty of power to cope with complex images: a 40-megahertz SPARC RISC processor, 16 megabytes of RAM, two SCSI ports for extra font storage, and Adobe PostScript Level 2 firmware. Plus, its 120-megabyte internal hard drive enables it to process one image while simultaneously printing another — a convenient feature when you're sharing the printer (parallel, serial, and LocalTalk ports are standard; Ethernet is optional).

Except for being limited to letter-sized (A or A4) paper, the ColorEase PS is similar to the Eddy Award-winning Kodak XLT 7720, its bigger, premium-priced cousin. Considering that it's one-third the XLT 7720's price and has a lower cost per page ($2 for prints and $2.50 for transparencies), how can you go wrong?

Eastman Kodak Co., 901 Elmgrove Road, Rochester, NY 14653; 800-344-0006 or 716-724-4000. $7,995.
— Tony A. Bojorquez

A Pro PIM

Keeping track of your contacts and appointments is a hot topic, which is what keeps the PIM (personal information manager) war raging. After Hours Software has just launched its latest attack, with two new packages: TouchBASE Pro and DateBook Pro. The packages are highly integrated (via Apple events) and available in a bundle as well as separately.

While perusing your contacts in TouchBASE Pro, you can view all the DateBook Pro appointments, to-do items, and calendar memos associated with a specific contact. You can view and access all of your TouchBASE Pro contact information in DateBook Pro; you can even go directly to a specific contact record, dial the person's telephone number, send a fax, or print a letter.

TouchBASE Pro includes several features that TouchBASE users have long requested. A mini word processor in the program lets you quickly write, address, and track letters. Data entry has been speeded up with shortcuts such as "clairvoyance," which automatically enters a user-defined text string after you've typed a few characters. TouchBASE Pro can automatically convert Dynodex and Address Book Pro files, and you can now copy and paste among TouchBASE Pro files as well as have multiple files open simultaneously. The contact limit has been increased to 32,000, and you can create and save complex search routines. For PowerBook users, TouchBASE Pro has transaction-log-based file reconciliation, so you can keep two files in sync even if you've deleted records.

DateBook Pro has some helpful new features as well. You can have memos that aren't to-do items or events in your DateBook Pro file, and you can access your events, to-do items, memos, and alarms without launching the DateBook Pro application, thanks to the program's new Mini Window. You can customize your DateBook Pro view in several ways, and you can keep track of holidays and vacations — so you don't accidentally schedule meetings when you won't be anywhere near the office.

After Hours Software, Tri Center Plaza, 5900 Sepulveda Blvd., Van Nuys, CA 91411; 818-780-2220. DateBook Pro, $79.95; TouchBASE Pro, $79.95; Pro Bundle, $149.95.
— Russell Ito

Print Fast or Fine

Used to be, you had to give up on speed if you wanted a reasonably priced laser printer with high-resolution output. Not anymore. The new IBM LaserPrinter 4039 series, from Lexmark, IBM's printer-division spin-off, gives you 600-dpi resolution for high-quality output at 8 ppm plus a 300-dpi option for faster printing — at 10, 12, or 16 ppm, depending on the model you choose. And the price range is right: from $1,599 for the low-end 10R model to $3,399 for the top-of-the-line 16L.

The five printers in this series (the 10R, 12R, 12L, 16R, and 16L) offer many useful features, including a RISC processor for fast processing of complex documents, a duplexing option for double-sided printing, PCL 5 and PostScript compatibility (through a Phoenix/Lexmark interpreter), software updates for easy upgrading, and PictureGrade gray-scale enhancement technology.
Creating QuickTime special effects is a snap with version 1.5 of VideoFusion. It's faster than 1.0 and includes such new features as finer adjustment of control points for smoother morphing.

(similar to Apple’s Photo-Grade) for 100 levels of gray.

Serial and parallel ports are included on all models, and you can buy optional interfaces for LocalTalk, Ethernet, and token ring. EtherTalk compatibility (that's Ethernet for Macs) will be available late in 1993. All ports are active simultaneously — Lexmark’s Smartswitch technology lets any model spool and print jobs from different ports at the same time.


— Sean Safreed

Specially Effective

If you're using VideoFusion to create whizzy QuickTime special effects, you're about to become a lot more efficient. Version 1.5 of the program, available free to version 1.0 owners, has been internally optimized — its maker claims it's 50 percent faster than the original.

You also get improved controls for morphing and support for Adobe Photoshop's filmstrip format (so you can apply Photoshop filters to groups of frames). Plus, a new recording window enables you to digitize video clips from within VideoFusion.

Finally, version 1.5 offers several new features to warm the hearts of video professionals: field rendering, which provides smooth edges on graphics and composited video windows; an NTSC-safe filter, which converts colors to fit the NTSC TV standard; and support (in an $89 software add-on) for RISC accelerators from YARC, which lets the application use these RISC accelerators to speed up CPU-intensive operations on some filters.

VideoFusion Ltd., 1722 Indian Wood Circle, Maumee, OH 43537; 419-891-1090. $649.

— Mark Frost

VideoShop Gets Rebuilt

Since its introduction, DiVA's VideoShop has been a powerful QuickTime-video-editing tool — for users who didn’t mind its cumbersome HyperCard-based implementation. Version 2.0, rebuilt from the ground up, breaks free of HyperCard and offers enhanced sound-mixing and video-compositing features.

Two new add-on tool kits provide special tools for two types of output: digital and analog. The Digital Delivery Kit lets users drag and drop movies directly into HyperCard or create interactive movies as self-contained applications. The Analog Tool Kit is for video professionals who want to link up with controllable video decks; it provides device control, lets users access SMPTE time code for frame-accurate editing, and lets users generate Edit Decision Lists for broadcast-quality applications.

If all this sounds too high-end for you, you may want to wait for the more basic QuickTime-editing package that DiVA is introducing in August. Its simplified interface and expected $199 price will make it an obvious choice for the education market.

DiVA Corp., 222 Third Street, Cambridge, MA 02142; 617-491-4147. VideoShop 2.0, $499; Digital Delivery Kit, $399; Analog Tool Kit, $699.

— Mark Frost

HyperCard-dependent no more: Version 2.0 of VideoShop offers a powerful set of video-editing and effects features with a more streamlined, non-HyperCard-based interface.

Apple Pursues Multimedia Markets

CUPERTINO, CA — Signaling its intent to claim a large share of the emerging multimedia market, Apple has formed the New Media/New Markets Group. The group's goal is to increase the use of multimedia in both mainstream personal computing and specialized markets such as transportation and medical imaging (and to ensure that Apple will be supplying the right products for these markets). In addition to launching an aggressive CD-ROM marketing campaign and a Multimedia Developers Program, the group has announced an agreement with Macromedia to bundle that company's multimedia software with Macs containing CD-ROM drives. Agreements with other companies such as Radius, DiVA, Voyager, and Honeywell are in the works.

Real Funding for Virtual Reality

CARY, NC — Bringing virtual electronic worlds a step closer to reality, Motorola has invested an undisclosed amount of money in Virtus, creator of Virtus WalkThrough. This Eddy Award-winning software lets Mac users (and Windows users, by the time you read this) create and move through 3-D models in real time. With Motorola's backing, Virtus is well positioned to reach out to some of the same interactive-multimedia markets Apple is pursuing.

Tax-Software Vendors Merge

SAN DIEGO, CA — From virtual reality to virtual certainties: For those who do their taxes electronically, ChipSoft has just increased the likelihood that it will supply the software they use. The publisher of TurboTax and MacdTax, ChipSoft has added to its tax-preparation arsenal by purchasing MEGA Software, maker of such programs as Andrew Tobias' Managing Your Money and Andrew Tobias' TaxCut.

— Karen J. Ohlson

SAN DIEGO, CA — From virtual reality to virtual certainties: For those who do their taxes electronically, ChipSoft has just increased the likelihood that it will supply the software they use. The publisher of TurboTax and MacdTax, ChipSoft has added to its tax-preparation arsenal by purchasing MEGA Software, maker of such programs as Andrew Tobias' Managing Your Money and Andrew Tobias' TaxCut.

— Karen J. Ohlson
Easy to manage. Our new AppleShare Pro software delivers graphical tools to greatly simplify your server management tasks. So you can spend less time responding to workgroup requests, and more time being productive.

Lower cost of ownership. When server management is easier, it's also less expensive. The ease of use of AppleShare Pro translates into dramatic cost savings over time — in both single-server and multiple-server environments.

Workgroup strength. The Workgroup Server 95 is a new machine, optimized for workgroups. It's based on the Macintosh Quadra 950, with performance boosted by a processor-direct card with memory acceleration and up to a 512KB cache.

High performance made affordable. AppleShare Pro software exploits the hardware acceleration and high-performance A7UX of the Workgroup Server 95 to deliver up to four times the performance of a Macintosh Quadra 950 running AppleShare 3.0.

Grows with the group. It's easy to keep up with the workgroup as it gets bigger and more demanding. Memory is expandable to 256MB, and there's room to expand disk storage up to 20 gigabytes.

We now do for the workgroup what...

When Apple introduced the first Macintosh computer, we proved that making a desktop computer easy to use could have a dramatic effect on an individual's productivity. Now we're going to repeat that demonstration on a much larger scale: Introducing the Apple Workgroup Server 95.

It's an easily expanded, high-performance server designed to boost workgroup productivity in data-intensive environments. In typical Apple fashion, it's also designed to be very easy to use — demanding much less attention from you as a network manager.

The Workgroup Server 95 is built for speed and optimized to help large groups of users work together better. Starting with our most powerful Macintosh Quadra system, we added hardware acceleration, half a megabyte of high-performance cache memory,
at Macintosh did for the desktop.

enhanced SCSI/DMA driver support, disk I/O, memory expansion to 256MB and disk expansion up to 20 gigabytes.

It's all built around our performance-tuned UNIX®-based system software: A/UX® 3.0.1. Optimized to deliver stable, dependable file, print and database services as well as UNIX application processing, A/UX features the familiar, intuitive Macintosh interface.

Our new AppleShare® Pro software (for file and print services) also delivers industrial-strength performance and reliability. However, ease of use may very well be its most powerful feature. Built into AppleShare Pro is a set of simple, graphical tools to help you maintain the server, whether you're adding new users, upgrading workgroup software or installing network-wide services like e-mail. It also has sophisticated on-line documentation.

Soon you'll be seeing more new Apple servers and solutions for every size budget. Each one has been designed to help people share information more productively, and to expand as your needs grow. Which means each one can deliver the most important kind of computing power. The power to be your best.

The new Apple Workgroup Server 95 🍎.
Adobe Photoshop 2.5

Speed and ease of use sum up Adobe’s enhancements to its powerful image processor.

Behind the Mask

At first glance, Photoshop 2.5 looks and works much like its predecessor. However, experienced users will quickly discover a myriad of differences. Among the most striking are enhancements in the area of masking and alpha channels. Photoshop’s new Quick Mask feature greatly simplifies the process of creating a single mask for an image. Using Quick Mask, you create the mask directly on the image (no need for complicated paths and alpha channels), and you can use translucent color to distinguish between the area that’s protected by the mask and the area that’s not.

One of Photoshop’s traditional strengths has been the way it allows users to create multiple masks for an image, save them as alpha channels, and manipulate them. With this capability—which is more powerful than ever in version 2.5 of the program—users can create composite images and an almost unlimited variety of special effects. Photoshop’s alpha channels now have almost as much muscle as their counterparts in high-end, dedicated retouching systems. The program lets you simultaneously overlay multiple alpha channels on a color image and paint on any combination of the channels—a welcome enhancement. The original image remains visible and unaffected as you edit the channels.

The new floating Channels palette, which lists the color channels (R, G, and B, for example) as well as the alpha channels (or masks) of the active document, provides intuitive controls for making channels visible and active. A pop-up menu in the palette presents other channel operations, such as the New and Delete commands. You can name each alpha channel individually—a long-awaited enhancement—and give each channel a different color and level of transparency. This last capability is extremely helpful when you’re viewing more than one channel at a time.

Because Photoshop saves all alpha channels associated with a particular image in the image file itself, file sizes could grow unwieldy in the previous version. To address this problem, version 2.5 features a new compression scheme that saves considerable disk space: When you save an image with many alpha channels in this version, Photoshop compresses the alpha channels, dramatically reducing the size of the file.

The memory-management scheme of Photoshop 2.5 significantly boosts the program’s overall performance, making screen redraws significantly faster. The new version also lets you set a secondary scratch disk—when your first scratch disk runs out of space, Photoshop directs the overflow to the second disk.

Software in Hardware

Even more impressive speed gains will be possible through third-party DSP (digital-signal processor) boards, which will accelerate specific calculation-intensive Photoshop functions such as rotating, resizing, and colorspace converting (RGB to CMYK, for example). With the advent of Photoshop 2.5, board makers will be able to license Adobe’s own code, which guarantees full compatibility between board-level functions and the Photoshop software. DayStar Digital, SuperMac Technology, and Storm Technology are among the companies that have announced plans to release Photoshop-specific accelerators under the new licensing agreement. We expect the first of these boards to be available by the time this review appears.

Adobe has also made several of Photoshop’s existing
features easier to use in version 2.5. The path tool, for example, was especially frustrating, even for seasoned Photoshoppers. In the new version, Adobe has replaced Photoshop’s cryptic path-related keyboard commands with a helpful palette that presents icons specific to each path option.

In addition, version 2.5 supports “unclosed” paths, a key enhancement that gives you the ability to apply strokes to paths with any of Photoshop’s painting tools (in its next update, Adobe would do well to add the ability to change brush widths over the length of path strokes). One other useful path-related feature is that Photoshop’s TIFF file format can now incorporate clipping paths — only files in the EPS format had this capability in the previous version.

To help users adjust the color balance, contrast, and saturation of an image, Adobe has added the Variations dialog box. It presents a thumbnail of your original image side by side with a thumbnail of the same image with the current settings applied. As you adjust the settings, the second thumbnail changes to reflect your choices. Below the two reference images is a variety of other thumbnails that show how the target image will look with different color-correction settings applied. You simply click on a thumbnail to select its setting. With its Variations dialog box, Photoshop takes a color-correction approach similar to that of several other programs, including EFI’s Cachet, but we found Photoshop’s implementation to be the most intuitive.

More Special Effects

Expanding Photoshop’s special-effects repertoire are several new and fascinating filters. The Shear filter lets you distort images along a smooth, definable curve. The Color Halftone filter creates an impressionistic effect by simulating the result of using an enlarged halftone screen on each channel of the image. It provides full control over CMYK layer rotation and screen frequency. The unique Extrude effect turns an image into a series of square or spiked rods.

Photoshop 2.5’s new Variations dialog box lets you adjust color-correction settings simply by choosing an image from a selection of thumbnails that show how the image will look with different settings applied.

Photoshop 2.5 provides many new brush options. You can specify brush sizes as large as 999 pixels (which draw as slowly as you might expect), compared with 64 pixels in the previous version, and you can adjust the softness of brush edges. Another new feature lets you take a snapshot of the current state of an image; you can easily restore specific elements of the snapshot, even after you’ve invoked Photoshop’s Revert command (which causes the program to cancel all changes made to an image since the last time you saved it).

A CD-ROM version of Photoshop, which includes technical notes, sample third-party filters, a collection of clip-art images, and tutorials created in QuickTime, is available to current Photoshop users as a $199 upgrade.

The Bottom Line

For those who use Photoshop as a creative tool or as a production aid, the latest release features a slew of useful enhancements. With clear advances in performance and power, Photoshop maintains its status as the industry-standard image-processing tool.

— David Biedny
If you’re frequently charged with the task of analyzing large sets of complex business data, you may be a candidate for SpreadBase, an innovative new breed of Mac software that marries the familiar interface of a spreadsheet program to the data-management functions of a relational-database program. SpreadBase’s strength lies in its ability to handle frequent changes to complex business models with aplomb—changes that often bring traditional spreadsheet programs to their knees.

Category-Based Modeling

SpreadBase pioneers a new approach to data analysis. Called category-based modeling, this approach simplifies the process of model manipulation by organizing individual data items into categories (Products, Regions, and Planned Sales, for example) rather than assigning them to individual cells the way spreadsheet programs do. SpreadBase then associates the categories with fields in an underlying database.

This method greatly reduces the level of detail you must deal with as you manipulate models, because you work with rules and formulas that are associated with the categories and not with the individual data items. With spreadsheets, data relationships as well as the data itself are linked inextricably to rows and columns, so data changes usually require time-consuming remodelling. In contrast, because SpreadBase data is tracked within the database, the program accommodates your data changes automatically.

SpreadBase is designed to handle large data sets imported from corporate databases stored on mainframes or PCs (the program’s current model capacity is about 4,000 records). Each category in a SpreadBase model is comparable to a field in a database. This is a big advantage when you import data — the program automatically matches fields in the database with the appropriate SpreadBase categories. Because SpreadBase can combine chunks of data from different sources easily, it’s an ideal tool for analysis that involves consolidation. The program handles an impressive assortment of data formats and can connect to SQL-based host systems for data exchange.

The single most difficult aspect of SpreadBase is properly grouping model data into categories and establishing the relationships among categories. If you’re a veteran database user, you’ll have a leg up on this task. Spreadsheet jockeys experienced in named ranges and array manipulation will also have a head start.

Managing Changing Data

SpreadBase comprises four modules — Workspace, Macro, Spreadsheet, and Report. You analyze data with the three views available in the Workspace module: Matrix, Sheet, and Chart. To help you gain insight into your data, SpreadBase lets you link views in different workspaces. ModelTalk, the program’s macro language, enables you to create customized data-management methods and mathematical functions.

SpreadBase excels at handling modelling scenarios in which the structure of source data remains fixed while data values or the ways in which data is analyzed change. That’s because the underlying data relationships remain constant in the database, even though the data itself changes. And creating a different view of your data for analysis purposes is easy, because views are simply different representations of the underlying data stored in the database.

Although SpreadBase does resemble a spreadsheet program in many ways, building SpreadBase models is very different from building spreadsheets. Formulas in SpreadBase are based on category relationships, whereas in spreadsheets, they’re based on geometric relationships: No matter how a formula is written, traditional spreadsheet engines convert it into an expression such as “the value of this cell...”
equals the value of the cell located 2 columns across in the same row.”

With SpreadBase’s category-based modeling, the labels you create, as well as their hierarchical relationships with one another, are critical. Good results depend on your planning and building the correct category structure before loading data. You can revise models after you’ve set them up, but that tends to be cumbersome.

Categories can be either cell categories or label categories. Only cell categories can contain values. Label categories are the organizational tools that give SpreadBase its power and modeling flexibility. Although SpreadBase views can contain cell formulas similar to spreadsheet formulas, the program’s muscle lies in building much more powerful formulas based on categories.

**Category Hierarchies**

You do most work in SpreadBase in the Matrix view, which looks similar to a spreadsheet. Many cells are fixed, however — you can’t enter data into them because they’re located in rows or columns associated with label categories, rather than with cell categories.

Like an outliner, the Matrix view displays category hierarchies, which you can collapse and expand at will. Unlike Excel’s outline feature, SpreadBase can automatically generate category summaries without making you enter formulas. Moreover, you can easily rearrange matrix elements by dragging tabs located at the edge of matrix rows and columns; however, you can’t promote and demote categories by dragging. In contrast, spreadsheet programs make no distinction between the worksheet matrix and the values and formulas stored in the matrix.

SpreadBase’s features also invite comparison with those of MUSE, a data-analysis tool from Occam Research (see review, July ’92, page 52). We found data input to be more straightforward with SpreadBase, however. On the other hand, ModelTalk, SpreadBase’s powerful programming language, is more complicated to use than MUSE’s macro language. And you can’t use ModelTalk to create custom interfaces the way you can use Excel’s macro language: ModelTalk is designed strictly for building functions, formulas, and macros. With ModelTalk, you can have a single formula act on any number of cell values throughout a model, without using the copy-and-paste fill commands that spreadsheet programs require.

Unfortunately, SpreadBase’s macro editor isn’t as well designed as other aspects of the program. Its Spartan environment provides only simple buttons for importing, exporting, and running macros and checking the syntax of your code. The Functions button in the macro editor brings up a floating window with selections for SpreadBase’s built-in functions as well as for user-defined macros. A check box in the window lets you opt for a display of each function’s arguments. Another button provides easy access to the constants used in models.

Overall, SpreadBase does little to encourage the development of large, ambitious macros.

SpreadBase’s Spreadsheet module provides basic spreadsheet functions for preliminary work with models. Its Report module provides a modest selection of text and drawing tools. You can place workspace Matrix views, tables, graphs, and spreadsheet data into reports. Because data in reports is hot-linked to workspace data, it’s updated automatically when the source data is modified.

By the time this review appears, version 1.1 of SpreadBase should be available. In keeping with the company’s plan to expand the program’s capacity for data and to enhance its performance, the upgrade will feature a more efficient file format as well as improved memory management. This is key, because SpreadBase models are RAM-resident and a single file can contain multiple workspaces, reports, spreadsheets, and macros. According to the company, version 1.1 models will require about half the disk space required by version 1.0 models. In addition, in comparison with the original release, version 1.1 will be able to squeeze larger models into a given amount of RAM.

The company also plans to enhance SpreadBase’s connectivity capabilities by supporting Brio’s Data Prism, a powerful SQL connectivity tool.

SpreadBase is clean and well engineered, but because of its depth, the learning curve is steep. Objective Software wisely includes both a printed tutorial and a thorough, disk-based slide show.

**The Bottom Line**

If you need a tool that’s up to importing and manipulating many sets of complex data, SpreadBase may be for you. It’s a powerful tool that will handsomely reward the effort required to structure data into the correct categories prior to analysis. The one feature we found unsatisfactory was SpreadBase’s less-than-friendly macro language, which would be greatly improved by the addition of a debugger and the ability to create custom interface elements.

— Louis E. Benjamin, Jr.
REVIEWS

form•Z

This versatile modeling tool from autodesk can create an almost unlimited variety of 3-D forms.

If 3-D-modeling programs were circus performers, then form•Z would be the high-wire artist. form•Z may not be death-defying, but it does challenge many limitations that have characterized 3-D modeling programs for the Macintosh to date. form•Z is more expensive and more difficult to use than other programs in its class, but it is a star performer that can create a virtually unlimited variety of 3-D objects. The program includes surface- and solid-modeling tools, sophisticated model-editing capabilities, a customizable interface, and terrain-modeling and mesh-sculpting functions.

Model Perfect
The $1,495 form•Z comprises two modules — one for 3-D modeling and one for 2-D drafting. Because form•Z’s creators put most of their efforts into developing the program’s impressive surface- and solid-modeling tools, form•Z doesn’t have the sophisticated rendering capabilities of an Alias Sketch! or a MacroModel. However, the program makes an excellent modeling complement to dedicated rendering and animation programs.

With form•Z, you have several ways to create 3-D solid objects. You can use defined primitives, revolve or extrude 2-D objects, or use sweeps along paths. Once you’ve created a 3-D object, you can edit it on the vertex, segment, or face level.

You can also create spline-based 2-D surface objects. Initially, form•Z defines surface objects with sets of either closed or open outlines of the desired shapes. You then select the outlines and specify a mathematical method for generating smooth curves. The program supports NURBS (nonuniform rational B-splines), splines, Béziers, and several less powerful curve-generating methods.

Once you’ve defined a surface object, you have several options for editing it. You can control the degree of smoothness and the number of polygons used to approximate the surface. form•Z’s surface-editing interface isn’t as Mac-like or as easy to use as that of MacroModel or Sketch!, but it’s ultimately much more powerful, because it gives you more precise control over the smoothness of shapes and the coarseness of meshes.

form•Z’s meshes — surfaces subdivided into small patches — are useful, because they can adjust easily to conform to curved shapes. To sculpt forms, form•Z lets you move groups of points in a mesh. The effect simulates modeling with clay. When you also use the Random Point Disturbance feature, which randomly applies additional motion to the points in a mesh, you can quickly generate irregular natural-looking objects.

This feature addresses one drawback of 3-D photo-realistic rendered objects — they often look too perfect. A modeler that can simulate the imperfections of the real world is unique. In a similar vein, form•Z’s beveling and rounding tools provide an easy way to blunt sharp points and round square edges.

Cutting and Slicing
Another strength of form•Z is its ability to apply Boolean operations — union, intersection, and difference — to surface

form•Z is a powerful 3-D modeler that combines surface- and solid-modeling tools for conceptual design. The realistic-looking column shown here was modeled with form•Z (left) and then rendered in the Electric Image Animation System (right). A rough mesh was used to create the broken surface at the top of the pillar.
objects and solids, allowing you to combine simple shapes to create complex forms. For example, you can fuse two objects together or use a cylinder to subtract a hole from an object.

form•Z can also apply Boolean-like operations — trims, splits, and stitches — to spline surfaces. For example, you can trim one surface with another and then stitch the two resulting surfaces together. You can also trim solid objects. In fact, much of form•Z's power resides in its ability to combine surface and solid objects by using Boolean operations and trims.

We used these powerful functions to create a complex, realistic pillar. We began by creating the base from a revolved solid. Using Boolean operations, we then carved flutes into the pillar. Finally, we trimmed the top of the pillar with a rough mesh to create a broken surface. By using a trim instead of a Boolean operation, we were able to isolate the top surface and treat it as an object that was separate from the pillar base. Then, using the Electric Image FACT file, we applied different texture maps to the top surface and the pillar base.

For exchanging files with other programs, form•Z currently supports only the DXF file format for importing and exporting. However, according to auto­dessys, support for additional file formats — including IGES, RIB, and the Electric Image FACT file — will be available soon. To its credit, form•Z offers one of the cleanest DXF import/export implementations we've ever seen, including excellent support for layers. The program allows an unlimited number of layers and provides a full set of controls for manipulating them. When drawings are exported, form•Z maintains the proper arrangement of layers and their correct colors. This may seem unimportant, but many modeling programs have problems exporting files in non-native formats, and the DXF format is especially troublesome.

As 3-D modelers go, form•Z is not one of the easiest to use. However, once you've determined what tools you need and how you want the program to work, you can tailor form•Z's interface to fit your specifications. Tool palettes are user-definable. In the program's informative, easy-to-use Help dialog box, you can disable any tools and entire palettes you don't use regularly. For the future, another feature we'd like to see is the ability to move individual tools from one palette to another.

No Speed Demon

Its powerful modeling features aside, form•Z is not without problems. Most are speed-related. If you plan to use the program's more-advanced features, we recommend a Quadra-class machine with at least 20 megabytes of RAM. Even then, you'll still find yourself waiting several hours for Boolean and trim operations to finish. For example, the trim operation we used for cutting the top of our pillar required more than 3 hours on a Quadra 950 with 22 megabytes of RAM. Some of the spline surfaces, particularly the NURBS, also take an inordinate amount of time to generate.

Moreover, despite the ability to simplify form•Z's interface to suit their own needs, users may find some operations frustrating. The process of editing spline surface objects, for example, is more difficult than the process used by other programs, although the ability to define the exact number of polygons in a surface somewhat makes up for this shortcoming. However, surface editing is not intuitive. form•Z takes a modal approach, and it doesn't let you change your view while you're in surface-editing mode. This can be frustrating if you're trying to tweak a surface into a particular shape — you must leave the editing mode if you want a different view of the surface. One last disappointment: form•Z uses inconvenient hardware-based protection.

form•Z's documentation is excellent. The package includes three manuals — one comprising tutorials, another that describes the program's interface elements, and a third that covers modeling concepts and drafting functions.

The Bottom Line

form•Z's versatility and precision make it an excellent tool for a wide variety of conceptual-design applications, including architectural, mechanical, and spline-based modeling. As a stand-alone modeler, form•Z, with its ability to combine solid and surface modeling, is in a class by itself. However, if you require advanced rendering capabilities, form•Z by itself won't fill the bill — it works best as a modeling complement to a dedicated external rendering program.

Overall, form•Z's strengths outweigh its speed deficiencies and steep learning curve. form•Z combines the features, versatility, and power of two or three similarly priced 3-D programs taken together.

— Allen Manning
SuperATM

By mimicking Type 1 fonts, Adobe's great pretender preserves document formatting.

If you use a variety of fonts and regularly swap files with others who do the same, you know what happens when you open a document designed with fonts you don't have in your system. Not a pretty sight. Instead of the aesthetically pleasing original, you see a page of Geneva or Courier with more incorrect line breaks than a compound-fractured tibia. What happens is that your Mac substitutes a bunch of ugly default fonts when it can't find the originals. To combat this visual disaster, Adobe has enhanced its ATM (Adobe Type Manager) font utility to create SuperATM.

Masquerading as Originals

Like its predecessor, SuperATM is an install-and-forget application governed by a control panel. Also like ATM, it automatically smoothes the appearance of text on-screen, making it easy to read and providing users with control over character spacing. It also greatly improves the appearance of characters printed with non-PostScript printers.

The real beauty of SuperATM, however, is its font-substitution feature. Based on Adobe's multiple-master technology, it enables your Mac to detect when a document requires a font the system doesn't have. The utility then creates and displays a metrically correct substitute font that preserves the original document's line and page breaks. You can view, edit, and print the substitute fonts, which SuperATM creates on the fly. Substitute fonts are cleared from memory at shutdown.

But don't think you can rely on SuperATM to handle all of your font needs. True, the utility's substitute fonts do mimic the originals well enough for editing purposes, but they're no substitute for the real thing when it comes to the design process and final output, so you still need to purchase fonts. SuperATM has lots of benefits. It saves you disk space if you own numerous fonts but don't want to keep them all loaded just so you can view correctly formatted documents. And if you're in the habit of loading fonts on an as-needed basis, SuperATM saves you the tedious trek through the Suitcase or Master-Juggler dialog box to load the proper ones. You can avoid this step until you need to fine-tune the look of the document or make a final printout.

Although SuperATM's font substitution is extremely helpful, it unfortunately works only with font families from Adobe. If you want to view fonts from other companies, such as Bitstream or Monotype, you're at the mercy of ugly default fonts once again.

Additionally, SuperATM's on-the-fly font substitution doesn't yet work with all applications. As we went to press, 21 applications — including QuarkXPress 3.1, Aldus PageMaker, Microsoft Word and Excel, and ClarisWorks — provided support for SuperATM. If your application doesn't support ATM, you can manually create substitute fonts by installing bit-mapped versions of fonts, but we found this workaround somewhat clumsy.

SuperATM is bundled with Adobe Type Reunion 1.1, which conveniently groups fonts into families on pop-up and pull-down menus. Type Reunion helps you keep track of font substitution by placing a black diamond next to the names of any SuperATM-created substitute fonts on the font menu.

The SuperATM package also includes Adobe's Type On Call CD-ROM, which contains the complete Adobe Type Library, with 1,500+ fonts. Bit-mapped versions of all the fonts are on-disc and freely available, but if you want outline versions of the fonts, you must purchase them separately from Adobe.

SuperATM requires at least a Mac SE with 4 megabytes of RAM under System 7 or 2 megabytes of RAM under System 6. You also need at least 4 megabytes of hard-disk space to store the program and to allow for substitute-font storage.

The Bottom Line

ATM was a huge leap forward for graphics professionals and mainstream users alike. SuperATM may not be as revolutionary, but once you've used its font substitution to view correctly formatted documents, you'll wonder how you ever got along without it.

— Shelley Cryan
Ascend
Franklin Quest puts a New Age spin on PIM software.

Ascend is not your usual personal information manager. Created by Franklin Quest, a time-management-training organization, Ascend is billed not only as a personal information manager but also as a system that can help you take control of your life. As advertised, Ascend is indeed in harmony with Franklin Quest’s time-management techniques, although the overall effect of the program’s confusing proliferation of modules is decidedly jarring.

Module Mania

As with most PIMs, Ascend’s focus is on helping you keep track of names, addresses, phone numbers, appointments, and to-do items. The program combines these traditional PIM features with self-motivation aids, linking it to Franklin Quest’s Life Management system of “empowering” software, books, tapes, seminars, and the Franklin Day Planner System. In the end, Ascend comes off more as a philosophy than as a software program.

This in itself is not negative, particularly if you buy into Franklin’s time-management system. However, the key to the success of most PIMs is simplicity, and it’s here that Ascend goes seriously astray. The program provides no fewer than 11 modules to help you manage your time and personal information, including Address and Phone, Appointment Schedule, Daily Task List, and Master Task List.

To begin, Ascend emphasizes the importance of defining personal values and goals, which you then use to create a master plan. So you define a governing value — a principle you strongly believe in — and then you set long-range goals, intermediate goals, and daily tasks, all of which are designed to help reinforce the value for your total well-being. A governing value might be “I am a good provider for my family.” A long-range goal might be “to send my children to college.” You might break this down into intermediate tasks (“put enough money aside”) and daily tasks (“put $5 into the For College jar”) to help you step your way toward the long-term goal.

As you enter daily tasks into the Personal Values and Goals module, they automatically show up in your to-do list. You can set priorities for each to-do item, add descriptive notes to them, categorize them, and set the task code (Completed, In Process, Planned Forward, and so on). A similar module, called the Master Task List, includes to-do items that aren’t connected with specific dates.

Ascend’s Appointment Schedule module is poorly designed. You enter events at the appropriate day-and-time slot and then enter the event duration according to the number of 15-minute time blocks the event occupies. For example, if you have a meeting from 3:00 to 5:15, you must calculate that it requires nine time blocks. Unlike most other calendar programs, Ascend does not allow you to enter beginning and end times for events, nor can you click and drag a time line. Ascend lets you set up recurring events, but it doesn’t provide enough options to make the feature truly useful. As part of its scheduling module, Ascend offers an alarms feature, but because an alarms extension isn’t provided, the program must be running for this feature to work.

Ascend provides a modest Address and Phone module with fields for name, address, company, title, and as many as five phone numbers (automatic dialing is included). A free-form notes field with time and date stamps helps you keep contact logs.

In addition to contact-specific notes, Ascend lets you keep a daily record of business events and a personal daily journal. You can index events in the daily record to create a monthly report. In case your note-taking needs still remain unmet, the Red Tabs module lets you list miscellaneous ideas and notes.

The Turbo File and Favorite Quotes modules round out the program. Both are minidatabases that let you store tidbits of information and motivational quotes, respectively. Each offers keyword indexing and user-customizable categories.

The Bottom Line

Franklin Quest gets an A for effort for attempting to combine a wide variety of information-organizing features into one PIM program. Unfortunately, it doesn’t get high marks for implementation. Ascend’s many modules are not only confusing but they can even be downright intimidating. We can’t recommend Ascend.

— Tom Petaccia
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FASTAT 2.0

Inexperienced statisticians gain few advantages with SYSTAT's less costly sibling.

Billed as "easy-to-use statistics for real world analyses," FASTAT is tailored for business users who have outgrown the statistical-analysis capabilities of their spreadsheet programs. At half the price of its more sophisticated sibling, SYSTAT 5.2, FASTAT 2.0 can save you money if you don't require a full range of statistical procedures.

However, we discovered that despite its scaled-down functionality, FASTAT offers no real ease-of-use advantages to inexperienced statisticians — it turns out to be every bit as difficult to use as SYSTAT.

Family Resemblance

Although FASTAT and SYSTAT have many of the same menu commands and dialog boxes in common, FASTAT doesn't provide the full range of statistical procedures and graph types that SYSTAT does. Still, FASTAT is no lightweight — the program provides a healthy assortment of statistical tools and graph types, including factor analyses, time-series analyses, regression analyses, factorial ANOVA, scatterplot matrices, 3-D spin plots, probability plots, and function plots.

Both FASTAT and SYSTAT have been substantially improved since their initial releases. The first versions of both programs clearly demonstrated that they were derived from a batch-oriented command-line-based ancestor. The only concession to the graphical environment of the Mac was a surrounding shell comprising a few simple menu commands.

With this new version of FASTAT, however, menu commands and dialog boxes have almost completely replaced the command-line interface. FASTAT's data editor uses a familiar spreadsheetlike format. You can move, copy, paste, and edit data sets just as you do in a worksheet. In addition, the company has added a palette of plot tools that lets you enhance graphs.

Exploratory Tools

One of FASTAT 2.0's best new features is its selection of tools for identifying specific points on scatterplot graphs. When you click on a point in a graph, FASTAT highlights the corresponding record in the data editor, which makes it easy to isolate points for further analysis. Similarly, when viewing the results of an analysis, you can Option-click on any variable to bring up a pop-up menu that lists related graphs and statistics for that variable. With the addition of this feature, FASTAT becomes more versatile — it can serve not only as a traditional hypothesis-testing tool but also as an exploratory-analysis tool.

For those of you who frequently work with data comprising many variables, FASTAT's Define Bundles command is another plus. By letting you define any variable subset as a bundle, it eliminates the need to scroll through all variable names to find the ones you want. When you select the bundle, only its variables appear in the variable-selection list. You can define as many as five bundles and shift among them by clicking on the bundle icon.

Despite these improvements, FASTAT is still cumbersome. For example, sorting and recoding variables often require you to save the converted data to a separate file. To make matters worse, you can't have more than one file open at a time.

No Hot Links

When FASTAT completes an analysis, it places the results in a window. But the window is not hot-linked to the data editor, so you must run a new analysis each time you make a change in the data set. This makes it difficult to compare the effects of adding or deleting data elements. Similarly, to make even a minor modification to a graph (such as adding a best-fitting regression line to a scatterplot), you must recreate the entire analysis from scratch.

Equally irritating, the results of ANOVA analyses completely disappeared when we requested related supplementary analyses. This forced us to redo the initial ANOVA analysis each time we wanted to try an additional supplementary analysis.

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The latest version of FASTAT supports exploratory data analysis. When you Option-click on any variable in the FASTAT Analysis window, FASTAT presents a pop-up menu with additional options.

that’s just too bad — FASTAT’s Undo command is rarely active when you need it most. FASTAT does provide extensive context-sensitive on-line help, however, including a general Help window; an Information window, which provides in-context definitions of terms; a Balloon Help-like feature that explains each menu command; and mini help messages in every dialog box.

Unfortunately, FASTAT’s manual is not as impressive as the on-line help. For those who are already familiar with statistical procedures, the manual is adequate. But for those users who require a tutorial to help them learn unfamiliar procedures, it falls far short. Here’s an example: Although the manual instructs you to select the MGLH (multivariate general linear hypothesis) option to access FASTAT’s regression and ANOVA commands, it never explains MGLH. Ironically, the SYSTAT manual devotes an entire chapter to the meaning of this term.

Also, if you want to add a legend to a graph, you must first select the Symbol dialog box and assign separate symbols to each variable. The manual makes no mention of this requirement. Furthermore, the Symbol dialog box requires you to enter numbers that correspond to the symbols — you can’t simply click on the symbols themselves.

Another weakness is in the area of graphing. Although the FASTAT package promotes the program’s “presentation-quality graphics,” we found the quality not to be on a par with that of other statistical packages in FASTAT’s price range.

In order to get data into FASTAT, you can either enter it directly into a data-editor worksheet, import it as a text file, or import it from Excel.

The Bottom Line

The latest release of FASTAT is a big improvement over the previous version. Its interface is significantly enhanced, although there’s still more work to be done before FASTAT fully exploits the Mac’s graphical abilities. Improvements aside, FASTAT remains difficult to use. FASTAT 2.0 provides basic statistical procedures and graphing options and several more-advanced techniques at half the price of its more powerful sibling, SYSTAT. Still, in our view, it would be a better strategy for the company to offer a single midrange program, such as FASTAT, and make more-advanced features available as separate, optional plug-in modules. As it is now, FASTAT users who need more-advanced features must lay out an additional $400 to upgrade to SYSTAT, which duplicates many of the features they already have in FASTAT.

Compared with other midrange statistical programs for the Mac, FASTAT has an interface that puts it at a significant disadvantage. StatView, for example, has a well-designed interface and statistical power that’s comparable to FASTAT’s. And Data Desk and JMP are better choices than FASTAT if your main requirement is exploratory data analysis.

If your statistical demands are relatively light, a spreadsheet program may be all you need. Excel 4.0, in particular, has beefed up its statistical-analysis power by providing ANOVA and regression tools. By and large, spreadsheet programs offer more-flexible data entry features and more-attractive graphs than statistics programs do.

SYSTAT, however, remains the first choice for those who need the most complete range of sophisticated statistical-analysis procedures and graph types.

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Apple StyleWriter II

Boasting gray-scale output and improved speed, the Apple StyleWriter II jockeys for position with the HP DeskWriter.

Comparing Apple’s new StyleWriter with its predecessor is a no-brainer — faster, cheaper, and better sum it up. But how well does the StyleWriter II stack up against its real competition — the similarly priced HP DeskWriter? Our tests show that the StyleWriter II has no trouble besting the DeskWriter in text-output quality, but that it falls far behind the HP printer when it comes to printing speed and gray-scale-output quality.

Printing with Style

The $359 StyleWriter II is a 360-dpi thermal inkjet printer that connects directly to the Mac’s printer port. Its compact design is similar to the original StyleWriter’s, although its speed, ability to print graphics, and paper handling are much improved. At 2 pages per minute, it’s no speed demon, but it’s about twice as fast as its predecessor and handles about 100 sheets of standard paper and as many as 15 envelopes, double the original printer’s capacity.

The slim, trim printer measures about 13 inches long, 11 inches wide with the paper catcher extended, and 7 inches high (not counting the paper tray’s 10-inch tongue). Its improved design makes it slightly bigger than its predecessor, but it offers the advantage of coming in one piece with an internal power supply. The original StyleWriter used an inconvenient power brick and came in two large pieces that snapped together. In addition, the StyleWriter II’s print head is positioned closer to the paper, so it produces more accurate dot placement.

The most significant new StyleWriter II enhancement, however, is its GrayShare software. GrayShare adds two important functions: It allows the device to print true-gray-scale images (the old StyleWriter could produce only crude black-and-white graphics, because of the inadequacies of the original printer driver), and it lets users share a StyleWriter II on a LocalTalk network. The StyleWriter II doesn’t connect directly to the network — it’s shared through a host Mac. Users on the network select the printer from the Chooser, and the GrayShare software sends the print job to the host Mac.

To connect the StyleWriter II to your Mac, you need System 6.0.7 or later and a hard drive. An installer program installs the printer software and several TrueType fonts, making setup relatively painless. If you plan to share the printer with other Macs on a LocalTalk network, each networked Mac, in addition to the host Mac, must have the StyleWriter II software installed. Apple’s license lets you install the printer driver on as many Macs as you want, but you can’t install the TrueType fonts that come with the StyleWriter II on more than one Mac. StyleWriter II ink cartridges list for $19 apiece and should be adequate for approximately 500 pages. They contain water-based ink, so you have to protect printed output from moisture to prevent ink bleed.

We performed several tests to see how the StyleWriter II’s print performance and quality compared with the DeskWriter’s. We first tested the printers with a direct connection to a host Mac IIci with 8 megabytes of RAM, running System 7.0.1. Then we tested the StyleWriter II’s GrayShare printer-sharing abilities by networking a Mac Classic II with 5 megabytes of RAM to the Mac IIci host with LocalTalk (the DeskWriter was left out of this test, because it doesn’t support printer sharing). Our test files were a ten-page Word document and a gray-scale TIFF image. We printed the two files, using the highest-quality settings on both printers.

When directly connected to the host Mac, the two printers processed the ten-page text file in roughly the same time: 5 minutes, 32 seconds for the StyleWriter II, compared with 5 minutes, 50 seconds for the DeskWriter. The StyleWriter II printed the same file in 6 minutes, 19 seconds as a shared printer on the network. As for print quality, the StyleWriter II was the hands-down text-output winner — the characters were crisp and clean, whereas the output from the DeskWriter was somewhat muddy by comparison.

The tables were turned, however, for gray-scale-image quality. Here, the DeskWriter came out on top. Although the StyleWriter II’s GrayShare technology had no trouble improving on the original StyleWriter’s output, it couldn’t...
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Compared with output from the HP DeskWriter (top right and bottom right), StyleWriter II text output (top left) is better but the quality of the Apple printer’s gray-scale images (bottom left) can’t match the DeskWriter’s.

match the DeskWriter’s gray-scale output, which was consistently cleaner and more detailed than the StyleWriter’s. The DeskWriter’s speed for printing grayscale images was much faster than the StyleWriter II’s — the DeskWriter took 7 minutes, 17 seconds to print the same image that took 13 minutes, 17 seconds with the StyleWriter II.

When we shared the StyleWriter II over the network, the gray-scale image took 38 minutes, 27 seconds to print. The impact on the host Mac’s performance was noticeably disruptive. We often had to wait 10 to 20 seconds for menus to pull down or for keyboard input to catch up with our keystrokes. Overall, given the StyleWriter II’s poor showing in our graphics-file speed tests, we found that sharing a StyleWriter II over a network can seriously hamper your productivity.

Printing text files to the StyleWriter II over the network had relatively little effect on the host Mac. You may encounter a second or two of delay in your keystrokes as each new page of a print job starts, but we found the effect much less noticeable than printing in the background to a laser printer.

If you purchased an original StyleWriter, you’ll be pleased to know that you can use the improved StyleWriter II software to enhance your printer’s output. Contact your Apple dealer for details.

The Bottom Line
The StyleWriter II is a vast improvement over its predecessor. The most notable advancement is the printer’s new software, which allows the StyleWriter II to produce true-gray-scale images as well as to be shared on a network. When judged against its chief rival in the low-end-printer race — the HP DeskWriter — the StyleWriter II is a good choice if you want to print text only but don’t stack up well for gray-scale printing. And although it’s true that at a list price of $359, the StyleWriter II is less expensive than the $599 DeskWriter, when you consider the heavily discounted street price of the HP printer, the StyleWriter loses much of its price advantage. Apple has taken the next logical step with its lowest-cost printer, but we feel that it lags several steps behind the competition for gray-scale printing.

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DiskDoubler and StuffIt Deluxe

StuffIt Deluxe bests DiskDoubler as the most versatile file-compression utility around.

The data-compression world is in a constant state of flux, and it's sometimes hard to tell the players without a scorecard. Two veterans have recently reentered the fray, boasting new features aimed at making them more competitive. Fifth Generation's DiskDoubler and Aladdin's StuffIt Deluxe both specialize in manual file compression, but with its myriad of options and features, StuffIt Deluxe easily outdistance DiskDoubler.

**DiskDoubler**
The $79.95 DiskDoubler utility installs as a system extension and adds a menu of compression commands to the Finder. Other items installed are the DiskDoubler application (for use when the extension is turned off), a utility for repairing corrupted files, and an expand-only freeware application you can distribute to others so they can expand the compressed files you give them.

DiskDoubler's main features haven't changed much over the years. To compress a file, you simply select it and click on the DD menu's Compress command. The compressed file quickly appears in place of the original. The Expand command (you guessed it) decompresses a file. When you select a folder, DiskDoubler can either compress or decompress all the enclosed files. The program's Combine command lets you combine multiple files and folders into a single compressed archive, just as you would with StuffIt. However, unlike StuffIt, DiskDoubler doesn't let you select specific files and folders in an archive for decompression. You can decompress only whole archives — a real disadvantage.

New additions to the DD menu include commands that let you compress and expand files, as well as copy already-compressed files, to a specific location on your disk. The Create SEA command compresses a file as an application, which means that the file doesn't rely on the presence of DiskDoubler. The file self-decompresses when you double-click on it. Once decompressed, a file appears in its application's standard Open and Save dialog boxes. DiskDoubler can optionally recompress a file automatically when you close the document.

DiskDoubler's compression methods are compatible with those of Fifth Generation's AutoDoubler, a background compression utility that compresses files automatically.

**StuffIt Deluxe**
With the latest version of the StuffIt Deluxe utility, Aladdin has added two control panels — SpaceSaver and Magic Menu — to its $120 package. SpaceSaver provides optional automatic background compression, and Magic Menu installs a menu of compression commands in the Finder.

SpaceSaver can respond to keywords that you specify and add to filenames. When you add a keyword to a filename, SpaceSaver knows to compress the file. When you delete the keyword, SpaceSaver knows to decompress the file. If you're running System 7, you can set SpaceSaver to automatically compress all the files that have a specific Finder label.

StuffIt Deluxe is an archiving utility, which means that it can combine two or more files into a single file for compression. StuffIt lets you view the contents of an archive in a window and displays as many as eight archive windows simultaneously, so you can drag files and folders among windows to move or copy them. In addition, StuffIt optionally encrypts and password-protects archives. It also supports a wide variety of file-compression formats, including several DOS and UNIX formats.

Compared with SpaceSaver's automatic compression method, StuffIt's conventional method squeezes files much tighter. But the trade-off is that smaller files require more compression time. StuffIt's Magic Menu provides two commands for maximum compression — Stuff and Make Self-Extracting. To make a self-extracting file, StuffIt adds about 21K to the file size.

StuffIt Deluxe also provides a custom scripting language for automating repetitive archiving procedures, and it comes with QuicKeys extensions to let you...
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**OTHER DRIVES**

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<td>1.44 meg Floppy Drive</td>
<td>$298</td>
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<tr>
<td>PLI Infinity 128 Meg Optical Drive w/Cartridge</td>
<td>$1,799</td>
</tr>
<tr>
<td>NEC CD Express</td>
<td>$499</td>
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<tr>
<td>NEC CDR-74</td>
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**MacLand 21MB Floptical Drive**

Our Price **$399**

Bundled w/5-Pak Cartridges **$499**

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**FWB HARD DRIVES**

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<th>Model</th>
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<td>Sledgehammer</td>
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**MacLand Transportable 150MB H.D.**

Our Price **$799**

Includes Cables, s/w, one 150MB Cart.

MacLand's JULY BEST BUYS!

**MONOCHROME MONITORS**

Orion Complete Page Display **$499**

Lapis 1" Portrait **$499**

Orion Dual Page Display **$699**

Lapis 19" Two Page Display **$599**

Dual/Two Page Video Interface

Monochrome **$249**

Gray Scale **$549**

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**MACLAND - 640 X 480**

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**MACLAND 17 (31 dot pitch)**

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**MACLAND 17E (28 dot pitch)**

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**MACLAND 20T (Trinitron)**

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**MACLAND 20T (Trinitron)**

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Our best selling monitor now on sale

Orion MacScan Ultra

Was $499 Now! **$399**
All Syquest Drives Are Not The Same!
Our Service Is The Difference!

SyQuest
2 Year Warranty

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$499

88c Removable Drive with 86MB Cartridge
$589

MacLand has been a business partner with Syquest longer than most of our competition has been in business, period. Beginning in mid-1990 we began carrying our own MacLand/SyQuest Removable drive, and we have been providing our top-quality products with our industry leading service ever since.

Whichever MacLand/SyQuest drive you choose, you can rest assured that you are getting the best value on the market. Because only MacLand offers you the FWB Personal ToolKit, a $79 retail value, free of charge with your drive, along with a full 2 year warranty on parts and labor.

In addition, you receive the comfort in knowing that your warranty is good, since MacLand is a financially sound public corporation with a proven track record of growth and success.

We use only the best components in our production process, in order to deliver to you the best, most reliable drive possible. MacLand has sold and supported over 15,000 removable drives and over 200,000 SyQuest cartridges since 1990, and has set the industry standard on customer service and technical support.

So if you are in need of removable storage, your search is over. The MacLand/SyQuest removable drive line. One step above the rest.
Step 1: Load Now Up-to-Date 2.0, the software that lets you schedule events, set reminders, manage To Do lists, print calendars and keep your associates informed, allowing you to become disgustingly organized.

Step 2: Notice how incredibly easy Now Up-to-Date is to use. Totally customizable. 100% non-fascist. Just click on a date, enter your info, bang, you’re done.

Step 3: Think to yourself, “Wow, calendar software that’s actually faster and easier than the old pen and appointment book approach. Amazing.”

Step 4: If you are on a network, share events from your calendar with the other folks on your network. In return, they’ll no doubt share meeting dates and whatnot with you. Not on a network? No sweat, Now Up-to-Date still works fine all by itself.


Step 6: Pick up Now Up-to-Date 2.0. Or, for more info, call us at 1-800-237-3611.

Step 7: Quit goofing around reading software ads and get back to work. You’ve got a lot of stuff to do.
stuff or unstuff files by using a single keystroke.

StuffIt Deluxe is System 7-savvy, which means that other applications can control StuffIt functions with Apple events. One other especially useful aspect of using StuffIt under System 7 is that you can stuff and unstuff files simply by dragging and dropping their icons into the StuffIt Drop Box, in the Finder.

One caveat—you pay a price in complexity and disk space for StuffIt's rich feature set. The StuffIt folder is 1 megabyte in size and contains six folders of support files in addition to the application itself. The StuffIt Engine, the StuffIt Deluxe Extension, the SpaceSaver and Magic Menu control panels, and the Aladdin folders occupy another megabyte in your System Folder. That means you won't achieve any net increase in disk space until you have reclaimed more than 2 megabytes of space through compression. By comparison, all of DiskDoubler's files occupy only 466K.

The Bottom Line

With the addition of the SpaceSaver background-compression control panel, StuffIt Deluxe 3.0.4 provides the most versatile and full-featured compression software you can find. For $120, you get both manual and automatic background compression plus password protection, archive encryption, file translators, a scripting language, Apple-events support, QuicKeys extensions, and support for drag-and-drop compression.

The $79.95 DiskDoubler, on the other hand, is simpler to use than StuffIt, because it provides fewer options. And it can save you a few dollars (and some disk space) over StuffIt if you're sure you'll never need more than straight manual compression.

—Darryl Lewis

If You Don't Have Time For This:

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Items remaining to be copied: 2,462

Writing: Today's workload

Stop

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For more information: 800-366-4622

COPYright can save you hours by enabling you to copy in the background while you work—even over AppleTalk Remote Access. With COPYright Pro you can backup your files while you sleep! Save Time. Save Money. Buy COPYright for complete Macintosh copy management!
With Adobe Photoshop Version 2.5, visual travellers can fly from point A to point B in record time. Now, the world’s leading photo design and production tool is even faster, easier to use and more productive.

We’ve streamlined the interface and optimized the architecture to speed up many complex functions. Still feel the need for speed? You can even add 3rd-party accelerator cards to turbocharge many features. Enhanced tools include more responsive brushes and pens, dodge and burn capabilities and an extraordinary set of special-effect filters.

For production, a precise Quick Mask tool makes image selection easier.

Another remarkable tool called Variations previews color and brightness simultaneously. New Adobe Photoshop software has arrived; and now whether you’re an Adobe Photoshop expert on the Left Bank or a novice in Nevada, voilà! You’ll get where you’re going fast. Call 1-800-833-6687, Dept.G, Ext. 1125 for information and your nearest Adobe™ Authorized Reseller.

If you can dream it, you can do it.
OUR MISSION WAS CLEAR. REDUCE THE SIZE. ENLARGE THE MEMORY.

For the graphic artist, multimedia producer or the busy document image manager, storing large files has always been an enormous problem.

Introducing a very small solution. The new Fujitsu DynaMO: It's the highest performance, external, plug-and-play optical drive for PCs and Macs. The first thing you'll notice is its low profile. (It's just 1.5" x 5.0" x 8.0") The next thing you'll notice is its mammoth memory. Each re-writable cartridge saves up to 128 megabytes. (Roughly the equivalent of 88 3.5-inch double-density disks.) And because they’re removable, and each data cartridge has a life of 30 years, you have virtually unlimited capacity for all of your storage needs.

Get more information on the Fujitsu DynaMO. Call 1-800-831-4094. Or, to receive the facts by fax, just dial 1-408-428-0456 from your fax machine and request document 1367.

You'll be surprised at how easy it is to store megatons of memory in the smallest model ever.

FUJITSU

COMPUTERS, COMMUNICATIONS, MICROELECTRONICS

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CIRCLE 135 ON READER SERVICE CARD.
**QUICK CLICKS**

**The Madness of Roland**

If you think hypermedia is all hype and no substance, you haven’t experienced The Madness of Roland, a CD-ROM billed as “the world’s first interactive multimedia novel.” The Madness of Roland is a tale of passion, adventure, and intrigue presented in a sort of on-screen illuminated manuscript (in color or black-and-white) with hypertext and multimedia elements. Based on medieval legend, it tells the story of Roland, a knight in the service of the Emperor Charlemagne.

Each chapter opening presents you with a set of tarotlike icons that represent the available points of view, including those of Roland; Charlemagne; the enchantress Angelica; Roland’s magic sword Durendal; and Beji, a spy for Charlemagne’s Saracen enemies, who are fighting to regain possession of Durendal. Clicking on an icon opens the sequence of pages that correspond to the viewpoint you’ve chosen and begins the optional sound track, in which music plays and actors read the characters’ parts. Each page is edged with icons that link you to an assortment of treasures: other characters’ points of view; the sun layer, which has relevant quotations (for which sources range from Jung to a medieval cookbook to How to Make Love to a Woman); the moon layer, with poetic animated sequences; and tools such as bookmarks, the Find function, and a map.

The Madness of Roland uses layering and multimedia not for their own sake but to create a complex, adult work of fiction. The main characters’ distinct points of view provide sometimes-contradictory accounts, so the order in which you view them can be meaningful — for example, Roland’s initial triumph over the Saracens may seem more heroic if you haven’t yet heard Charlemagne disputing Roland’s account of the location and characterizing him as “not very bright.” When you reach Roland’s descent into madness, you may revisit the different points of view to try to unravel what happened or you may just shiver at the QuickTime sequence that plunges you into the dark forest of Roland’s unhinging.

Our encounter with the program was not without glitches. We had to turn off some extensions to get it to load, and some of the boldface words we clicked on in the text popped up blank messages instead of the clever asides and explanations we found elsewhere.

Nonetheless, such annoyances were greatly outweighed by our pleasure in exploring this multidimensional, ground-breaking work.

Hypertole Studios, 1412 W. Alabama, Houston, TX 77006; 713-529-9696. Version Book 1. $59.95.

— Karen J. Ohlson

**Safe & Sound**

Imagine being able to hand your misbehaving disk drive to an expert and say, “I don’t know if there’s anything wrong with this, but if there is, just fix it — I don’t want the gory details.” Well, now there is such an expert: Safe & Sound, from Central Point Software.

Pop in the Safe & Sound disk, and start your Mac 5 to 15 minutes later (depending on the disk’s size), your disk will have a clean bill of health. You won’t get any esoteric dialog boxes identifying a problem and asking if you’d like it fixed. Instead, you’ll get a dialog box telling you that Safe & Sound encountered some problems and took care of them.

Safe & Sound looks for the 100 most common disk problems. It scans your disk for bad blocks and looks for viruses and multiple System Folders. It checks files for bad dates and incorrectly set bundle bits (which can make files lose their icons). And it makes an Undo file of all the problems and fixes so you can return the disk to its previous, problematic state.

Although Safe & Sound is meant to work without troubling you with decisions, you can turn on any of its optional on or off, choosing whether the program should scan for viruses or report on file fragmentation, for instance.

Safe & Sound works flawlessly, but its documentation is a little too light for a product meant for rank beginners. The documentation never mentions, for instance, that you should run the program as preventive medicine and not just use it for problems that are already rearing their ugly heads. Nor does it mention that you can run the program from your hard disk instead of from the slower startup floppy disk. And when you run Safe & Sound from the floppy disk, the program never remembers the options you set — because Safe & Sound can’t write changes to the locked floppy disk.

Still, Safe & Sound is perfect for non-technical users who might shy away from MacTools, Central Point’s highly praised disk-utilities package. In fact, Safe & Sound is the DiskFix portion of MacTools with a friendlier interface. Can’t decide which you should get? Safe & Sound is $50, and you can upgrade to MacTools for about $50; MacTools alone is about $150. You figure it out.

Central Point Software, 15220 N.W. Greenbrier Parkway, Suite 200, Beaverton, OR 97006; 503-690-8090. Version 1.0. $50.

— Sharon Zardetto Aker

**Color It!**

If you want a reasonably priced paint program that also lets you jazz up clip art, scanned-in photos, and other imported images, check out Color It! 2.0.1. Welcome enhancements to the program include some handy new tools; a redesigned tool palette, a plethora of added filters, support for pressure-sensitive tablets, and the ability to colorize gray-scale images. However, set aside plenty of time to learn these new features, because the poorly written tutorial and manual aren’t much help.

The new scissors and zap tools make the program’s much-touted magic-wand tool even more useful. The magic-wand tool, as in earlier versions, lets you easily select image areas that have the same intensity level. But now when the magic wand grabs more than you’d like it to, you can use the scissors tool to mark off unwanted areas and the zap tool to remove those areas from the selection range.

To colorize your gray-scale images, you specify that you want anywhere from 256 to millions of color levels and then use Color It!’s rich assortment of paint tools to apply colors. Customizable settings for opacity, brush size, and anti-aliasing (for rounding out rough edges) are particularly handy. If you don’t like your changes, use the 15 levels of Undo to backtrack.

Forty new image-processing filters and the ability to add custom filters are features that could profit from better explanations in the manual. Fortunately, Color
QUICK CLICKS

It's preview feature helps you figure out through trial and error which filter to use. You'll find filters that enhance edges or gray levels or blur, sharpen, or despeckle. For additional effects, you can use most Photoshop-compatible plug-in filters with Color It! If your final output will be on a television, you can optimize your image quality with the program's NTSC Video Safe filter.

Although Color It! isn't all that easy to use, it provides a lot of value with its many new features — by the time you read this, you'll even be able to get an add-on color-separation utility, called Color It! PrePress, as a $49.95 upgrade. And with Timeworks bundling Color It! with Publish It! Easy, for $199.95 through June 30, it's a great bargain for entry-level and midlevel desktop publishers.

Timeworks, 625 Academy Drive, Northbrook, IL 60062; 800-323-7744 or 708-559-1300. Version 2.0.1, $299.95 for disk or CD (CD contains 400 extra sample image files).
— Shelley Cryan

A-Train

The great unwashed, at first glance, might mistake A-Train for SimCity II. After all, both simulations focus on the successful development of a large city featuring residential, commercial, industrial, and recreational properties. But where SimCity places you in the position of a benevolent urban planner nurturing an unregulated development of the surrounding countryside.

You open A-Train to a bird's-eye view of a landscape with chugging trains hauling in building materials from an offscreen metropolis. Depending on the scenario you've chosen — A-Train includes six, ranging from the pastoral and easy New Town to the difficult Multi-City Connection — your trains wind their way through meadows and mountain ranges or between towering skyscrapers.

To earn enough lucre to win the simulation game, you must first don your engineer's cap and design a viable railway system that delivers building materials and — once you've built things up — people to your burg. Then you become more involved in financial matters: You learn to route and schedule rail traffic, take on bank loans, play the stock market, and buy and sell properties. Although A-Train's manual is up to Maxis' high standards, consulting Nick Dargahi's A-Train: The Official Strategy Guide (Rocklin, CA: Prima Publishing, 1993) will turn you more quickly into the next Leland Stanford, Jr.

A-Train is a complex simulation with some nice touches. Tables and graphs detail the success or failure of your railroad, properties, and investments. Players can watch their town change from day to night and season to season (look for Santa's appearance on December 24!). Unfortunately, you pay for these goodies with a slowdown (even on a Mac with a 40-megahertz accelerator) that suggests
you're riding on the Zzzz-Train. Once A-Train gets up steam, though, you should find enough challenges to entertain you all the livelong day.

Maxis, 2 Theatre Square, Suite 230, Orinda, CA 94563; 800-336-2947 or 510-254-9700. Version 1.0. $69.95; A-Train Construction Set, $34.95.
—Christopher Breen

L-TV

Ever wondered why you can't use a television as the display system for your LC or LC II? Ah, but you can, with the L-TV card, from Lapis Technologies. The question is, Should you bother?

First, a caveat: The L-TV isn't meant to let you replace your monitor with a television: TV resolution isn't good enough to supplant your Mac monitor for everyday jobs. Instead, it's aimed at those who need supplemental video output for demonstration purposes — a teacher in a classroom, for instance, or a presenter who travels to sites where televisions are easier to find than monitors.

The L-TV setup consists of a video card and software drivers. It doesn't include the various cables and connectors you need in order to actually hook up the TV or the RF modulator (which you need if the TV doesn't have a monitor input and you're not running the signal through a VCR). The bare-bones documentation leaves even experienced Mac users with questions, so it's bound to disconcert the less experienced (although you can always call the company's stellar tech-support staff).

Still, ease or difficulty of setup hardly matters with a product like this, where looks are everything. And the looks just aren't good enough, even for a classroom setting and an undemanding audience. Text is blurry on the screen — you need to use at least a bold, 14-point font to make it readable. And despite several software settings for jitter control, text shimmers enough at the best setting to make you rub your eyes after just a few moments.

Viewing graphics is a different story, because fine details aren't so important. But animation — which uses its own jitter-control settings — is a different story. In fact, the L-TV slows the LC's overall operation to the point that when you close a window on the desktop, the standard zoom effect appears as a discrete series of shrinking rectangles.

The L-TV is a nifty idea, without a doubt, and it's the only product that does what it does. But if shimmering text and slow-dancing animation just won't cut it for your demo needs, you and your Mac might want to sit this one out — and perhaps wait for the $499 L-TV Pro (just announced at press time), which includes a mode called Stabilize, which Lapis claims will eliminate flicker entirely.

Lapis Technologies, Inc., 1100 Marina Village Parkway, Suite 100, Alameda, CA 94501; 800-435-2747 or 510-748-1600. $349.
—Sharon Zardetto Aker

HANGS IN THE BALANCE.

Introducing the KODAK COLORSENSE Color Manager. For true color balance across your entire Macintosh Computer System, in one complete and affordable solution.

To get the colors you want out of your color desktop peripherals, you want the KODAK COLORSENSE Color Manager. It's a software tool that balances your color desktop peripherals so they all speak the same color language. It's also a hardware tool that calibrates your monitor for consistent screen display over time.

The result? Balanced, accurate color from start to finish. What you see is what you get. No more guesswork. No more surprises. So now, when you want to present or sell a graphic idea, you'll have the color you want. Instead of a poor excuse. You'll also generate fewer reprints as you work. Saving you time, material, and wear and tear on the printer.

Thanks to an easy-to-use interface, the COLORSENSE Color Manager is a cinch to set up and use. Just select the devices (scanners, Photo CD disc, monitors, printers) and the COLORSENSE Color Manager does the rest.

Call 1 800 242-2424, Ext 56 (in Canada: 1 800 465-6325) today for information on the KODAK COLORSENSE Color Manager. And experience accurate color like never before.

Kodak

COLORSENSE
COLOR MANAGER

Even visionaries need to see reality

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CIRCLE 82 ON READER SERVICE CARD.
Before you buy theirs,

Agfa Arcus—133 line screen, factory default settings.

If you haven’t seen Silverscanner II, you’re buying your scanner blindfolded.

When it comes to color scanning, talk is cheap. Seeing is believing. That’s why we let Silverscanner II’s brilliant imagery speak for itself. In one eye-opening comparison after another, Silverscanner II gives you visibly truer color and finer detail than its nearest competitors. You can’t tell how good a scanner is by looking at images on a monitor, so don’t be fooled.

The scanner makes the image.

Silverscanner II earned Macworld’s 1992 World Class Award for its perfectly balanced color, shadowy detail and crisp curved lines. Now Silverscanner II enhances our award-winning image—with gorgeous color, gray scale and line art right out of the box. Silverscanner II’s independent color controls (RGB) on the gamma/contrast/brightness operate on 9 bits of data before conversion to 8 bits per color. So you get clean, bright scans with excellent detail and tonal range in the highlights and shadow areas.

“La Cie’s Photoshop plug-in is a delight to use.” —Macweek

Heuwelt Packard Scanjet IIc—133 line screen, factory default settings.

The software makes the scanner.

People on deadlines don’t have time to waste. Silverscanner II makes scanning as quick, painless and productive as possible. With features like dynamic color preview (16 sec), magnify in preview, proof in preview, variable scan setting, up to 400% scaling in 1% steps and up to 1600 dpi in 1 dpi steps—all in one pass—it’s easy to get great images fast. And with new advanced features like a densitometer, white and black limit, color histogram and auto image adjustment—all interactive in preview—Silverscanner II is unsurpassed. It’s easy for the beginner—yet still has powerful controls for the advanced user.

Qualified, courteous service & support.

When you add our 30-day-money-back satisfaction guarantee, one-year warranty, unlimited toll-free telephone technical support and the confidence that comes with buying directly from a Quantum company, with Fortune 500 resources, it’s easy to see why so many people choose Silverscanner II.

“La Cie’s Photoshop plug-in is a delight to use.” —Macweek

*Call for details on terms, conditions, limited money-back guarantee and free offers. System 7.0.x software included only with certain configurations. ZIP+Drive do not have switchable termination. Prices do not include shipping and only apply to products shipped within the continental United States. Please contact La Cie for international distribution. Add sales tax where applicable. ZFP, ZFP+, Cirrus, Tuerent, PacketDrive, PowerDock, ExpressDrive, Silverscanner, Silverline, La Cie and the La Cie logo are trademarks of La Cie Ltd., a Quantum Company. PIONEER 800 is a registered trademark of the Tens Inc. Magazine Company. All other trademarks are the property of their respective companies. All prices, specifications, terms, descriptions, products and services herein are subject to change without notice or recourse. © Copyright 1993 La Cie Ltd. 8700 SW Tukwila Place, Beaverton, OR 97005. Phone: (503) 520-9000. Fax: (503) 520-9100. All rights reserved. Printed in U.S.A.
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CIRCLE 48 ON READER SERVICE CARD.
admit it: You probably thought the folks who bought those high-capacity, high-performance hard-disk drives — you know, the drives measured in gigabytes — had money to burn. They wanted big, fast storage, so they went out and bought it, no matter what the price. Meanwhile, you’ve gotten by with a 100- or 200-megabyte hard drive, because that’s what you could afford.
1- and 2-Gigabyte Hard Drives

Who Are You?

Hard drives are a lot like underwear—one size or style does not fit all. What you do with your Mac can make a big difference in what storage device you should consider.

QuickTime Users

QuickTime applications create enormous files. They write and read those files in large, contiguous transactions. So if you're creating and editing QuickTime files, you'll need a drive that not only can store huge amounts of data but can also support high sustained data-transfer rates. Drives that spin their disks fast and disk arrays usually offer the highest sustained data-transfer rates.

Word-Processor and Spreadsheet Users

If you spend most of your time working in word-processing and spreadsheet applications, your files are smaller than those of graphics users and your applications don't spend much time accessing your disk. For instance, a single page of double-spaced, unformatted text in Microsoft Word takes up about 6K. So you can fit 262,144 pages of text on a 1-gigabyte disk. A slower, less expensive 1-gigabyte drive might make a lot more sense for you than a higher-priced, higher-speed, higher-capacity drive.

Photoshop Users

If you're a heavy graphics user, you know that you tend to create large files and that the speed of your hard drive has a great impact on how much work you can accomplish in a day. Graphics applications can reap some speed improvements with a disk array, but for the money, a single drive with a large and efficient cache will give you a bigger bang.

— Mark Frost

Well, take another look at your budget. These days, gigabyte-hard-drive prices are dropping well below $2,000, and the drives can fit inside almost any Mac. Consider System 7's 32-bit-addressing capabilities, the Finder's improved filing capabilities, AppleShare 4.0, and faster Macs with improved SCSI implementations (particularly the Quadra family), and all of a sudden a gigabyte drive makes sense. But which one makes the most sense for you?

The 37 drives we evaluated for this report range in capacity from 800 megabytes to 2.6 gigabytes (or 2,500 megabytes) and range from $1,449 for the Cirrus 1-megabyte to a street price of $8,655 for the Storage Dimensions 2-gigabyte (see Table 1). Four of the products we tested— the FWB SledgeHammer 2000FMF, the PLI MiniArray 2 GB and MiniArray 404, and the Storage Dimensions SAZ-2610F2—are disk arrays, sometimes referred to as RAID (redundant array of inexpensive disks) devices. In an array, the data stream from your Mac is split by your SCSI processor across two or more drives. Because an array takes advantage of the sustained-throughput characteristics of each of its component drives, the speed increase is theoretically cumulative, with two drives offering twice the speed of a single drive, and so on.

In practice, the real speed impediment to a high-performance drive is the Mac to which it's attached. Speed can be limited either by the processing power of the Mac's CPU, the Mac's SCSI processor, or both. If you plan to hook one of these drives up to a Mac SE, for example, don't expect it to run much faster than your old 40-megabyte Quantum drive, because the SE's SCSI controller isn't terribly quick.

But there's more to the story than speed. We looked at everything these drives had to offer, from the quality of their accompanying documentation and software to the sturdiness of their accompanying documentation and software to the sturdiness of...
or fits more data onto each track. Because 5.25-inch disks have a larger circumference than 3.5-inch disks, their outer tracks hold more data. The 2-gigabyte drives, which were all based on 5.25-inch mechanisms, did well on this test, but the disk arrays did the best. The arrays in this report, especially the Storage Dimensions array, seemed optimized for high-sustained-throughput applications, because they split the data stream from your Mac across two or more drives. Remember, try to match your drive to your application — if your QuickTime digitizer can handle only as much as 5 megabytes of video data per second, there's no use buying a 10-megabyte-per-second array — it won't make your movies any smoother.

**Finder Findings:**

If you spend most of your time in the Finder or a word-processing or spreadsheet application, sustained throughput isn't that important. These applications move data in little chunks, so what really helps is a large, efficient caching system. The drives that are based on the 3.5-inch mechanisms really smoked in this test. Why? Because these drives are generally newer and they have more sophisticated caching schemes that are better suited to small-chunk transactions. Notice that the $1,449 La Cie Cirrus 1000Q beat the $8,000+ Storage Dimensions SAZ-2610F2 disk array in our Finder duplicate test by almost 60 seconds.

**Photo(shop) Finish:**

In general, Photoshop moves data in small chunks. It differs from the Finder in that it uses your disk as a scratch area if you can't fit both the image you're displaying and its Undo copy into RAM. Compared with those of our other tests, the results in our Photoshop rotate test varied the least. But for the money, an array might not be the best choice. Notice that the $1,699 APS Micropolis 1.2 GB drive was only about 20 seconds slower than the fastest PLI array, which costs $5,785. Some might say that power Photoshop users don't care about price — they just want the fastest thing out there. If that's true, they ought to buy bucketfuls of RAM.
1- and 2-Gigabyte Hard Drives

Buying a drive doesn’t have to mean killing a tree.

Their construction. We evaluated the entire purchasing experience of unpacking, setting up, and using each drive on our test-unit Quadra 950, and we rounded out the process by challenging each vendor’s technical-support staff. The overall quality was surprisingly good, but we did find some products to avoid.

On Time and In One Piece

The biggest, fastest hard drive won’t do you much good if it arrives in pieces. And it won’t do our planet much good if we clog our landfills with excessive packaging. So we carefully examined how well each manufacturer’s packaging protected the drive and how many resources it sacrificed in the process.

We’ve seen a trend toward smaller, more efficient packaging systems, and we like it. A surprisingly high number of the products tested — 19 of 37 — got top ratings for efficient packaging strategies. Only the PLI MiniArray 040 got a thumbs-down for wasteful packaging.

Your Papers, Please

After taking stock of what comes in the box, most of us are eager to get set up. But unless you’re an experienced user, you shouldn’t jump into the setup process without first reading the instructions. In some cases, we didn’t find much to read.

The Storage Dimensions MAC B-1000F and MAC 1-2030F-1 drives arrived with outdated documentation that did not address SCSI-2 or the installation of the SCSI card included with the drives. Storage Dimensions told us that it is no longer using standard manuals for these particular reports, with the exception of the Storage Dimensions SAZ-261OF2. The Barracudas accomplish this by spinning their disks at a rate of 7,200 rpm — faster than any other drive mechanism now available for desktop computers. Barracudas are currently available with Fast SCSI-2 cards. But soon they will include Fast-and-Wide SCSI-2 cards, which the company expects will enable drives based on them to reach even higher sustained data-transfer rates.

IBM and Seagate are the first companies to offer 2-gigabyte, 3.5-inch mechanisms. And both mechanisms should be suited for QuickTime users, because QuickTime recording and playback stress a drive’s sustained data-transfer rate.

Seagate’s new Barracuda mechanism, in 1.4- and 2-gigabyte capacities, offers sustained data-transfer rates better than those of any of the arrays tested in this report, with the exception of the Storage Dimensions SAZ-261OF2. The Barracuda accomplish this by spinning their disks at a rate of 7,200 rpm — faster than any other drive mechanism now available for desktop computers. Barracudas are currently available with Fast SCSI-2 cards. But soon they will include Fast-and-Wide SCSI-2 cards, which the company expects will enable drives based on them to reach even higher sustained data-transfer rates.

IBM has introduced a 2-gigabyte, 3.5-inch mechanism that looks equally awesome. Although we didn’t get to test this mechanism’s performance, the specs promise a lot. Instead of spinning the disks faster to increase sustained throughput, IBM has increased bit density — the amount of data you can store on each track. To put it simply, there are only two ways you can increase data-transfer speed: increase the rotational speed — as does Seagate — or increase the number of blocks per track and spin at the same rate — as does IBM. By keeping the rotational speed down, IBM claims, its mechanism uses less power and runs cooler and more quietly than the faster-spinning Barracuda mechanisms. We weren’t able to check out IBM’s assertions, but the Barracuda we examined was indeed loud and could probably cook burritos in your Quadra if you left the front panel open.

— Mark Frost

With a full megabyte of cache RAM and a rotational speed of 7,200 rpm, Seagate’s 2-gigabyte Barracuda is most likely the fastest high-capacity hard-drive mechanism available to Mac users. But be forewarned: Our tests showed it to be optimized for applications where high sustained data-transfer rates are critical, such as with QuickTime, rather than for small block transfers.
drives, opting instead for documentation based on index cards. We never got to see the card-based instructions, despite two follow-up requests.

In contrast, the Storage Dimensions SAZ-261OF2 array comes with a 109-page user’s guide.

The two Liberty drives — the 870 MB-T and the 1.2 GB-Q — each came with a single sheet of paper, which passed for the user’s guide. The sheet contained all the important information about such things as setting SCSI ID, connecting the drive to the CPU, formatting the disk, and even connecting to a PC-compatible. However, each topic was covered so briefly that the information would be useless to novice users, and there were no illustrations. Worse was Loviel, which provided no documentation specific to its hardware. Enclosed with the Loviel drive was a software manual that consisted of 32 loose photocopied sheets. This document provided limited hardware information for internal drive mechanisms but no mention of the Loviel 1225 MB external drive.

Setting Up for the Gig(s)

After you’ve learned everything you can from the manual, it’s time to set up. In some cases, this means installing an internal drive or SCSI card in your Mac. This is where many users get hung up on SCSI problems, including termination, ID-number assignment, and even defective cables. During the setup phase, we always make careful notes about any problems we have getting the hardware or software to work properly. We suggest that you do the same, because it will help you and the vendor’s tech-support staff solve any problems more quickly.

The PLI 2.1 GB Turbo arrived without the Turboware utility mentioned on the packing list. And when we tried to format the PLI MiniArray 040 internal array, the formatter recognized only 1 gigabyte of the 2-gigabyte drive, even though this glitch didn’t occur when we set up

---

**Data Plumbing**

A large, fast data-storage device is a wonderful thing to have. But if the pipe it uses to send and receive data leaks, the wonder fades quickly indeed.

We predicted that drives costing more than $1,000 would include a high-quality SCSI cable. Unfortunately, we found several drives that included cables that would have been more at home on a bargain-basement 40-megabyte drive.

---

**High-Quality Cable**

This is the sort of cable you ought to get with any drive, but especially if you’re buying a high-capacity, high-speed drive:

- The individual wires are of a heavy gauge and are individually insulated.
- Data wires are paired and twisted together with their corresponding ground wires to prevent signals from bleeding onto adjacent data wires.
- The wires are then wrapped in insulating foil to reduce external interference and line impedance.
- The paired, twisted, and wrapped wires are then enclosed in a wire braid to prevent kinking and reduce interference. In good cables, this braid is soldered to the outer metal housing of each connector for grounding.
- Finally, all of this is covered by a plastic sheath.

---

**Bargain-Basement Cable**

This is the kind of cable you do not want to see bundled with your new high-capacity hard drive. The individual wires are of a very thin gauge, and signal lines are not paired with their ground wires.

In contrast to those of a better cable, the wires in these lower-quality cables are protected only by foil wrap and a plastic sheath.

— Mark Frost
the PLI MiniArray 2 GB external array. It took a few software updates and some time on the phone with PLI before we finally learned the magic key sequence and password required to get the software to offer special formatting for the MiniArray(s). PLI's explanation was that the company wanted the array options hidden from the majority of its customers, who purchase single-drive mechanisms. We think the PLI arrays would be a better deal if they came with special documentation and more-straightforward software.

We experienced installation problems with the PLI MiniArray 040 internal assembly even prior to the formatting glitch, however. Instructions for installation were simple, easy to follow, and well illustrated, although the print was small. But we had to do some careful manipulation (and even a little bending) in order to fit the drives into the PLI mounting brackets. And when we finally got the drives to fit, the screw holes on the brackets were not well aligned with the Quadra's mounting-tray holes — even though the assembly was designed for the Quadra.

In contrast, setting up the PLI MiniArray 2 GB consisted of simply installing the PLI Quick SCSI card and then attaching the array to the card with a supplied cable. Each of the three Storage Dimensions drives also included a Fast SCSI-2 host card. These cards plug in to the Quadra's PDS (processor-direct slot) rather than a NuBus slot. Unfortunately,
Packaging, Documentation, and Service

You shouldn’t have to go through installing your drive blind and alone. When you open your new drive’s box, you ought to find a packing list that tells you what you get for your money and a number to call if it isn’t all there. Furthermore, easy-to-follow instructions are essential. We looked at the things that make installation a pleasure instead of a pain, allowing a total of 32 points for packaging, documentation, and service. Here are some of our major considerations:

<table>
<thead>
<tr>
<th>Product</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Dimensions SAZ-2610F2</td>
<td>27</td>
</tr>
<tr>
<td>FWB SledgeHammer 2000FMF</td>
<td>26</td>
</tr>
<tr>
<td>APS Micropolis 1.2 GB</td>
<td>25</td>
</tr>
<tr>
<td>GCC UltraDrive 2000X</td>
<td>25</td>
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<tr>
<td>FWB Hammer 2000FMF</td>
<td>24</td>
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<td>FWB Hammer 1000FMF</td>
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<td>La Cie Cirrus 10000</td>
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<tr>
<td>Saturae Edge 1000r</td>
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<tr>
<td>GCC UltraDrive 1000S</td>
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<tr>
<td>Saturae Proline 1910Hz</td>
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<tr>
<td>MacDirect 2400</td>
<td>20</td>
</tr>
<tr>
<td>MacProducts Magic 2.1 GB</td>
<td>20</td>
</tr>
<tr>
<td>Third Wave 1.2 GB</td>
<td>19</td>
</tr>
</tbody>
</table>

The Storage Dimensions Data Cannon Fast SCSI-2 cards fit poorly into the Quadra’s PDS — in fact, they were so wobbly that we had to exercise extreme care when we were plugging in the SCSI-2 cable, in order to avoid unseating the card from the slot. Then an outdated ROM chip on the cards caused some formatting problems and had to be replaced. One final disappointment with Storage Dimensions’ MacinStor formatter came when we learned that it could recognize only about 2 gigabytes of the 2.6 gigabytes available on the SAZ-2610F2 array.

Make Mine a Quickie

We designed several speed tests to look at three types of disk use: sustained throughput (or sustained data-transfer rates), which is critical for QuickTime users; small block transfers, which is how most Mac applications move data to and from drives; and caching and sustained speed, which is important for applications such as Photoshop. The tests and our test platforms are described in more detail in the “How We Tested Gigabyte Drives” sidebar.

Big Stuff

If you plan to play QuickTime videos or even create them, you’ll be interested in the results of our throughput (DiskTop copy) test (see Figure 1). The Storage Dimensions SAZ-2610F2 array, based on a Seagate mechanism, excelled in this test. All the products based on the Seagate ST42400N (Elite 2) mechanism also did well. In addition, the drives based on Micropolis mechanisms, especially the PLI MiniArray 2 GB external drive, scored high in the throughput test. (To see which drives use which mechanism, see Table 1.)

Products based on the Digital Equipment mechanism, with the exception of the FWB SledgeHammer 2000FMF and the PLI MiniArray 040, were unimpressive in the DiskTop copy test. These arrays take advantage of the Quadra 900’s and 950’s unique SCSI architecture by...
1- and 2-Gigabyte Hard Drives

Photoshop is a very disk-intensive application that can take advantage of high sustained data-transfer rates and efficient caching. Because none of the drives excelled in both of these areas, the relative results were pretty flat. The only major exceptions were the drives based on Toshiba mechanisms, which were slower, because of their lower rotational speed.

Server Apps. Finally, we took a quick look to see how well suited the arrays were for file-serving applications. All the arrays outperformed drives based on single mechanisms — but not by much — in the network-server test. The FWB Sledge-Hammer 2000FMF was only 25 percent faster than the single-drive FWB Hammer 1000FMF (both are based on Digital Equipment mechanisms). Paying 100 percent more for a 25-percent speed improvement doesn’t make much sense.

Built to Last
Even the best drive mechanism can be ruined by a poorly engineered power supply or a poorly ventilated enclosure. This means that your decision about which drive to buy may well come down to design and construction considerations, along with warranty and service issues.

Case designs varied dramatically. Some of the things we looked for were sturdiness, electromagnetic shielding, ventilation, and even the construction of the SCSI cables.

GCC’s two drives got excellent marks for construction, with the GCC UltraDrive 2000XM taking top honors (see Figure 2). This winner is built with multiple brackets that hold the drive assembly steady. Shielding surrounds the power supply, and there are additional shielding and sound-deadening layers inside the cover. Clearly marked labels on the wiring promise to make service quick and easy. You can activate write protection and internal SCSI termination from well-placed buttons on the front of the case, where you also find the SCSI-ID number displayed.

The Focus 1.2 GB and the two drives from Liberty had almost-identical compact metal cases. Their size is great for portability, but these small cases may offer less protection than the larger enclosures. No fan is included to cool the Liberty drives;

Our test platform for this report was a Quadra 950 with 64 megabytes of RAM running System 7.1. After some pretesting, we decided on a system cache of 32K, because that cache size allowed optimum application speed in all of our tests. As the system-cache size increased, however (particularly when it reached 768K or above), all the test times increased dramatically. We ran our tests with file sharing, AppleTalk, and virtual memory turned off and 32-bit addressing turned on. An Apple 13-inch color monitor ran 16-bit color off the Quadra’s built-in video.

We evaluated the effectiveness and efficiency of each product’s packaging, focusing on whether or not the packaging used recycled materials and soy-based inks. To see how easy it was to install each unit, we looked at its accompanying documentation and software.
possibly Liberty believes that the cases’ wraparound metal skins act as heat sinks, but we’re not convinced that this is a good practice. La Cie’s Cirrus Q drives also are compact, each with a metal-reinforced plastic case designed for vertical operation. However, the Focus back panel sports two 50-pin SCSI connectors, compared with two 25-pin connectors on the Liberty and La Cie drives.

If you’ve ever opened a fan-cooled Mac or hard drive and found the interior covered with a fuzzy coating of dust, then you can appreciate the advantage of a filtered air intake. An accumulation of the fuzzy stuff can cause overheating, but on the other hand, so can a clogged air intake. The APS drives were the only products in this roundup to feature a removable, washable air filter on the fan intake. Optima went so far as to install two fans in the Concorde 2100 drive — one for the power supply and one for the disk mechanism and controller circuitry.

### How Do I Work This?

Suppose you’ve purchased the perfect high-capacity drive for your system but can’t get it to work. Don’t feel dumb — it happened to us with several of these products. Many times the fix was as simple as calling the company, getting an RMA (returned material authorization) number, and sending the product back. Usually the replaced or returned drive had no problems.

But if you’re even more fortunate, the manufacturer’s technical-support staff will be able to help you solve your problem over the phone, toll-free. We tested the technical-support prowess of each vendor by asking a straightforward how-to question about partitioning the disk. We also introduced an error on each disk that we knew could be fixed with Apple’s Disk First Aid or another disk utility. Then we asked each vendor to help us fix the problem we’d introduced. A surprisingly high percentage of our contestants provided the right answer to both questions. The major differences among the technical-support staffs were in how quickly they responded. Sometimes we had to wait as long as 24 hours for a callback.

Insight fell short of our expectations. When faced with our simple data-recovery problem, which could have been handled by any of the popular disk-recovery utilities, the Insight technician and the supervisor told us not to bother with recovery — that “not even Norton would help.” They recommended that we just reformat the disk and accept the loss of our data. For a quick rundown of technical-support performance, see the “Rating Tech Support” sidebar.

### Rating Tech Support

<table>
<thead>
<tr>
<th>APS</th>
<th>CMS</th>
<th>Dynatek</th>
<th>Focus</th>
<th>FWB</th>
<th>GCC</th>
<th>Insight</th>
<th>La Cie</th>
<th>Liberty</th>
<th>MacDirect</th>
<th>MacProducts</th>
<th>Micropolis</th>
<th>Tri</th>
<th>Spin Peripherals</th>
<th>Storage Dimensions</th>
</tr>
</thead>
</table>
1- and 2-Gigabyte Hard Drives

The Bottom Line

If there was ever a time to seriously consider purchasing a 1-gigabyte or larger hard drive, this is it. Although we have gripes about many of the drives in this report, almost all of them are still worth the money. And as usual, some of the drives stood out from the rest. At the 1-gigabyte level, we witnessed some incredible performances from the drives based on the Digital DSP3105 and the Micropolis 2112 mechanisms. We also saw some amazingly low-priced drives based on the Toshiba MK538FB mechanism. But the overall winning combination of software, documentation, design and construction, speed, and after-sale support belongs to the APS Micropolis 1.2 GB ($1,699 direct). Although its documentation was weak, solid construction backed by a good warranty and prompt tech support made the Loviel 1225 MB ($1,799 direct) the logical runner-up.

The 2-gigabyte drives in this report were all based on older, 5.25-inch mechanisms, which, although faster for sustained data-transfer rates, lag behind their 3.5-inch, 1-gigabyte siblings in most other tasks. Still, in terms of per-megabyte cost, 2-gigabyte drives are some of your best bets. There were less expensive 2-gigabyte drives, but we liked the FWB Hammer 2000FMF ($4,529 list, $3,600 street) best. Its solid construction, excellent Hard Disk Toolkit (HDT) software, and aggressive price put it at the top of the 2-gigabyte pile. Right behind the Hammer 2000FMF is the GCC UltraDrive 2000X ($4,699 list, $4,225 street). The UltraDrive 2000X’s case is the best we’ve ever seen. We had high expectations for the disk arrays, and we were only partly disappointed. They were excellent in terms of sustained throughput — an important consideration if you plan to do any serious work with QuickTime — but they were less than spectacular in our other speed tests. Not only that, but the prices of most of the arrays tested in this report were mind-numbing. Our pick of the bunch is the FWB SledgeHammer 2000FMF ($4,899 list, $4,300 street). It wasn’t the fastest, but its well-designed software and reasonable price made it the obvious choice.

Mark Hill is a (now relaxed) free-lance writer in Austin, Texas. Kristina De Nile, a ZD Labs project leader, directed the ZD Labs testing effort for this report.

Table 1 Criteria

| List price | The vendor’s suggested retail price for the drive. |
| Street price | The average price of the drive at dealers surveyed across the U.S. in March 1993 or through mail order. |
| Formatted capacity | The amount of usable storage space available on the drive after formatting, in megabytes. |
| Mechanism | The make and model number of the internal mechanism used in the drive. |
| Formatter | Software for formatting the drive for use with a Mac. |
| Turnaround time | The guaranteed maximum time to repair or replace a product. |
| FCC Class B cert. | According to the FCC, peripherals designed to work with home computers should be certified as Class B devices. Products that pass only the Class A standard should not be sold in the consumer market. |

The APS Micropolis 1.2 GB (top left) offered the best value of the 1-gigabyte drives, followed by the Loviel 1225 MB (bottom left). The FWB Hammer 2000FMF (center) took top honors among the 2-gigabyte drives, with the GCC UltraDrive 2000X (top right) second. The best of the arrays was the FWB SledgeHammer 2000FMF (bottom right).

Mark Hill is a (now relaxed) free-lance writer in Austin, Texas. Kristina De Nile, a ZD Labs project leader, directed the ZD Labs testing effort for this report.
MicroNet's Raven-800. Disk Array Power For The Quadra 800.

MicroNet is the first to bring disk array power to the Quadra 800. With a matched pair of fast spindle drives, the Raven-800 delivers up to 9.2 MB/second sustained transfers with access time as fast as 4 ms.

Disk arrays can improve performance up to 400 percent over standard drives. Combine MicroNet's Raven-800 disk array with the speed of the Quadra 800 and you have an unbeatable system for applications such as PhotoShop, file servers, and full rate digital video and audio recording.

Cost effective two drive disk arrays are available in capacities of 1030 to 5560 MBytes and are expandable to more than 38 GBytes. MicroNet also offers single disk drive systems that can be upgraded to a Raven-800 disk array at a later date.

Built on award winning technology, the Raven-800 takes full advantage of Apple's existing hardware. One drive connects to the native SCSI port of the Quadra, and one connects to a MicroNet NuPORT-III, SCSI-2 host adapter. Together, these two drives create a fast, parallel, 16-bit data path.

MicroNet has designed a complete family of internal storage systems for the Quadra 800. Included are SyQuest removable systems, rewritable optical drives, and DAT backup systems. All are shipped complete with custom designed bezels.

To put high performance disk array power in your Quadra 800, call MicroNet's Sales Department for configuration assistance or the name of your nearest Reseller. 1-714-581-1540.

Quality You Can Count On

MicroNet Technology, Inc.

20 MASON • IRVINE, CA 92718 • TEL: (714) 581-1540 • FAX: (714) 837-1164
AppleLink: MICRONET.SLS • Compuserve: 76004,1611

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CIRCLE 198 ON READER SERVICE CARD.
Table 1: Features of 1- and 2-Gigabyte Hard Drives

<table>
<thead>
<tr>
<th></th>
<th>APS Micropolis 1.2 GB</th>
<th>APS Toshiba 1.2 GB</th>
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<th>Dynatek HDA 1.2 GB</th>
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<td></td>
<td>List price $1,999</td>
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<td>$3,799</td>
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<td></td>
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<td>$3,050</td>
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<td>Pros</td>
<td>Low cost per MB.</td>
<td>Extra AC outlets.</td>
<td>Good case design.</td>
<td>Good case design.</td>
<td>Solid case design.</td>
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<tr>
<td></td>
<td>Extra AC outlets.</td>
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<td>Good case design.</td>
<td>Switchable termination.</td>
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<td>Good case design.</td>
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<td>2722 Michelson Dr. Irvine, CA 92715</td>
<td>15 Tangiers Rd., Toronto, ON M3J 2B1</td>
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<td></td>
<td>800-233-7550</td>
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<td>714-222-6000</td>
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<td>816-478-8300</td>
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<td>Company Dynatek Automation Systems, Inc.</td>
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<td>Focus Enhancements</td>
<td>FWB Hammer 2000FMF</td>
<td>FSB Hammer 2000FMF</td>
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<td>999.1 MB</td>
<td>2,028.7 MB</td>
<td>2,000.4 MB</td>
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<td>Mechanism Fujitsu M2265S-512</td>
<td>Micropolis 2112</td>
<td>Digital DSP3105</td>
<td>Seagate ST42400N</td>
<td>Digital DSP3105</td>
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<tr>
<td></td>
<td>Formattor Compass Utility</td>
<td>DiskMaker 1.6.5</td>
<td>HDT Primer</td>
<td>HDT Primer</td>
<td>HDT Primer Pro 1.3</td>
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<td>Warranty 5 years</td>
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<td></td>
<td>Money-back guarantee 30 days</td>
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</table>

MacUser's "Bottom Line" pick

104 July 1993 MacUser
Hardware Data Compression

- Double the storage capacity of every disk drive on your Macintosh
- 7 to 10 times faster than software compression utilities
- Lossless data compression
- Files can be transported and decompressed via software

SCSI Bus Expansion

- Plug more than 7 SCSI devices into your Macintosh
- Each DataPRESS is a gateway to another SCSI chain
- Increase the maximum number of SCSI storage devices to 49

Before you buy another drive, call (800) 727-8159
# Table 1: Features of 1- and 2-Gigabyte Hard Drives, continued

<table>
<thead>
<tr>
<th>GCC UltraDrive 1000S</th>
<th>GCC UltraDrive 2000X</th>
<th>Insight Power Drive 1075</th>
<th>Insight Power Drive 1750</th>
<th>La Cie Cirrus 10000</th>
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<tr>
<td>Pros</td>
<td>Fast.</td>
<td>Excellent case design.</td>
<td>Switchable termination.</td>
<td></td>
</tr>
<tr>
<td>Cons</td>
<td>Internal termination.</td>
<td>Few software features.</td>
<td>Thin SCSI cable.</td>
<td>DIP switch for</td>
</tr>
<tr>
<td>Formatted capacity</td>
<td>1,003.2 MB</td>
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<tr>
<td>Mechanism</td>
<td>Seagate ST11200N</td>
<td>Seagate ST42400N</td>
<td>Fujitsu M226SS-512</td>
<td>Fujitsu M226SS-512</td>
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<tr>
<td>Formatter</td>
<td>Drive Manager</td>
<td>Drive Manager</td>
<td>Disk Manager Mac</td>
<td>Disk Manager Mac</td>
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<td>Warranty</td>
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<td>1 year</td>
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<td>yes</td>
<td>yes</td>
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<tr>
<td>Company</td>
<td>GCC Technology</td>
<td>GCC Technology</td>
<td>Insight</td>
<td>La Cie Ltd.</td>
</tr>
<tr>
<td></td>
<td>209 Burlington Rd.</td>
<td>209 Burlington Rd.</td>
<td>1912 W. 4th St.</td>
<td>1912 W. 4th St.</td>
</tr>
<tr>
<td></td>
<td>Bedford, MA 01730</td>
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<td>Tempe, AZ 85281</td>
<td>Tempe, AZ 85281</td>
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<tr>
<td></td>
<td>800-422-7777</td>
<td>800-422-7777</td>
<td>800-927-7787</td>
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<tr>
<td></td>
<td>617-275-5800</td>
<td>617-275-5800</td>
<td>602-350-1181</td>
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<table>
<thead>
<tr>
<th>La Cie Cirrus 1200Q</th>
<th>Liberty 870 MB-T</th>
<th>Liberty 1.2 GB-Q</th>
<th>MacDirect 1225 MB</th>
<th>MacDirect 2400</th>
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<td>$2,598 (direct)</td>
</tr>
<tr>
<td>Pros</td>
<td>Switchable</td>
<td>Small and portable.</td>
<td>Small and portable.</td>
<td>Low cost per MB.</td>
</tr>
<tr>
<td>Cons</td>
<td>DIP switch for</td>
<td>High cost per MB.</td>
<td>High cost per MB.</td>
<td>Few software</td>
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<tr>
<td>Formatted capacity</td>
<td>1,167.6 MB</td>
<td>Thin SCSI cable.</td>
<td>Thin SCSI cable.</td>
<td>features.</td>
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<td>Mechanism</td>
<td>Quantum PD1225</td>
<td>Toshiba MK439FB</td>
<td>Quantum PD1225</td>
<td>Fujitsu M2654S-512</td>
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<tr>
<td>Formatter</td>
<td>Silverlining</td>
<td>HDT Primer PE</td>
<td>SCSI Director</td>
<td>Anubis</td>
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<td>Warranty</td>
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<td>5 years</td>
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<td>Money-back guarantee</td>
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<td>30 days</td>
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<tr>
<td>Turnaround time</td>
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<td>8700 S.W. Creekside</td>
<td>160 Saratoga Ave.</td>
<td>160 Saratoga Ave.</td>
<td>5599 W. 78th St.</td>
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<tr>
<td></td>
<td>Beaverton, OR 97005</td>
<td>Santa Clara, CA 95061</td>
<td>Santa Clara, CA 95061</td>
<td>Edina, MN 55439</td>
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<tr>
<td></td>
<td>800-999-0143</td>
<td>408-963-1127</td>
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<td></td>
<td>503-520-9000</td>
<td></td>
<td></td>
<td>612-828-6880</td>
</tr>
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</table>

*MacUser's "Bottom Line" pick*
THE BENCHMARK FOR HIGH PERFORMANCE
3.5-Inch Disk Drives

Have It Your Way
Upgrade your AT™ system without changing the interface using a Model 2112A drive with IDE interface; upgrade any Workstation with the Model 2112 with Fast SCSI-2 Interface

Write-Behind Cache
Provides up to a 300% improvement in write performance by managing writes to the disk

Super Fast Performance
A 10ms Average Seek, a 5.56ms Average Latency and a 512K Buffer with Advanced Cache Management

Tagged Command Queuing
Increases data throughput by optimizing seek and latency and minimizing other delays (SCSI models only)

Multi-Segmented, Read-Ahead Cache
Permits multiple seeks to be serviced from the buffer without the delay of mechanical seeks and latency

Fast Command Processing
Cuts command processing time to as low as 180µs (IDE) or 350µs (SCSI)

Call 1-800-395-3748 for the name of your nearest Micropolis Authorized Distributor

<table>
<thead>
<tr>
<th>IDE (AT) INTERFACE</th>
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<td>Formatted Capacity</td>
<td>Average Seek</td>
<td>Transfer Rate (MB/s)</td>
<td>5-Year Warranty</td>
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<tr>
<td>2105 A</td>
<td>560 MB</td>
<td>10 ms</td>
<td>5 max</td>
<td>Yes</td>
</tr>
<tr>
<td>2112 A</td>
<td>1.050 MB</td>
<td>10 ms</td>
<td>5 max</td>
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<th>FAST SCSI-2 INTERFACE</th>
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<td>Formatted Capacity</td>
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<td>5-Year Warranty</td>
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<td>2105</td>
<td>560 MB</td>
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<td>10 max</td>
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<tr>
<td>2112</td>
<td>1.050 MB</td>
<td>10 ms</td>
<td>10 max</td>
<td>Yes</td>
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Micropolis is a registered trademark of Micropolis Corporation. AT is a registered trademark of IBM.
CIRCLE 148 ON READER SERVICE CARD.
# 1- and 2-Gigabyte Hard Drives

## Table 1: Features of 1- and 2-Gigabyte Hard Drives, continued

<table>
<thead>
<tr>
<th>Company</th>
<th>PLI 2.1 GB Turbo</th>
<th>PLI MiniArray 2 GB (external)</th>
<th>PLI MiniArray 040 (internal)</th>
<th>Relax 960 MB</th>
<th>Saturae Edge 1000r</th>
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<td>MacProducts USA, Inc.</td>
<td>$6,429</td>
<td>$6,975</td>
<td>$6,781</td>
<td>$1,999</td>
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<td>$5,785</td>
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<td>$1,999 (direct)</td>
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<td>Pros</td>
<td>Switchable</td>
<td>Fast</td>
<td>Low cost per MB, Good service and support.</td>
<td>Small and portable.</td>
<td>Good service and support.</td>
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<tr>
<td>Formatted capacity</td>
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<td>2,001.1 MB</td>
<td>2,001.1 MB</td>
<td>1,028.5 MB</td>
<td>999.2 MB</td>
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<tr>
<td>Mechanism</td>
<td>Seagate ST42400N</td>
<td>Micropolis 2112</td>
<td>Digital DSP3105</td>
<td>Fujitsu M2266S-512</td>
<td>Digital DSP3105</td>
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<td>Formatter</td>
<td>PLI Formatter 3.7</td>
<td>Quick SCSI Formatter 1.2</td>
<td>PLI 040 Formatter 1.1</td>
<td>Disk Utilities</td>
<td>Silhouette 1.0v</td>
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<td>Turnaround time</td>
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<td>none visible</td>
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<td>Saturae Corp.</td>
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<td>Fremont, CA 94538</td>
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<td>Union City, CA 94587</td>
<td>Saturae Corp.</td>
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## Specifications

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<th>Company</th>
<th>Magic 1.2 GB</th>
<th>Magic 2.1 GB</th>
<th>Micropolis Optima</th>
<th>Optima Concorde 2100</th>
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<td>Pros</td>
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<td>Extra AC outlets.</td>
<td>Small and portable.</td>
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<td>Seagate ST42100</td>
<td>Micropolis 1924</td>
<td>Seagate ST42400N</td>
<td>Digital DSP3105</td>
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<td>Anubis</td>
<td>Anubis</td>
<td>Microdisk</td>
<td>DiskMount</td>
<td>DiskMount</td>
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<td>5 years</td>
<td>1 year</td>
<td>1 year</td>
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<td>yes</td>
<td>yes</td>
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<td>Company</td>
<td>MacProducts USA, Inc.</td>
<td>MacProducts USA, Inc.</td>
<td>Micropolis Technology</td>
<td>Optima Technology</td>
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<td>608 W. 22nd St.</td>
<td>608 W. 22nd St.</td>
<td>Austin, TX 78795</td>
<td>Austin, TX 78795</td>
<td>17526 Von Karman</td>
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<tr>
<td>800-622-3475</td>
<td>800-395-3748</td>
<td>91311</td>
<td>714-476-0515</td>
<td>Irvine, CA 92714</td>
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<td>512-472-8881</td>
<td>818-709-3325</td>
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<td>714-476-0515</td>
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<td>PLI 2.1 GB Turbo</td>
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<td>PLI MiniArray 040 (internal)</td>
<td>Relax 960 MB</td>
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<td>Fremont, CA 94538</td>
<td>Union City, CA 94587</td>
<td>Union City, CA 94587</td>
</tr>
</tbody>
</table>

108 July 1993 MacUser
Get a Mac.
Install some programs.
Do some cool stuff.
Run out of disk space.
Throw away some files.
Get more cool programs.
Run out of disk space, again.

Get Stacker for Macintosh.

Do more cool stuff.

It starts with the tutorials. Then the templates. Pretty soon you're dragging your help files into the trash. Next it's the extra fonts. Finally, the games. And you're still tight for disk space.

That's why we invented Stacker® for Macintosh.
Stacker is a software program that doubles your disk capacity. Once you've installed it on your hard disk, nothing about your Mac changes except your available disk space. Stacker is totally transparent and completely safe - just ask the four million people who already use our technology.

New Stacker for Macintosh. Without it you might just find yourself out of space. And that wouldn't be cool.

Available now.

Call 1-800-522-STAC, ext. 7207
or (619) 431-7474 ext. 7207

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CIRCLE 132 ON READER SERVICE CARD.
## 1- and 2-Gigabyte Hard Drives

### Table 1: Features of 1- and 2-Gigabyte Hard Drives, continued

<table>
<thead>
<tr>
<th>Feature</th>
<th>Sature ProLine 1910Hz</th>
<th>Spin Peripherals</th>
<th>Storage Dimensions MAC B-1000F</th>
<th>Storage Dimensions MAC 1-2000F-1</th>
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<tr>
<td><strong>List price</strong></td>
<td>$2,799</td>
<td>$1,549</td>
<td>$4,728</td>
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<td><strong>Street price</strong></td>
<td>$2,799 (direct)</td>
<td>$1,549 (direct)</td>
<td>$3,180</td>
<td>$6,200</td>
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<tr>
<td><strong>Pros</strong></td>
<td>Low cost per MB.</td>
<td>Low cost per MB.</td>
<td>Includes SCSI card.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Good service and</td>
<td></td>
<td>Good construction.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>support.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>Thin SCSI cable.</td>
<td>Thin SCSI cable.</td>
<td>Could not perform large block transfers.</td>
<td>High cost per MB.</td>
</tr>
<tr>
<td></td>
<td></td>
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### Power & Surge Protection

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<td>Surge Arrest</td>
<td>AP</td>
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### Sony Disk Prices

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**Hot Products...Sony High-Precision Disks As Low As .64¢!** And Get An America Online Membership Kit & 10 Hours FREE with your order!
Not that long ago, you could gauge a project team's commitment to a business proposal by the production quality of its presentation. A handwritten flip chart meant that the proposal was pulled together quickly and inexpensively. Black-and-white printed overheads signified more effort. A full-color slide show, however, indicated that someone had invested serious time, energy, and money in the presentation.

Presentation software has changed all that, making it possible to create high-impact presentations, even within a limited budget or time frame. As a result, the presentation ante has been upped. Audiences now routinely expect a healthy dose of style and glitz along with meaningful
Presentation Software

information. For that you need software that lets you organize your thoughts clearly, integrate text and graphics seamlessly, apply color and special effects easily, and present the results professionally.

The popularity of presentation software has spawned a crowded field that can be split into two major categories: programs that allow you to make traditional, static slide presentations and the newer applications that let you create interactive and/or animated presentations. Here, we concentrate on the slide-making programs and leave the generally higher-priced, more complex segment of the market for another article.

Among the slide makers, recent upgrades have kept the competition fierce. New features such as cross-platform compatibility, System 7 smarts (including QuickTime), fancier graphing and drawing tools, easier formatting, and updated templates have raised the stakes.

What to Look for

A good presentation has a consistent look among slides yet provides enough visual interest to keep an audience awake and engaged. Pleasing background color blends, coordinated graphs and charts, and easy-to-read type are important elements. If you plan to give your presentation while using your computer (as opposed to giving a presentation with 35mm slides), you’ll also want to add some appealing transition effects between slides. Mixing in a few diagonal sweeps, vertical blinds, and soft fades between slides can subtly help keep audience interest high.

But, of course, the most important part of your presentation is its content. A good presentation program takes charge of the production details, so you can concentrate more on what you are going to say.

The presentation programs we looked at were Microsoft’s PowerPoint 3.0, Aldus’ Persuasion 2.1, Symantec’s MORE 3.1, and Computer Associates’ CA-Cricket Presents 2.1. We also looked at StandOut, an ancient program that hasn’t really changed since its introduction as ReadySetShow in 1988. Marketing rights have now returned to Manhattan Graphics, after a four-year stint with Letraset. All this changing of hands has apparently taken its toll on the product, which has been left to languish. Manhattan Graphics does not plan to revive it, opting instead to incorporate presentation capabilities into its flagship desktop-publishing product, Ready.Set.Go! 6.0. Retail copies of StandOut are still circulating, though. It suffices for the most-low-end presentations, but beyond that, we cannot recommend it.

We tested key features such as outlining ease, graphics support, design templates, graphing capabilities, and cross-platform compatibility (see Table 1) and factored these in with a program’s overall feel. The programs that came out on top let you quickly pull together a professional-looking presentation based on the provided templates but also offer enough depth to let you work up snazzy

Colorwise Slides

One persistent problem that tends to plague presentations is poor color choices. When they are viewed across a dark room, color combinations that looked brilliant up close on your computer screen appear dark, subtle gradations become a murky mess, pie charts seem half-baked, and fine typographic details render your words illegible. When you’re creating presentations, finding the right balance of color and contrast can be a tough challenge. That’s where Pantone’s ColorUP comes in.

This $99 utility makes your color choice for you. You can choose from hundreds of pre-defined background colors and color palettes, each preselected for their compatibility and legibility in presentations. Each palette contains 16 colors that are assigned to such common slide elements as hierarchical titles and labels and data sets for charts and graphs (see the figure at right).

To start, specify your output medium — slide, screen, overhead transparency, or hard copy — and then choose a background color. If that color will not translate well to that

Pantone’s ColorUP utility takes the guesswork out of choosing colors for presentations. Predefined palettes linked to appropriate media show the best combinations for backgrounds, titles, text, charts, and more.

medium, ColorUP looks it out. Each background color bears a descriptive tag — for instance, Blue Curacao is deemed “cool, exotic, placid, and intriguing.” Previews of sample business presentations let you see what the palette looks like in action, and you can experiment with four gradient-fill patterns.

Not surprisingly, ColorUP also supports Pantone colors — the first presentation-related program to do so. Because many corporate logos are based on Pantone spot colors, this means you’ll finally be able to get it right on screen. Don’t know what a Pantone color is? Fire up ColorUP’s interactive color encyclopedia, Explorer. Weighing in at a whopping 10 megabytes, it shows you the difference between spot and process colors, dithering and halftones, and other aspects of color science.

ColorUP provides palettes for five leading presentation and illustration programs, including PowerPoint, Persuasion, Illustrator, and FreeHand.

Pantone, Inc., 55 Knickerbocker Road, Moonachie, NJ 07074; 201-935-5500.
— Pamela Pfiffner
custom slide designs. The heavyweights, which had superior features and excellent interfaces, were PowerPoint and Persuasion. Quite far behind were MORE and CA-Cricket Presents.

**What to Expect**

Each of the programs we tested allows you to produce 35mm slides, overheads, and on-screen presentations, in color or black-and-white. The majority also let you create audience handouts, speaker’s notes, and a presentation outline.

Most of these programs have five types of windows, or views, in common. In one, you type or import outline-based text of your presentation. In another, you format text, draw or import illustrative graphics, and set colors and patterns. Still other windows let you sort slides and produce handouts and speaker’s notes.

All four programs we reviewed use the concept of a master slide. Generally, anything you put on a master slide — typically a background, placeholders for text, maybe a logo — shows up on all the slides in your presentation. This approach makes formatting an entire presentation quick and easy. A collection of similar masters, or a single master, with a consistent color scheme, makes up a template.

With all these similarities, it seems as though there’s little room left for variation. But that’s like equating a Porsche with a Yugo, just because they’re both cars.

**PowerPoint 3.0**

PowerPoint started out as a powerhouse five years ago. But then it sat. And sat. And sat. Its dormancy contributed to the growth of wannabes, most notably Persuasion, which for a while beat PowerPoint at its own game. Finally, last fall, version 3.0 of PowerPoint blasted onto the scene and recaptured the top of the presentation-program heap. (For a more in-depth look at PowerPoint, see the February ’93 issue, page 50.) What sets PowerPoint apart is its attention to the needs of business presenters and the way it fills the gaps left by archival Persuasion.

PowerPoint’s seamless integration of views is a real time-saver. Take, for example, the WYSIWYG (what you see is what you get) Outline view. PowerPoint shows text formatting — fonts, sizes, styles — in this view. Any formats you apply in Outline view show up in Slide view, and vice versa. This helpful feature seems so simple, but only PowerPoint has it. Other programs allow you to select fonts only in Slide view, and the selected fonts fail to show up in your outline.

You access PowerPoint’s impressive graphing capabilities via Microsoft Graph, a powerful stand-alone package. Graph is hot-linked to PowerPoint, meaning that you can launch it from within PowerPoint. It offers 12 categories of graphs, including area graphs, 3-D line graphs, and scatterplots. Each category has 4 to 10 built-in formats, for a total of 84, as well as several impressive options for customizing 3-D graphs.

Graph isn’t the only Microsoft program you can launch from within PowerPoint. You can, for example, create a table in Microsoft Excel and embed it in a PowerPoint slide. To edit the table, simply double-click on it in PowerPoint, and Excel launches automatically.

PowerPoint’s windows sport handy tool bars at the top, a familiar feature for those who have used other Microsoft applications. This tool bar saves you from schlepping to the menu when you need to perform many common tasks, such as changing font size and style and applying bullets and drop shadows.

PowerPoint lacks a Bezier-curve drawing tool (Symantec’s MORE is the only one of these programs that has such a tool), but it does provide a versatile shape tool (see Figure 1). This tool is really 24 tools in 1, letting you draw perfect stars, arrows, triangles, and so on. Although you can always import graphics, it’s faster to create at least the simple elements within PowerPoint itself. You can also add impact to your slides by inserting QuickTime movies.

Poor color choices can ruin well-composed slides, so nondesigners will also appreciate PowerPoint’s color handling. The program has a built-in color coach, which helps you choose colors that go well together, and when you alter colors on your color palette, your graphs are automatically recolored to match.

Currently, no presentation program supports Pantone spot color (see the “Colorwise Slides” sidebar), and trying to simulate specific Pantone colors or match colors for imported graphics can be cumbersome. Because you can’t spec colors by using familiar RGB or CMYK percentages, you must either point to the shade you want in the Apple Color Picker or adjust HSB- or RGB-value levels (rather than percentages).
You need to design the prototype, present it to your client and get it into production—all in just three weeks. You better have the right tools.

Conceptually, you nailed it. Unfortunately, this client won't give anyone the go-ahead on concept alone.

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For presentations in which the monitor is the final output, PowerPoint offers a rich selection of 44 transition effects. It also has a tool that lets you mark up your slides as you’re giving a Mac-based presentation, à la John Madden’s NFL visuals: “And here’s how we grabbed — bam! — a chunk of Acme’s sales. Boom!”

For versatility, PowerPoint for the Mac is compatible with the Microsoft Windows version, so sharing files with a PC-based colleague is usually not a problem (see the “Sliding Cross-Platform” sidebar). The included run-time player enables you to distribute disk-based presentations freely for playback by those who do not have PowerPoint.

**Persuasion 2.1**

Persuasion finishes a close second in this horse race. Although it has many impressive features, it’s behind PowerPoint, for a variety of reasons. Chief among these are that it lacks a WYSIWYG Outline view and that its cross-platform compatibility is not as complete as PowerPoint’s (Aldus is working to improve that situation, though; see the “On the Horizon” sidebar.) Persuasion’s graphing capabilities can’t compete with the PowerPoint/Graph combination, and Persuasion’s drawing tools are not quite as good as those of PowerPoint.

Persuasion is missing a few other niceties that are available in PowerPoint. It has no tool bar, and you can’t launch other programs from within Persuasion the way you can with PowerPoint. Additionally, Persuasion lacks a color coach. Like PowerPoint, Persuasion makes it cumbersome to simulate Pantone colors and match colors of imported graphics.

But don’t let this fool you. Persuasion is a powerful program that has much to recommend it. It offers a run-time player; it has excellent integration among views; and it has System 7 smarts, including the ability to import

---

**Sliding Cross-Platform**

Need to use your Mac to edit presentations created on a PC and send them back to the PC for further refinement? Maybe you want to distribute your Mac-created disk-based presentations to people with PCs? In either case, you’ll need a program with cross-platform compatibility.

PowerPoint and Persuasion promise this capability, but only PowerPoint truly delivers. That’s because, unlike with Persuasion, the Mac and Windows versions of PowerPoint are based on the same core programming code. Virtually everything you create for a Mac presentation transfers well to the Windows version of PowerPoint, and vice versa.

There are exceptions. You can’t play QuickTime movies in most Windows applications yet, and fonts sometimes transfer with uneven results. For best results, you need to have the same fonts installed on both computers. Even then, because of platform differences, you may get slightly different results. However, TrueType fonts, which are included with both the Mac and the PC version of PowerPoint, make the leap well. Transferring Persuasion presentations, on the other hand, can be trickier. Because the underlying program code is not the same, you’ve got to be careful about what you try to transfer. The limitations noted for PowerPoint are multiplied.

For best results, use a Persuasion AutoTemplate that is available in both Mac and PC form. This limits you to the 37 PC-compatible templates that come with the Mac package. Even then, you’ll lose some features in transfers, including subtitles, patterned lines, object shadows, some indenting, and graduated fills in polygons. Additionally, you need to save the Persuasion presentation in the Interchange File format (see the figure at left). PowerPoint doesn’t require this extra step. The bottom line is that Persuasion’s cross-platform compatibility is certainly better than none, but if you plan to use this feature, budget some time for some clerical cleanup work on your slides.

With either program, keep in mind that you’ll need a way to transfer files between platforms—for example, a network or a PC-disk-reading utility such as Dayna’s DOS Mounter or Insignia Solutions’ AccessPC.

— Shelley Cryan
and play QuickTime movies.

Aficionados are quick to point out Persuasion's greatest structural difference from PowerPoint: master-slide handling. With each program, anything on the master shows up on each presentation slide and you can then alter individual slides as you wish. But that's where the similarity ends. Persuasion's approach is more complex, yet more flexible (see Figure 2). It breaks master slides into a master foreground and a master background, letting you create several of each. PowerPoint gives you just one master slide, and that master serves as both background and foreground. If you're creating a large presentation that contains several formats, you'll prefer Persuasion's versatility.

Say you're working on a 30-slide presentation and half the slides have bullet points, a quarter have a graph or chart and minimal text off to the side, and the last quarter have only one or two centered words. With PowerPoint, you set up your master slide as a bulleted-text slide and can then produce those slides quickly. But you have to adjust the others by hand. With Persuasion, you can have a different master design for each type of slide and simply assign each slide to its corresponding master layout to format everything. This flexibility is valuable if you frequently produce large presentations, although the added complexity may not be worth it if your presentations are usually small.

Figure 3: MORE's origins as an outlining program are evident in its superior outlining features, such as automatic level labeling and text-style formatting. Its slide-presentation features can't compete with those of the top slide makers, however.

Persuasion provides an excellent collection of clip art and predesigned templates. Additionally, it allows you to draw on different layers, a feature PowerPoint lacks. This can make drawing a little more complicated, but it also makes it easier to select elements, especially if they're close to other items.

**MORE 3.1**

MORE and CA-Cricket Present make up the second tier of presentation programs. The products in this second group lack many System 7 smarts, cross-platform compatibility, and a run-time player and are significantly more cumbersome to use than the two category leaders, PowerPoint and Persuasion.

MORE began life as an organizer/outline called ThinkTank, and slide-making capabilities were added later. These features have evolved enough to gain MORE a spot in any slide-maker roundup but not enough to challenge the presentation-software leaders.

Perhaps because slide making was an afterthought in the case of MORE, the program's underlying structure is downright clumsy for creating presentations. It offers only three views: outline, bullet chart, and tree chart. This assortment may be helpful for producing written reports but not for slide shows.

The tree-chart view offers impressive streamlining features for creating organization charts and general...
Presentation Software

Presentation diagrams. Using these on presentation slides is awkward, though, because you need to do some unexpected cutting and pasting. Other presentation programs, although they may not offer as many automated tree-chart features, can create tree charts in slide view quite ably, and they’re much easier to use.

The lack of a slide sorter for rearranging the order of your presentation is a definite drawback, as is the way MORE handles speaker’s notes. You create these in a separate pop-up window that’s also where you create audience handouts, so you can’t have both.

MORE’s presentation/graphic features, with a few notable exceptions, are average. The exceptions include a Bézier-curve drawing tool, a rare and welcome find in presentation software. MORE also lets you use two monitors—one for the presentation and the other for speaker’s notes—while you’re giving an on-screen presentation. And MORE lets you assign a different duration for each slide in an automatic slide show.

But these helpful features don’t make up for MORE’s generally cumbersome nature, subpar graphing capabilities, and decidedly unspectacular transition effects. Additionally, MORE offers neither a run-time player nor cross-platform compatibility. You can’t place QuickTime movies in MORE slides, and the program doesn’t support publish-and-subscribe.

Like PowerPoint’s, MORE’s graphing functions reside in a separate, stand-alone application—in this case, MORE Graph. However, the relationship between the main and the graphing program is not nearly as smooth as it is with Microsoft’s programs: With MORE Graph, you have to copy and paste a graph into a MORE slide, whereas in PowerPoint, the graph shows up automatically. Additionally, MORE Graph itself is stuck in the Dark Ages: You have only nine graph types to choose from, and it provides you with only limited ways to customize the look of your graph. Unless your graphing needs are basic, you’ll be disappointed by MORE Graph.

Not surprisingly, MORE’s outlining capabilities are excellent, the best of the pack (see Figure 3). Indeed, the manual devotes 40 percent of its pages to outlining alone, giving you an indication of the real focus of this program. Intuitive keyboard and mouse shortcuts abound, such as selection of all level 1 headlines by Option-clicking on a single headline. Other superb outline features include MORE’s automatic labeling (I, II, III; A, B, C; and so on) and its ability to carry styles (italic, bold, and the like), although not fonts, from an outline to a slide.

In the past, it might have made sense to develop an outline in MORE and then export it to other slide makers.
Imagine the reaction to our new PostScript Level 2 printer.

No matter what the competition says about our DEClaser™ 1152, you'll swear by it. Call 1-800-DECINFO, ext. 848 to place your order or get the name of your local distributor.

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But as competing companies continue to improve their programs' outlining capabilities, MORE's value as a slide maker will continue, well, slide.

**CA-Cricket Presents 2.1**

CA-Cricket Presents is yet another presentation program in need of an overhaul (see the “On the Horizon” sidebar). Two major structural defects plague the current version. First, it has no built-in outliner; second, poor master-page features make for weak template handling. CA-Cricket Presents does provide an outliner—Symmetry's Acta—as a separate DA, but Acta's poor integration with CA-Cricket Present's slide-making functions make the combination fall far short of current standards. Getting words onto your slides via an Acta outline is just plain difficult. As an attempt to remedy this situation, the program offers what it calls the AutoPrents feature, which is supposed to streamline the process. Although AutoPrents does help somewhat, in all, it's much more cumbersome than the seamless outline-to-slide relationship that PowerPoint and Persuasion provide.

CA-Cricket Presents' handling of master slides and templates leaves much to be desired (see Figure 4). The

### Table 1: Features of Presentation Software

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Presentation Software

A single available master page is really only a master background. You can’t position any text placeholders on it; instead, you use it only to set a background color and graphics to appear on each slide. Provided graphics templates are less than impressive. A second type of template, used for text, is supposed to streamline text formatting in lieu of decent master-page features. You must apply a text template to each slide, unless you prefer to create the text formatting manually. You can apply text templates to a range of slides to save some time, but it’s still tedious.

Eight basic graph types are available, with no-frills customizing features. Data entry is similar to that of many programs in this genre: a spreadsheetlike area into which you can type or import data. Unlike the top programs, though, CA-Cricket Presents can import spreadsheet data only in SYLK format and does not contain any facility for hot-linking to spreadsheet files.

Finally, the interface is old news. Because the program has no on-screen icons for switching among views quickly, you have to resort to the View menu every time.

On the plus side, CA-Cricket Presents lets you kern text manually. This ability to fine-tune the space between letters is crucial, because most slides consist primarily of text at large sizes, in which spacing problems are most glaring. The built-in kerning pairs that type manufacturers provide aren’t always sufficient, and Computer Associates was wise to include this feature. Persuasion’s and PowerPoint’s designers should take note.

CA-Cricket Presents’ manual is clearly written and provides a good explanation of working with a service bureau to output 35mm color slides. But praising the documentation despite the program’s numerous deficiencies is akin to being disappointed at a restaurant but not complaining, reasoning that even though the food is horrible, the portions are gigantic.

The Bottom Line

Intelligent outline and template handling as well as seamless integration among views are the key to a smoothly operating presentation program. These three areas, more than lists of features, are the entry ticket to the acceptable-program arena. PowerPoint and Persuasion are the only programs to clear that hurdle. Given its richer set of features, PowerPoint gets the nod this time. 

Shelley Cryan runs a consulting business in New York that specializes in helping companies computerize their graphic-design departments.

Table 2: Presentation Software

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<th>CA-Cricket Presents 2.1</th>
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<th>Persuasion 2.1</th>
<th>PowerPoint 3.0</th>
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<td>List price</td>
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<td>$395</td>
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Figure 4: CA-Cricket Presents’ background patterns are nice, but its single-master-slide approach is too limiting. The clunky interface also needs an overhaul. On the plus side, you can manually kern text; CA-Cricket Presents is the only program to offer this essential feature.
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ow that color is available in every Mac family in Apple’s product line — from the Color Classic to the Quadra, the Performa to the PowerBook — it may appear that monochrome and gray-scale monitors are not long for this world. But even though Apple is unlikely to introduce a new black-and-white desktop computer ever again, millions of Mac users have neither the capability, the call, nor the cash for color. Fortunately, there’s still a wide selection of affordable monitors for the color-free crowd.

Built-in color has become ubiquitous in Mac computing. But if you don’t need color, why pay for it?

BY OWEN W. LINZMAYER
To display color or gray-scale images, your Mac must have built-in color capability. This requirement excludes the Mac Plus, SE, and original Classic. If you have one of these models, a monochrome monitor, which displays images in black-and-white, is your only display-system choice. All other Macs can drive gray-scale monitors; gray-scale monitors, which use varying levels of intensity to achieve as many as 256 shades of gray; or color monitors, which use an optional video card or existing video circuitry on the Mac’s motherboard.

But even if you have a color-capable Mac, you might not really need a color monitor. Sure, color makes for a friendly Finder and pretty pictures, but is it really essential for the work you do on your Macintosh? If you spend the majority of your day writing with a word processor, crunching numbers in a spreadsheet program, or doing other text-and-number tasks, chances are that color isn’t a necessity. Nor is color always a requirement when you’re shopping for a second monitor. And you certainly don’t need a color monitor for a server that spends most of its time tucked away in some dusty corner. In such cases, a color monitor would be superfluous and extravagant.

Color costs more, there’s no doubt about it. Inch for inch, monochrome monitors are considerably cheaper. A relatively inexpensive 19-inch color monitor with an 8-bit-video card can easily set you back more than $2,800 (see “Affordable Luxury: Two-Page Color Monitors,” May ’93, page 128). On the other hand, a similar-sized gray-scale display system might put only a $1,000 dent in your wallet and a monochrome setup carries a street price in the neighborhood of $700.

Not only are monochrome and gray-scale monitors less expensive but, in many respects, they also perform better and display better-looking images than color monitors do. Scrolling and screen redraw can be more than twice as fast in monochrome or gray-scale mode than in color (see the “Outliving Color” sidebar). You probably think that color is nice, but at what price? Only you can decide whether it’s worth four times the cost of a noncolor monitor.

Sure, color makes for a friendly Finder and pretty pictures, but is it really essential for the work that you do on your Macintosh?

Mono a Mono

In an effort to see what really shines in the noncolor-monitor market, we gathered 23 display systems — including monitor, video-display card, and Mac-compatible cable — from 12 vendors. With such a large, diverse batch, there’s something for everyone, no matter what your needs or resources. When we examined gray-scale monitors in 1989 (see “Grading the Grays,” October ’89, page 182), the Apple Portrait Display was the only 15-inch (full page) monitor on the market, but now there are 11 full-page monitors from which to choose, each large enough to display a full letter-sized page without scrolling. Of these, 4 are monochrome and the others are capable of displaying 256 shades of gray, sufficient for realistic gray-scale photographic retouching. And the switch-hitting Radius 15” Pivot can be flipped between portrait and landscape orientations, as needed.

If you crave something bigger, pick from a dozen two-page monitors, measuring 19, 20, or 21 inches diagonally. There are 4 monochrome and 8 gray-scale monitors in this category. The nice thing about these monitors is that, at 72 dpi, they let you display two 8.5-x-11-inch pages side by side at actual size, a real plus for desktop publishing. The drawback is that these machines are huge. With weights in excess of 60 pounds, a two-page monitor is far too heavy to perch atop any Mac, so you must devote roughly 2 square feet of desk space to such a behemoth. If you have more than one monitor and the monitors aren’t adequately shielded, you’ll need even more space to separate them so that their magnetic fields don’t cause jitter.
Monochrome
Images are painted on a monochrome display by a single electron beam fired by a gun at the back of the monitor that rapidly sweeps the tube from left to right, top to bottom, many times a second. The inside of the CRT (cathode-ray tube) is coated with phosphors that glow temporarily when excited by the electron beam. If the beam is pulsed on when it hits a phosphor, the phosphor lights up and you see a white pixel (picture element) on-screen. Conversely, if the beam is off, the pixel is black.

Gray Scale
Gray-scale monitors work in much the same way as monochrome monitors do, but instead of relying on an electron beam that is either off or on to create black-and-white images, the strength of the beam varies to create shades of gray.

Color
Monochrome and gray-scale displays tend to look better than color ones do, because to show what appears to be a single color on-screen, a color monitor uses three electron beams that stimulate a triad of adjacent phosphors, which combine to form an individual color pixel. Properly focusing these three beams is considerably more difficult than focusing a single electron beam. As a result, monochrome and gray-scale displays usually have sharper detail, which can lessen eyestrain.

We put these display systems through their paces at ZD Labs, using a Mac LC as our primary test platform. For those cases in which, whether by chance or by design, an LC video card was not available, we used an SE/30 instead. Many of these display systems are also available with more-expensive NuBus video cards that support most Mac platforms. Although pricing may differ, performance should not.

Our technicians used a Minolta Color Analyzer CA-100 — which, despite its name, works just fine for testing monochrome and gray-scale monitors — to make objective measurements of brightness and image quality. We used another piece of hardware, a Microvision Superspot 100 System, to look for problems such as excessive jitter, poor focus, and pincushioning (see the “How We Tested Monochrome and Gray-Scale Monitors” sidebar).

With a few minor exceptions, all the monitors performed well in our objective tests. But the numbers of the Color Analyzer and the Superspot 100 don’t provide the whole picture, so we also evaluated ease of installation, bundled software, and technical support (see the “Rating Tech Support” sidebar).

Easy Setup
As you might expect, installing a video card in a Mac LC is a piece of cake. Just unplug your Mac, pop off the top, touch the power supply to discharge static electricity, and then plug the video card in to the expansion slot. Connect the cable, apply power, and load the software, and you’re ready to rock.

But installing a video card in a compact Mac (the Color Classic excepted) is a whole different story. We recommend that compact-Mac owners have their dealer perform the installation. If you really want to do it yourself, you need a long Torx screwdriver to remove the security screws, and a “case cracker” is helpful for separating the front and back bezels. Only Mirror included both tools with its display systems. MacProducts and Mobius were kind enough to provide Torx screwdrivers, but they did not include case crackers. None of the other vendors that submitted SE-compatible display systems provided either tool.

Once you’ve opened the case of a compact Macintosh, you’re far from home free. Our technicians had to deal with outdated, confusing, and erroneous documentation; software incompatibilities; incorrect cables;
Monochrome and Gray-Scale Monitors

**Figure 1: Maximum Usable Brightness**

Figure 1: Brighter is not necessarily better. The more you turn up a display’s brightness, the more likely the display is to go blurry. We used a Minolta Color Analyzer CA-100 to measure how bright each display could be while still maintaining a sharp focus. We compared our results for full-page and two-page monitors separately, because it’s easier to get a brighter image on a smaller screen.

**Hardware That Fits RealTech 15”**
- Apple Macintosh Portrait Display
- Mirror 15” Analog Portrait Display
- Sigma PageView
- Radius 15” Pivot
- Lapis Full Page Display
- RasterOps ClearVue 15” Portrait Display
- Sigma Power Portrait
- Lapis Full Page Grayscale Display
- Mirror ViewPort 15” SCSI Display
- Radius Full Page Display

**Full-Page Monitors:**
As a monitor gets older, its phosphors also age and become dim. You can slow the aging of the phosphors by not turning the brightness control to maximum. The Hardware That Fits RealTech 15” will be the best at compensating for phosphor aging. With this monitor, you can continue turning up the brightness and still keep a sharp focus. All the full-page monitors met the adequate-brightness level of 20 footlamberts.

**Two-Page Monitors:**
The brightness of the Mirror 21” Two Page Display was unacceptably low in our tests. Mirror recommends this monitor mainly for use with Mac II-series display cards and Quadra on-board video. The Nanao Flexscan 6500 also had a low score, but its brightness is adequate if the display is turned away from bright light.

and defective hardware. The worst offender was the Radius Full Page Display. The documentation says that the Radius logo should appear on-screen after you’ve set up the system to indicate that all is well. When that didn’t happen, we called our contact at Radius and were told that the card and software were compatible only with System 7. Wrong! We finally discovered that our test monitor was defective. A replacement monitor worked fine with System 6 and 7.

**Self-Brighteous**
Screen brightness is largely a matter of preference: In a typical office, you may choose to set your display’s brightness level considerably below the maximum usable brightness (MUB). If your monitor faces a direct light source, such as a window, however, you may have to turn the dial to the maximum. The question to ask is, How bright can I make the display before the focus is affected? A 20-footlambert brightness level...
is considered acceptable under most conditions. The dimmest full-page display, the Radius Full Page Display, easily cleared this hurdle with an MUB of 26 footlamberts (see Figure 1). The Hardware That Fits RealTech 15" was way ahead of the pack, with an MUB of 49 footlamberts. Actually, turning the display up that high makes it almost too bright for most situations, but it’s ideal if your display faces a direct light source.

The two-page monitors had dimmer displays on average. The Mirror 19" Two Page Display, with a brightness level of 43.3 footlamberts, edged out the Sigma SilverView Pro as the brightest monitor, but Mirror’s 21" counterpart, at only 9.9 footlamberts, trailed the Nanao Flexscan 6500 for the unenviable distinction of having the dimmest display.

Avoid the Hot Spot

Buying a monitor that has a bright display but poor spatial uniformity is like buying a flashy car that has

---

**Figure 2: Sharpness**

*Figure 2: Using the Microvision Superspot 100 System, we measured each display’s modulation transfer function (MTF), or ability to display sharp vertical and horizontal lines. Lines 1 pixel thick are the most difficult pattern that a display can render. On many displays, the black and white lines merge slightly, creating a soft gray area. The higher the MTF number, the better the monitor’s ability to display fine detail. An MTF of 50 percent or higher is considered acceptable.*

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**Full-Page Monitors:**

All the full-page displays we tested, with the exception of those of both Radius monitors and the Sigma Power Portrait, had excellent average MTF measurements.

**Two-Page Monitors:**

Among the two-page displays, those of the Mirror 21" Two Page Display and the MacProducts Panasonic M1900 had MTF values that were less than 50 percent, although the results were still acceptable.
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Monochrome and Gray-Scale Monitors

Buying a monitor that has a bright display but suffers from poor spatial uniformity is like buying a flashy car that has an uneven paint job. What you want is a consistent, or uniform, level of brightness over the entire display. All displays tend to be a bit brighter in the middle and a bit dimmer around the edges. However, none of the monitors we tested exhibited any deviations that are worth worrying about. The Mirror 21" Two Page Display had the worst score in this test, with a deviation between the center and the edges of 8.3 percent, but even that isn’t noticeable to the human eye.

Sharper Image
You probably already know that a sharp display is easier to work with than a poorly focused one. To get an objective picture of sharpness, we obtained values for each display’s modulation transfer function (MTF). An MTF of more than 50 percent is generally considered acceptable; the higher the percentage, the better the monitor’s ability to display fine detail such as hairlines and tiny text. Displays with low MTF values look blurry or unfocused and can contribute to eyestrain. Of the full-page displays, the two Mirror ones were the sharpest, each with an average MTF of 62.5 percent (see Figure 2). All the other full-page displays were acceptable, although the Radius Full Page Display fell right on the 50 percent cutoff. Radius redeemed itself with the TPD/21, which had the highest MTF (66.5 percent) of all the monitors we tested. The Mirror

How We Tested Monochrome and Gray-Scale Monitors

Under the keen eye of a Microvision Superspot 100 System sitting atop a Newport MST Series optical table, our technical staff evaluated focus- and geometry-related factors for each monitor’s display. We then used a Minolta Color Analyzer CA-100 to measure brightness.

The maximum usable brightness (MUB) is measured in footlamberts. We measured a solid white screen displayed after adjusting for maximum sharpness. If you turn up a display’s brightness to a value that’s greater than the MUB, you’re likely to lose sharpness.

Most displays are a little brighter at the center and a little dimmer around the edges. We determined spatial uniformity — how evenly a monitor maintains brightness over the whole screen — by measuring the luminance of nine areas on the display. We then calculated the percentage deviation by normalizing the standard deviation of the measurements to the average brightness.

The objective measurement of sharpness is the modulation transfer function (MTF). We used the Superspot 100 to ascertain the monitor’s ability to resolve from white to black, and vice versa, using a test pattern of alternating black and white lines, each 1 pixel thick. We focused on this pattern while adjusting the display’s brightness and contrast settings for maximum MTF, to achieve the brightest, sharpest image on each display.

We also measured pincushion error. The Superspot 100 can automatically focus on and move along a line on-screen and then calculate the line’s deviation from a straight path. The maximum deviation from that path is the pincushion error.

Our jitter, swim, and drift tests provided data about the screen’s stability. Jitter is the movement a pixel makes during half a second. Swim and drift are slower movements, measured over intervals of ten seconds and one minute, respectively. We used the Superspot 100 to measure jitter, swim, and drift at the upper left and lower right corners and at the center of the screen. For accuracy, measurements for jitter, swim, and drift are averaged over two and a half minutes.

— Stephen Chan
21" Two Page Display and the MacProducts Panasonic M1900 turned in the poorest MTF results — 48 and 47.5 percent, respectively.

**Don't Distort the Facts**
You also want a display that is free from geometric distortion. If circles are elliptical and straight lines curved, the display suffers from pincushioning. On average, we found that the full-page displays were less affected by pincushioning than the two-page ones were. This is because, on the smaller monitors, the electron beams don't have to bend as far to "paint" the edges of the screen. Of all the full-page displays, the Apple Macintosh Portrait Display had the largest pincushion error, but this paled in comparison with the pincushion error of the MacProducts Panasonic M1900, the Nanao Flexscan 6500, and the Mirror 21" Two Page Display.

Finally, our tests for jitter, swim, and drift all measured how much the screen image moves. Jitter is an annoying shaking motion that can drive your eyes crazy. Swim and drift are more gradual, undulating motions that can be just as irritating. All three contribute to eyestrain and headaches. The monitors we tested showed minimal amounts of jitter, swim, and drift, none of which were noticeable to the eye.

**Software Bonuses**
You don't need any special software to use a monochrome or grayscale display system, but some vendors provide utilities that make life with a large-screen monitor easier and more productive.

All of the Radius display systems come with the RadiusWare control panel, which lets you select features such as a screen saver, screen capture, enlarged menu-bar font, cursor beacon, and bit-depth changer. Mirror provides a similar collection of utilities with its display systems, but much more functional alternatives are available in the public domain.

The Radius control panel also has several options specifically for its Pivot that help rearrange the desktop when you switch orientation. Another Radius feature is the ability to use a compact Mac's internal screen to display a 2x to 8x magnification of a portion of the larger external monitor's display.

Sigma Designs provides a useful feature with its 19-inch monochrome multimode L-View. At its standard resolution of 72 dpi, the L-View displays 1,024 x 768 pixels. At the touch of a hot key, the L-View switches among six modes, from 512 x 384 oversized pixels, at 36 dpi, to 1,664 x 1,200 tiny pixels, at 120 dpi. The lower dpi settings are great for presentations and reducing eyestrain.
Monochrome and Gray-Scale Monitors

The Bottom Line

If you're in the market for a large monitor but you don't need color, we have good news. With few exceptions, you really can't go wrong buying any of the monitors tested for this report.

Of the 11 full-page display systems we tested, we liked the Mirror 15" Analog Portrait Display ($549 direct) the best. Good test results, knowledgeable tech support, and a near rock-bottom price make it the best value for the money in its class.

Another strongly recommended buy is the RasterOps ClearVue 15" Portrait Display ($1,048 list, $785 street), whose results in most tests nearly matched those of the Mirror 15" Analog Portrait Display. Excellent tech support and a low street price make this display system a fine buy.

Although it costs a little more, we also recommend the Radius 15" Pivot ($1,448 list, $1,205 street) for those who want a top-rated 15-inch monitor with the unique ability to switch between portrait and landscape orientation on the fly. You can save several hundred dollars if you purchase a 1-bit monochrome video card rather than the 8-bit gray-scale card we used for our review.

In the two-page-monitor category, we recommend the monochrome Mirror 19" Two Page Display ($799 direct), the brightest monitor in the jumbo size. Not only is it free from jitter, swim, and drift but it also scored above average in all of our tests. It has a mechanically etched screen to reduce glare, and its three extra ADB (Apple Desktop Bus) ports are a real convenience. But the real kicker is a price of less than $800 for a monitor, a video card, and a useful software bundle.

Among the large gray-scale monitors, the Radius TPD/19 ($1,558 list, $1,250 street) walks off with our recommendation. Although it doesn't excel in anyone particular area, slow and steady wins the race, thanks to an uneven cast of competitors. The Radius TPD/19 is a solid, all-around good performer backed by excellent tech support. It's definitely worth a slight premium.

Table 1 and 2 Criteria

| List price | The vendor's retail price for the display system. |
| Street price | The average price of the display system at dealers surveyed across the U.S. in March 1993 or through mail order. |
| Monochrome/gray-scale | Whether the display shows images in black-and-white or in varying shades of gray. |
| Screen size (diagonal) | The length, diagonally, of the exposed glass face of the monitor, in inches. |
| Active-screen size (diagonal) | The length, diagonally, of the portion of the screen that lights up, in inches. |
| Max. pixel dimensions | The maximum number of dots (pixels) that can be displayed on the screen, counting horizontally and vertically. |
| Horizontal-scan rate | The number of lines of pixels that can be written on the screen per second, in kilohertz. |
| Vertical-scan rate | The rate at which the screen is redrawn from top to bottom, in hertz. |
| Swivel-stand angle | The area the monitor stand occupies on top of your desk, in square inches. |
| Anti-glare treatment | The coating or transparent panel on the monitor screen, designed to eliminate or diffuse reflected light. |
| Controls | The location of available user controls for adjusting the monitor's performance. |
| FCC certification | Whether the monitor has Class A or Class B certification. According to the FCC, Class A products should not be sold in the consumer market. |
| Cables supplied | The Mac-compatible cable included in the monitor price. |
| Connection options | The type of video port(s) on the back of the monitor. |
| Dimensions (W x D x H) | The width, depth, and height of the monitor's plastic shell, in inches. |
| Service location | Where you return the monitor for service: to the dealer or directly to the manufacturer. |

and the higher settings allow you to squeeze more information on-screen for extrawide spreadsheets and the like. Although the multimode feature is available on the L-View only, all the Sigma Designs monitors come with software that gives you enlarged menu fonts, pop-up menus, screen savers, enlarged cursors, and screen capture.

Aside from Sigma Designs' multimode feature, the software bundled with the current crop of monochrome and gray-scale monitors is pretty generic stuff and shouldn't influence your buying decision too heavily. It's best to stick to more-significant factors such as the test results, pricing, and tech support. We reveal our favorite monitors in the bunch in the "Bottom Line" sidebar.

Owen W. Linzmayer shamelessly recommends his book Totally Rad Mac Programs, regardless of the kind of monitor you own. Stephen Chan, a project leader at 2D Labs, managed the testing for this report.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Apple Macintosh Portrait Display</th>
<th>Hardware That Fits RealTech 15&quot;</th>
<th>Lapis Full Page Display</th>
<th>Lapis Full Page Grayscale Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price*</td>
<td>$1,388</td>
<td>$878</td>
<td>$898</td>
<td>$1,298</td>
</tr>
<tr>
<td>Street price*</td>
<td>$1,135</td>
<td>$878 (direct)</td>
<td>$850</td>
<td>$910</td>
</tr>
<tr>
<td>Cons</td>
<td>Large pincushion error.</td>
<td>Difficult card installation.</td>
<td>No antiglare treatment. Difficult card installation.</td>
<td></td>
</tr>
</tbody>
</table>

### Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Apple Macintosh Portrait Display</th>
<th>Hardware That Fits RealTech 15&quot;</th>
<th>Lapis Full Page Display</th>
<th>Lapis Full Page Grayscale Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monochrome/gray-scale</td>
<td>gray-scale</td>
<td>gray-scale</td>
<td>monochrome</td>
<td>gray-scale</td>
</tr>
<tr>
<td>Tube size</td>
<td>15 in.</td>
<td>15 in.</td>
<td>15 in.</td>
<td>15 in.</td>
</tr>
<tr>
<td>Screen size (diagonal)</td>
<td>14.25 in.</td>
<td>13.75 in.</td>
<td>13.75 in.</td>
<td>13.75 in.</td>
</tr>
<tr>
<td>Active-screen size (diagonal)</td>
<td>13.5 in.</td>
<td>13.5 in.</td>
<td>13.5 in.</td>
<td>13.5 in.</td>
</tr>
<tr>
<td>Max. pixel dimensions</td>
<td>640 x 870 pixels @ 80 dpi</td>
<td>640 x 870 pixels @ 80 dpi</td>
<td>640 x 872 pixels @ 80 dpi</td>
<td>640 x 872 pixels @ 80 dpi</td>
</tr>
<tr>
<td>Horizontal-scan rate</td>
<td>68.85 kHz</td>
<td>68.85 kHz</td>
<td>68.85 kHz</td>
<td>68.85 kHz</td>
</tr>
<tr>
<td>Vertical-scan rate</td>
<td>75 Hz</td>
<td>75 Hz</td>
<td>75 Hz</td>
<td>75 Hz</td>
</tr>
<tr>
<td>Swivel stand included</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Swivel-stand area</td>
<td>NA</td>
<td>72 sq. in.</td>
<td>72.25 sq. in.</td>
<td>72.25 sq. in.</td>
</tr>
<tr>
<td>Monitor weight</td>
<td>35 lb</td>
<td>23.8 lb</td>
<td>23.8 lb</td>
<td>23.8 lb</td>
</tr>
<tr>
<td>Antiglare treatment</td>
<td>etched</td>
<td>silica</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>120/240-volt switching</td>
<td>auto</td>
<td>manual</td>
<td>manual</td>
<td>manual</td>
</tr>
</tbody>
</table>

### Controls

<table>
<thead>
<tr>
<th>Feature</th>
<th>Apple Macintosh Portrait Display</th>
<th>Hardware That Fits RealTech 15&quot;</th>
<th>Lapis Full Page Display</th>
<th>Lapis Full Page Grayscale Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brightness</td>
<td>right side</td>
<td>right side</td>
<td>front</td>
<td>front</td>
</tr>
<tr>
<td>Contrast</td>
<td>right side</td>
<td>back</td>
<td>back</td>
<td>back</td>
</tr>
<tr>
<td>Horizontal position</td>
<td>back</td>
<td>back</td>
<td>back</td>
<td>back</td>
</tr>
<tr>
<td>Vertical position</td>
<td>back</td>
<td>back</td>
<td>back</td>
<td>back</td>
</tr>
<tr>
<td>Horizontal size</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Vertical size</td>
<td>back</td>
<td>back</td>
<td>back</td>
<td>back</td>
</tr>
<tr>
<td>Power switch</td>
<td>back</td>
<td>front</td>
<td>front</td>
<td>front</td>
</tr>
</tbody>
</table>

### Other

<table>
<thead>
<tr>
<th>Feature</th>
<th>Apple Macintosh Portrait Display</th>
<th>Hardware That Fits RealTech 15&quot;</th>
<th>Lapis Full Page Display</th>
<th>Lapis Full Page Grayscale Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCC certification</td>
<td>Class B</td>
<td>Class A</td>
<td>Class A</td>
<td>Class A</td>
</tr>
<tr>
<td>Cables supplied</td>
<td>13W3 to 15-pin</td>
<td>9-pin to 15-pin</td>
<td>9-pin to 9-pin</td>
<td>9-pin to 15-pin</td>
</tr>
<tr>
<td>Connection options</td>
<td>3 ADP ports</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>11.5 x 14 x 15 in.</td>
<td>11.75 x 12.5 x 15.25 in.</td>
<td>12 x 13 x 16 in.</td>
<td>12 x 13 x 16 in.</td>
</tr>
<tr>
<td>Service location</td>
<td>dealer</td>
<td>direct</td>
<td>dealer or direct</td>
<td>dealer or direct</td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Money-back guarantee</td>
<td>dealer option</td>
<td>30 days</td>
<td>30 days</td>
<td>30 days</td>
</tr>
</tbody>
</table>

### Company

<table>
<thead>
<tr>
<th>Feature</th>
<th>Apple Macintosh Portrait Display</th>
<th>Hardware That Fits RealTech 15&quot;</th>
<th>Lapis Full Page Display</th>
<th>Lapis Full Page Grayscale Display</th>
</tr>
</thead>
</table>

*For complete system, including video card.*
# Monochrome and Gray-Scale Monitors

## Table 1: Features of Full-Page Monitors, continued

<table>
<thead>
<tr>
<th></th>
<th>Mirror 15° Analog ViewPort Display</th>
<th>Mirror 15° SCSI Display</th>
<th>Radius 15° Pivot Full Page Display</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$549</td>
<td>$699</td>
<td>$1,448</td>
</tr>
<tr>
<td><strong>Street price</strong></td>
<td>$549 (direct)</td>
<td>$699 (direct)</td>
<td>$1,205</td>
</tr>
<tr>
<td><strong>Pros</strong></td>
<td>Least expensive. Easy to set up.</td>
<td>Easy to set up.</td>
<td>Excellent tech support. Small pin cushion error. Landscape or portrait orientation.</td>
</tr>
</tbody>
</table>

## Specifications

<table>
<thead>
<tr>
<th>Monochrome/gray-scale</th>
<th>gray-scale(^a)</th>
<th>monochrome</th>
<th>gray-scale</th>
<th>gray-scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube size</td>
<td>15 in.</td>
<td>15 in.</td>
<td>15 in.</td>
<td>15 in.</td>
</tr>
<tr>
<td>Screen size (diagonal)</td>
<td>13.75 in.</td>
<td>13.75 in.</td>
<td>14.5 in.</td>
<td>14.25 in.</td>
</tr>
<tr>
<td>Active-screen size (diagonal)</td>
<td>13.25 in.</td>
<td>13.5 in.</td>
<td>13.75 in.</td>
<td>13.5 in.</td>
</tr>
<tr>
<td>Max. pixel dimensions</td>
<td>640 x 870 pixels @ 80 dpi</td>
<td>640 x 870 pixels @ 80 dpi</td>
<td>640 x 870 pixels @ 78 dpi</td>
<td>640 x 870 pixels @ 78 dpi</td>
</tr>
<tr>
<td>Horizontal-scan rate</td>
<td>68.85 kHz</td>
<td>68.85 kHz</td>
<td>68.9 kHz</td>
<td>68.9 kHz</td>
</tr>
<tr>
<td>Vertical-scan rate</td>
<td>75 Hz</td>
<td>72 Hz</td>
<td>75 Hz</td>
<td>no</td>
</tr>
<tr>
<td>Swivel stand included</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Swivel-stand area</td>
<td>72 sq. in.</td>
<td>72 sq. in.</td>
<td>155 sq. in.</td>
<td>NA</td>
</tr>
<tr>
<td>Monitor weight</td>
<td>42 lb</td>
<td>24 lb</td>
<td>35 lb</td>
<td>35 lb</td>
</tr>
<tr>
<td>Antiglare treatment</td>
<td>etched</td>
<td>etched</td>
<td>etched</td>
<td>etched</td>
</tr>
<tr>
<td>120/240-volt switching</td>
<td>manual</td>
<td>manual</td>
<td>auto</td>
<td>auto</td>
</tr>
</tbody>
</table>

## Controls

<table>
<thead>
<tr>
<th></th>
<th>right side</th>
<th>front</th>
<th>right side</th>
<th>right side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brightness</td>
<td>back</td>
<td>back</td>
<td>right side</td>
<td>right side</td>
</tr>
<tr>
<td>Contrast</td>
<td>back</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Horizontal position</td>
<td>back</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Vertical position</td>
<td>back</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Horizontal size</td>
<td>back</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Vertical size</td>
<td>back</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Power switch</td>
<td>front</td>
<td>front</td>
<td>right side</td>
<td>right side</td>
</tr>
</tbody>
</table>

## Other

<table>
<thead>
<tr>
<th></th>
<th>Class A</th>
<th>Class A</th>
<th>Class B</th>
<th>Class B</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCC certification</td>
<td>Class A</td>
<td>Class B</td>
<td>Class B</td>
<td>Class B</td>
</tr>
<tr>
<td>Cables supplied</td>
<td>9-pin to 15-pin</td>
<td>two SCSI ports to SCSI</td>
<td>15-pin to 15-pin mini</td>
<td>15-pin to 15-pin mini</td>
</tr>
<tr>
<td>Connection options</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Dimensions (W x D x H)</td>
<td>11.75 x 12.75 x 16 in.</td>
<td>11.75 x 13 x 16 in.</td>
<td>12.3 x 15.3 x 17.8 in.</td>
<td>12.5 x 13.8 x 14.3 in.</td>
</tr>
<tr>
<td>Service location</td>
<td>direct</td>
<td>direct</td>
<td>dealer</td>
<td>dealer</td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Money-back guarantee</td>
<td>30 days</td>
<td>30 days</td>
<td>dealer option</td>
<td>dealer option</td>
</tr>
</tbody>
</table>

## Company

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>2644 Patton Rd. Roseville, MN 55113</td>
<td>2644 Patton Rd. Roseville, MN 55113</td>
<td>1710 Fortune Dr. San Jose, CA 95131</td>
<td>1710 Fortune Dr. San Jose, CA 95131</td>
</tr>
<tr>
<td></td>
<td>800-554-5294</td>
<td>800-554-5294</td>
<td>800-227-2795</td>
<td>800-227-2795</td>
</tr>
<tr>
<td></td>
<td>612-633-4450</td>
<td>612-633-4450</td>
<td>408-434-1010</td>
<td>408-434-1010</td>
</tr>
<tr>
<td></td>
<td>612-633-3136 (fax)</td>
<td>612-633-3136 (fax)</td>
<td>408-434-0770 (fax)</td>
<td>408-434-0770 (fax)</td>
</tr>
</tbody>
</table>

\(^a\)For complete system, including video card.

\(^b\)SCSI display; no video card necessary.

\(^c\)Vendor supplied monochrome card only.

\(\text{MacUser's} \text{ "Bottom Line" pick}\)
Now's the time to see your RasterOps® dealer for something really big. Announcing great deals on two accelerated 21" display systems featuring the biggest screens available for the Macintosh. Choose the one that's right for you, 24-bit color or 256 levels of gray. Think big. Think fast. Think RasterOps. For more information, or the name of your nearest dealer, call 1.800.SAY.COLOR.

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## Table 1: Features of Full-Page Monitors, continued

<table>
<thead>
<tr>
<th></th>
<th>RasterOps ClearVue 15&quot; Portrait Display</th>
<th>Sigma PageView</th>
<th>Sigma Power Portrait</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>List price*</td>
<td>$1,048</td>
<td>$648</td>
</tr>
<tr>
<td></td>
<td>Street price*</td>
<td>$785</td>
<td>$755</td>
</tr>
<tr>
<td><strong>Pros</strong></td>
<td>Excellent tech support.</td>
<td>Easy to set up.</td>
<td>Easy to set up.</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Specifications</strong></td>
<td>Monochrome/gray-scale</td>
<td>gray-scale</td>
<td>monochrome</td>
</tr>
<tr>
<td></td>
<td>Tube size</td>
<td>15 in.</td>
<td>15 in.</td>
</tr>
<tr>
<td></td>
<td>Screen size (diagonal)</td>
<td>13.75 in.</td>
<td>14 in.</td>
</tr>
<tr>
<td></td>
<td>Active-screen size (diagonal)</td>
<td>13.5 in.</td>
<td>13.25 in.</td>
</tr>
<tr>
<td></td>
<td>Max. pixel dimensions</td>
<td>640 x 870 pixels @ 80 dpi</td>
<td>704 x 940 pixels @ 88 dpi</td>
</tr>
<tr>
<td></td>
<td>Horizontal-scan rate</td>
<td>75 kHz</td>
<td>79 kHz</td>
</tr>
<tr>
<td></td>
<td>Vertical-scan rate</td>
<td>68.85 Hz</td>
<td>97 Hz @ 72 dpi</td>
</tr>
<tr>
<td></td>
<td>Swivel-stand included</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>Swivel-stand area</td>
<td>72.5 sq. in.</td>
<td>100 sq. in.</td>
</tr>
<tr>
<td></td>
<td>Monitor weight</td>
<td>23 lb</td>
<td>22 lb</td>
</tr>
<tr>
<td></td>
<td>Antiglare treatment</td>
<td>dark glass</td>
<td>ESF</td>
</tr>
<tr>
<td></td>
<td>120/240-volt switching</td>
<td>manual</td>
<td>120V only</td>
</tr>
<tr>
<td><strong>Controls</strong></td>
<td>Brightness</td>
<td>right side</td>
<td>front</td>
</tr>
<tr>
<td></td>
<td>Contrast</td>
<td>back</td>
<td>front</td>
</tr>
<tr>
<td></td>
<td>Horizontal position</td>
<td>back</td>
<td>back</td>
</tr>
<tr>
<td></td>
<td>Vertical position</td>
<td>back</td>
<td>back</td>
</tr>
<tr>
<td></td>
<td>Horizontal size</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>Vertical size</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>Power switch</td>
<td>front</td>
<td>front</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>FCC certification</td>
<td>Class A</td>
<td>Class A</td>
</tr>
<tr>
<td></td>
<td>Cables supplied</td>
<td>9-pin to 15-pin</td>
<td>9-pin to 9-pin</td>
</tr>
<tr>
<td></td>
<td>Connection options</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>Dimensions (W x D x H)</td>
<td>11.75 x 12.75 x 16 in.</td>
<td>11.25 x 14.25 x 16 in.</td>
</tr>
<tr>
<td></td>
<td>Service location</td>
<td>direct or dealer</td>
<td>direct or dealer (try dealer first)</td>
</tr>
<tr>
<td></td>
<td>Warranty</td>
<td>3 years</td>
<td>1 year</td>
</tr>
<tr>
<td></td>
<td>Money-back guarantee</td>
<td>30 days</td>
<td>30 days</td>
</tr>
</tbody>
</table>

*For complete system, including video card.
†SCSI display; no video card necessary.
‡Dimensions of 640 x 870 pixels @ 80 dpi and 576 x 768 @ 72 dpi are also available.
Why buy any other display when you can now get a 15" PrecisionColor™ Pivot® for just $1149. It's like getting two great displays for the price of an ordinary one.

Because only the Pivot lets you work in both portrait and landscape modes, and turn from one to the other.

So there's no compromise in what you're doing. See your entire letter, not just a paragraph or two. And see 12 months on a spreadsheet, instead of just five or six months.

There's also no need for all that scrolling up and down, zooming in and out, getting you off track.

And no interface is required for Macintosh® built-in video, either.

PrecisionColor Pivot. The display that lets you really turn work around, at a price you can't turn down.

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CIRCLE 68 ON READER SERVICE CARD.
# Monochrome and Gray-Scale Monitors

## Table 2: Features of Two-Page Monitors

<table>
<thead>
<tr>
<th></th>
<th>Lapis Two Page Display</th>
<th>MacProducts Panasonic M1900</th>
<th>Mirror 19&quot; Two Page Display</th>
<th>Mirror 21&quot; Two Page Display</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$1,548</td>
<td>$1,037</td>
<td>$799</td>
<td>$1,199</td>
</tr>
<tr>
<td><strong>Street price</strong></td>
<td>$1,160</td>
<td>$1,037 (direct)</td>
<td>$799 (direct)</td>
<td>$1,199 (direct)</td>
</tr>
<tr>
<td><strong>Pros</strong></td>
<td>2-year warranty</td>
<td>CPU-accelerator card</td>
<td>Easy to set up</td>
<td>Easy to set up</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>No antiglare treatment.</td>
<td>Large pincushion error</td>
<td>Large pincushion error</td>
<td>Too dim. Recommended only for Mac II or Quadra series.</td>
</tr>
</tbody>
</table>

### Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Lapis</th>
<th>MacProducts</th>
<th>Mirror 19&quot;</th>
<th>Mirror 21&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>** Tubes size**</td>
<td>19 in.</td>
<td>19 in.</td>
<td>19 in.</td>
<td>21 in.</td>
</tr>
<tr>
<td>** Screen size (diagonal)**</td>
<td>18.75 in.</td>
<td>18.75 in.</td>
<td>18.75 in.</td>
<td>18.75 in.</td>
</tr>
<tr>
<td>** Active-screen size (diagonal)**</td>
<td>17.75 in.</td>
<td>17.75 in.</td>
<td>17.75 in.</td>
<td>17.85 in.</td>
</tr>
<tr>
<td>** Max. pixel dimensions**</td>
<td>1,024 x 828 pixels @ 74 dpi</td>
<td>1,152 x 996 pixels @ 84 dpi</td>
<td>1,024 x 768 pixels @ 72 dpi</td>
<td>1,152 x 870 pixels @ 77 dpi</td>
</tr>
<tr>
<td>** Horizontal-scan rate**</td>
<td>64.5 kHz</td>
<td>63.95 kHz</td>
<td>63.92 kHz</td>
<td>68.68 kHz</td>
</tr>
<tr>
<td>** Vertical-scan rate**</td>
<td>75 Hz</td>
<td>64 Hz</td>
<td>78 Hz</td>
<td>75 Hz</td>
</tr>
<tr>
<td>** Swivel stand included**</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>** Swivel-stand area**</td>
<td>132 sq. in.</td>
<td>169 sq. in.</td>
<td>147 sq. in.</td>
<td>150 sq. in.</td>
</tr>
<tr>
<td>** Monitor weight**</td>
<td>55 lb</td>
<td>41.9 lb</td>
<td>53 lb</td>
<td>60 lb</td>
</tr>
<tr>
<td>** Antiglare treatment**</td>
<td>none</td>
<td>etched</td>
<td>etched</td>
<td>etched</td>
</tr>
<tr>
<td>** 120/240-volt switching**</td>
<td>auto</td>
<td>120V only</td>
<td>auto</td>
<td>auto</td>
</tr>
</tbody>
</table>

### Controls

<table>
<thead>
<tr>
<th>Feature</th>
<th>Lapis</th>
<th>MacProducts</th>
<th>Mirror 19&quot;</th>
<th>Mirror 21&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>** Brightness**</td>
<td>front</td>
<td>front</td>
<td>right side</td>
<td>right side</td>
</tr>
<tr>
<td>** Contrast**</td>
<td>front</td>
<td>front</td>
<td>none</td>
<td>right side</td>
</tr>
<tr>
<td>** Horizontal position**</td>
<td>back</td>
<td>back</td>
<td>left side</td>
<td>left side</td>
</tr>
<tr>
<td>** Vertical position**</td>
<td>back</td>
<td>back</td>
<td>left side</td>
<td>left side</td>
</tr>
<tr>
<td>** Horizontal size**</td>
<td>none</td>
<td>back</td>
<td>left side</td>
<td>left side</td>
</tr>
<tr>
<td>** Vertical size**</td>
<td>back</td>
<td>back</td>
<td>left side</td>
<td>left side</td>
</tr>
<tr>
<td>** Power switch**</td>
<td>front</td>
<td>front</td>
<td>right side</td>
<td>right side</td>
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</table>

### Other

<table>
<thead>
<tr>
<th>Feature</th>
<th>Lapis</th>
<th>MacProducts</th>
<th>Mirror Technologies, Inc.</th>
<th>Mirror Technologies, Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>** FCC certification**</td>
<td>Class A</td>
<td>Class A</td>
<td>Class A</td>
<td>Class A</td>
</tr>
<tr>
<td>** Cables supplied**</td>
<td>BNC to 9-pin/BNC to 15-pin</td>
<td>3X BNC to 15-pin</td>
<td>9-pin to 9-pin</td>
<td>15-pin mini to 15-pin</td>
</tr>
<tr>
<td>** Connection options**</td>
<td>none</td>
<td>none</td>
<td>3 ADB ports</td>
<td>3 ADB ports</td>
</tr>
<tr>
<td>** Dimensions (W x D x H)**</td>
<td>18 x 15.5 x 18.25 in.</td>
<td>18.25 x 15.5 x 18.25 in.</td>
<td>18.5 x 15 x 17.5 in.</td>
<td>19.25 x 17.5 x 18.25 in.</td>
</tr>
<tr>
<td>** Service location**</td>
<td>dealer or direct</td>
<td>dealer or direct</td>
<td>direct</td>
<td>direct</td>
</tr>
<tr>
<td>** Warranty**</td>
<td>2 years</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>** Money-back guarantee**</td>
<td>30 days</td>
<td>30 days</td>
<td>30 days</td>
<td>30 days</td>
</tr>
</tbody>
</table>

*For complete system, including video card.

---

*MacUser's "Bottom Line" pick*
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CIRCLE 127 ON READER SERVICE CARD.
## Monochrome and Gray-Scale Monitors

### Table 2: Features of Two-Page Monitors, continued

<table>
<thead>
<tr>
<th></th>
<th>Mobius Two Page Display</th>
<th>Nano USA Corp.</th>
<th>Radius TPD/19</th>
<th>Radius TPD/21</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$799</td>
<td>$2,398</td>
<td>$1,558</td>
<td>$1,858</td>
</tr>
<tr>
<td><strong>Street price</strong></td>
<td>$799 (direct)</td>
<td>$1,760</td>
<td>$1,250</td>
<td>$1,500</td>
</tr>
<tr>
<td><strong>Pros</strong></td>
<td>Easy to set up.</td>
<td>Most stable two-page display.</td>
<td>Small pincushion error. Excellent tech support.</td>
<td>Excellent tech support.</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>No antiglare treatment.</td>
<td>Most expensive. Large pincushion error. Too dim.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Specifications

<table>
<thead>
<tr>
<th></th>
<th>Monochrome/gray-scale</th>
<th>Gray-scale</th>
<th>Gray-scale</th>
<th>Gray-scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube size</td>
<td>19 in.</td>
<td>21 in.</td>
<td>19 in.</td>
<td>21 in.</td>
</tr>
<tr>
<td>Screen size (diagonal)</td>
<td>18.75 in.</td>
<td>19.5 in.</td>
<td>18.75 in.</td>
<td>20.25 in.</td>
</tr>
<tr>
<td>Active-screen size (diagonal)</td>
<td>17.75 in.</td>
<td>19 in.</td>
<td>17.75 in.</td>
<td>19.25 in.</td>
</tr>
<tr>
<td>Max. pixel dimensions</td>
<td>1,024 x 826 pixels @ 75 dpi</td>
<td>1,152 x 872 pixels @ 75 dpi</td>
<td>1,152 x 882 pixels @ 82 dpi</td>
<td>1,152 x 882 pixels @ 74 dpi</td>
</tr>
<tr>
<td>Horizontal-scan rate</td>
<td>64.7 kHz</td>
<td>31.5 kHz – 80 kHz</td>
<td>65 kHz</td>
<td>65 kHz</td>
</tr>
<tr>
<td>Vertical-scan rate</td>
<td>75 Hz</td>
<td>55 – 90 Hz</td>
<td>71 Hz</td>
<td>71 Hz</td>
</tr>
<tr>
<td>Swivel stand included</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Swivel-stand area</td>
<td>135 sq. in.</td>
<td>122 sq. in.</td>
<td>143 sq. in.</td>
<td>143 sq. in.</td>
</tr>
<tr>
<td>Monitor weight</td>
<td>50 lb</td>
<td>61.6 lb</td>
<td>55 lb</td>
<td>60 lb</td>
</tr>
<tr>
<td>Antiglare treatment</td>
<td>none</td>
<td>AR panel</td>
<td>none (optional add-on)</td>
<td>none (optional add-on)</td>
</tr>
<tr>
<td>120/240-volt switching</td>
<td>auto</td>
<td>auto</td>
<td>auto</td>
<td>auto</td>
</tr>
</tbody>
</table>

### Controls

<table>
<thead>
<tr>
<th></th>
<th>Brightness</th>
<th>Contrast</th>
<th>Horizontal position</th>
<th>Vertical position</th>
<th>Horizontal size</th>
<th>Vertical size</th>
<th>Power switch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>front</td>
<td>front</td>
<td>front</td>
<td>front</td>
<td>front</td>
<td>front</td>
<td>front</td>
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</tbody>
</table>

### Other

<table>
<thead>
<tr>
<th></th>
<th>FCC certification</th>
<th>Cables supplied</th>
<th>Connection options</th>
<th>Dimensions (W x D x H)</th>
<th>Service location</th>
<th>Warranty</th>
<th>Money-back guarantee</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class B</td>
<td>9-pin to 9-pin</td>
<td>none</td>
<td>18.5 x 15.75 x 18.5 in.</td>
<td>dealer</td>
<td>2 years</td>
<td>30 days</td>
<td>Mobius Technologies, Inc.</td>
</tr>
<tr>
<td></td>
<td>Class A</td>
<td>BNC to 15-pin</td>
<td>none</td>
<td>19.5 x 17.2 x 18.25 in.</td>
<td>dealer</td>
<td>1 year</td>
<td>dealer option</td>
<td>Nanao USA Corp.</td>
</tr>
<tr>
<td></td>
<td>Class A</td>
<td>BNC to 15-pin</td>
<td>none</td>
<td>18 x 16.5 x 15.5 in.</td>
<td>dealer</td>
<td>1 year</td>
<td>dealer option</td>
<td>Radius, Inc.</td>
</tr>
<tr>
<td></td>
<td>Class A</td>
<td>BNC to 15-pin</td>
<td>none</td>
<td>20 x 16.5 x 19.5 in.</td>
<td>dealer</td>
<td>1 year</td>
<td>dealer option</td>
<td>Radius, Inc.</td>
</tr>
</tbody>
</table>

*For complete system, including video card.

G Vendor supplied monochrome card only.

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The Mitsubishi Diamond Pro® 17 is the ideal Macintosh® monitor for desktop publishing, graphic design, multimedia or image processing. It offers a large display with the most compact enclosure of any 17" flat-square or Trinitron monitor.

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Mac LC, Mac II or Quadra cable adapters available at no charge from your dealer.
### Table 2: Features of Two-Page Monitors, continued

<table>
<thead>
<tr>
<th></th>
<th>Relax Sampo OfficePRO Ila</th>
<th>Sampo OfficePRO Ilia-8</th>
<th>Sigma L-View</th>
<th>Sigma SilverView Pro</th>
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</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td><strong>$999</strong></td>
<td><strong>$1,295</strong></td>
<td><strong>$1,398</strong></td>
<td><strong>$1,598</strong></td>
</tr>
<tr>
<td><strong>Street price</strong></td>
<td><strong>$999 (direct)</strong></td>
<td><strong>$1,050</strong></td>
<td><strong>$1,290</strong></td>
<td><strong>$1,745</strong></td>
</tr>
<tr>
<td><strong>Pros</strong></td>
<td></td>
<td></td>
<td>Small pincushion error. Easy to set up.</td>
<td>Small pincushion error. Easy to set up.</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>Poor tech support. No antiglare treatment. Difficult card installation.</td>
<td>Poor tech support. No antiglare treatment. Difficult card installation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Specifications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Monochrome/gray-scale</strong></td>
<td>gray-scale</td>
<td>gray-scale</td>
<td>monochrome</td>
<td>gray-scale</td>
</tr>
<tr>
<td><strong>Tube size</strong></td>
<td>20 in.</td>
<td>20 in.</td>
<td>19 in.</td>
<td>21 in.</td>
</tr>
<tr>
<td><strong>Screen size (diagonal)</strong></td>
<td>18.5 in.</td>
<td>18.5 in.</td>
<td>18.5 in.</td>
<td>20.25 in.</td>
</tr>
<tr>
<td><strong>Active-screen size (diagonal)</strong></td>
<td>17.5 in.</td>
<td>17.5 in.</td>
<td>18.25 in.</td>
<td>19.5 in.</td>
</tr>
<tr>
<td><strong>Max. pixel dimensions</strong></td>
<td>1,024 x 768 pixels @ 72 dpi</td>
<td>1,024 x 768 pixels @ 72 dpi</td>
<td>1,664 x 1,200 pixels @ 120 dpi</td>
<td>1,152 x 870 pixels @ 72 dpi</td>
</tr>
<tr>
<td><strong>Horizontal-scan rate</strong></td>
<td>64 kHz</td>
<td>60 kHz</td>
<td>75 kHz</td>
<td>60-92 Hz</td>
</tr>
<tr>
<td><strong>Vertical-scan rate</strong></td>
<td>75 Hz</td>
<td>75 Hz</td>
<td>60-92 Hz</td>
<td>75 Hz</td>
</tr>
<tr>
<td><strong>Swivel stand included</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Swivel-stand area</strong></td>
<td>140 sq. in.</td>
<td>137.5 sq. in.</td>
<td>100 sq. in.</td>
<td>100 sq. in.</td>
</tr>
<tr>
<td><strong>Monitor weight</strong></td>
<td>46.2 lb</td>
<td>46.2 lb</td>
<td>46 lb</td>
<td>58 lb</td>
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<tr>
<td><strong>Antiglare treatment</strong></td>
<td>none</td>
<td>none</td>
<td>OCLI</td>
<td>OCLI</td>
</tr>
<tr>
<td><strong>120/240-volt switching</strong></td>
<td>manual</td>
<td>manual</td>
<td>120V only</td>
<td>120V only</td>
</tr>
<tr>
<td><strong>Controls</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Brightness</strong></td>
<td>right side</td>
<td>right side</td>
<td>front</td>
<td>front</td>
</tr>
<tr>
<td><strong>Contrast</strong></td>
<td>right side</td>
<td>right side</td>
<td>front</td>
<td>front</td>
</tr>
<tr>
<td><strong>Horizontal position</strong></td>
<td>left side</td>
<td>left side</td>
<td>back</td>
<td>back</td>
</tr>
<tr>
<td><strong>Vertical position</strong></td>
<td>left side</td>
<td>left side</td>
<td>back</td>
<td>back</td>
</tr>
<tr>
<td><strong>Horizontal size</strong></td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td><strong>Vertical size</strong></td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td><strong>Power switch</strong></td>
<td>right side</td>
<td>right side</td>
<td>right side</td>
<td>right side</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td><strong>FCC certification</strong></td>
<td>Class A</td>
<td>Class A</td>
<td>Class A</td>
<td>Class A</td>
</tr>
<tr>
<td><strong>Cables supplied</strong></td>
<td>15-pin to BNC</td>
<td>15-pin to BNC</td>
<td>9-pin to 9-pin</td>
<td>15-pin to 15-pin</td>
</tr>
<tr>
<td><strong>Connection options</strong></td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td><strong>Dimensions (W x D x H)</strong></td>
<td>18.75 x 17 x 17.5 in.</td>
<td>18.75 x 17 x 17.5 in.</td>
<td>19 x 16.75 x 17.5 in.</td>
<td>19 x 17.75 x 17.5 in.</td>
</tr>
<tr>
<td><strong>Service location</strong></td>
<td>direct</td>
<td>direct</td>
<td>direct</td>
<td>dealer or direct</td>
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<tr>
<td><strong>Warranty</strong></td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td><strong>Money-back guarantee</strong></td>
<td>30 days</td>
<td>90 days</td>
<td>30 days</td>
<td>30 days</td>
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<tr>
<td><strong>Company</strong></td>
<td>Relax Technology</td>
<td>Sampo America</td>
<td>Sigma Designs, Inc.</td>
<td>Sigma Designs, Inc.</td>
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<tr>
<td></td>
<td>Union City, CA 94587</td>
<td>Norcross, GA 30071</td>
<td>Fremont, CA 94538</td>
<td>Fremont, CA 94538</td>
</tr>
<tr>
<td></td>
<td>510-471-6112</td>
<td>404-449-6220</td>
<td>800-845-8086</td>
<td>800-845-8086</td>
</tr>
<tr>
<td></td>
<td>510-471-6267 (fax)</td>
<td>404-447-1109 (fax)</td>
<td>510-770-0100</td>
<td>510-770-0100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>510-770-2840 (fax)</td>
<td>510-770-2640 (fax)</td>
</tr>
</tbody>
</table>

*For complete system, including video card.

Vendor supplied monochrome card only.

* Dimensions of 1,280 x 960 pixels @ 92 dpi, 1,024 x 768 pixels @ 72 dpi, 832 x 600 pixels @ 60 dpi, 640 x 480 pixels @ 46 dpi, and 512 x 384 pixels @ 36 dpi are also available.
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Drives from $159

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Sharing Schedules

The average work day can be divided into two unequal parts: one-third is for attending meetings and two-thirds for scheduling them. Juggling conflicting appointments, booking conference rooms, and finding that nomadic overhead projector can often be an entire day's activities. All of that running around would be eliminated if you could see everyone's calendar on your machine.

That's where group scheduling software steps in — or tries to. In the past couple of years, group scheduling software has emerged as a distinct category. Judging by the 11 programs we examined for this article, however, it's clear that this genre is nowhere near as mature as, say, word processing or desktop publishing. Of the 11 packages, we found only 4 worthy of consideration and extended discussion: Meeting Maker, the mother of all meeting-proposal programs; Microsoft Schedule+, because it piggybacks onto Microsoft Mail; Now Up-to-Date, an elegant, great-looking

Sharing a workgroups' calendars over a network can take a lot of the stress out of working together.

BY ERIC TAUB
Group Scheduling Software

Calendar Considerations

When evaluating a group scheduler, you need to consider several important factors and features — beyond the basic issue of whether you can see someone else’s calendar.

- Is the program a calendar or a meeting proposer?
Some programs let you share calendar information, whereas others automate the drudgery of arranging meetings.

- How good is it as an appointment book?
A program with good network features isn’t going to be terribly helpful if it’s so feeble that people don’t want to trust it with their lives.

- Does it let you schedule more than one thing at the same time?
On occasion, you may want to book simultaneous events (such as trade-show parties). Some schedulers gracefully let you do this; others flat-out don’t.

- Does it work all the time or only when you launch it?
Most of these programs use system extensions or control panels to monitor network scheduling activity constantly, even when you’re not running the scheduler application. But not all of them do.

- What can you see about others’ schedules? What can they see about yours?
The whole point of group schedulers is to let your workgroup share calendars, but the trick is how to share a lot of overlapping information while still presenting it clearly and maintaining some privacy.

- Can you use proxies?
Sometimes you’ll want to let someone else — a proxy — change your schedule. Do proxies see all of your information or only some of it? Can you have “view only” proxies?

- How does the program link people over a network?
Many programs are server-based, which requires an administrator. Although most server-based programs limit your ability to take your schedule with you, because everyone’s calendar resides on the server, they do make it easy to check any person’s availability, whether or not that person is currently logged on to the server. Some programs that use peer-to-peer — or serverless — communications can send information only to users who are currently running the program, or who are at least currently active on the network.

- What happens when you’re not connected?
Although PowerBooks are no longer new, it’s disappointing how many of these programs, including most of the heavy hitters, assume that you never unplug your Mac and take it to the road. Ideally, you should be able to disconnect from the network, edit your calendar off-line, and have the program automatically reconcile your calendar files when you reconnect.

- How good are the program’s printing options?
Sometimes the most user-friendly computerized schedule is one that’s printed on a piece of paper. Most of these programs can print bare-bones schedules; many can print attractive monthly or weekly calendars or can print on presized forms designed to snap into your Day-Timer or similar organizer.

Meeting Maker: Meeting Specialist

ON Technology’s Meeting Maker 1.5 was the first network scheduler for the Mac, and in many ways, it’s still the most full-featured. Using a bevy of dialog boxes and windows and dozens of tiny icons that convey fine shades of meaning — often none too clearly — Meeting Maker tells you more about your meetings and their current status than any other program.

Like most network schedulers, Meeting Maker is server-based. An administrator must define users, groups, and resources on a server machine (it needn’t be dedicated). You can set up more than one server on a network and servers can trade information about users and their schedules, although these options are somewhat confusing. And you can’t accomplish anything at all with Meeting Maker if you’re not connected to your server.

When you log on to Meeting Maker, you’re presented with a five-day Daily Calendar, which displays your activities and meetings as blocks on a time line (see Figure 1). Drag through a time slot, and a dialog box pops up for creating a personal appointment. You can also specify the days and hours you’re available for meetings.

It’s when you start scheduling meetings that the fun really begins. First, you enter a title and location for the meeting. Then you select the guests and resources, using one of the following designations for each person: required (must attend), optional (doesn’t have to attend), cc:, or blind cc:. The program assigns all invitees their own mini-icon, depending on which of the four types they belong to; the appropriate icon appears next to each invitee’s name on the Guests list. These icons tell you a great deal about your invitees’ types (required, optional, and so on) and status (available, busy, or on vacation), provided you can remember what they mean.

Clicking on the Schedule button brings up a window with some of Meeting Maker’s fancier bells and whistles. The window gives you a list of all the guests and a time line for setting the meeting’s start time and duration (see Figure 2). You can click on the Auto-Pick button to find the first time and date all required guests are free to attend, but it’s more fun to scroll through the composite-schedule field, which shows a time line for the selected day. As you scroll, white bars indicate times when any required or optional guest is busy (required and optional guests have their own columns in the time bar, identified by their respective icons). You can change the meeting’s...
time and duration by dragging and resizing its rectangle in the time line. A diagonal bar appears through the icon of any user or resource whose schedule conflicts with your meeting time.

When you send a proposal, Meeting Maker automatically warns you if any guests respond that they are busy. The program has a plethora of options for tracking responses. A dialog box alerts you when every guest has accepted a meeting or when any guest says no. Icons on the five-day view convey similar information, and if you open a proposal, still more icons next to guests’ names indicate whether they’ve accepted, declined, or will decide later. You can also view any comments a guest has sent back about the meeting — but you can’t reply. If you change a meeting you’ve scheduled, Meeting Maker will automatically notify all guests.

Although you can book overlapping events, Meeting Maker treats these as conflicts rather than understanding that you might actually want to schedule multiple events. You can view one conflicting event at a time but not all of them simultaneously.

Meeting Maker’s proxy features are useful and flexible: You can designate any number of users as your proxies, granting them read/write or read-only access. You can also hide the contents of your appointments and to-do items from your proxies.

In addition to its daily and messaging views, Meeting Maker offers a rudimentary monthly view and a very simple to-do list. You can print a variety of reports, and ON Technology sells special paper designed to fit into standard appointment books. You can export events to a text file or to Sharp, Hewlett-Packard, or Casio electronic organizers.

**Microsoft Schedule+: Bare Basics**

Schedule+ 1.0 lets users of Microsoft Mail 3.0 or later do quite a lot with just a bare-bones interface. There’s a single main window for setting your schedule and viewing others’, and you use the familiar Mail interface to propose, accept, and reject meetings. Unfortunately, Schedule+ is a little too simple: It offers no weekly or monthly views, no to-do lists, and no repeating or overlapping events, and you can’t use Schedule+ at all when you’re not connected to your Mail server.

Schedule+ causes little extra work for your Mail administrator. Users and groups on your server are automatically available to Schedule+ users, and if you’re logged on to your Mail server, you’re automatically logged on to Schedule+. The Schedule+ window includes a scrolling daily time line, buttons for selecting the year and month you want, and a small monthly calendar (see Figure 3). You enter the name of an appointment in its starting time slot (on the hour or half-hour only, and be pithy — there’s not much room) and then indicate the amount of time it will take by clicking on boxes next to each half-hour segment. You can set

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**Table 1: Pros and Cons of Group Scheduling Software**

<table>
<thead>
<tr>
<th>Software</th>
<th>Pros</th>
<th>Cons</th>
<th>Ideal Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting Maker 1.5</td>
<td>• Comprehensive meeting-proposal features.</td>
<td>• Fussy interface.</td>
<td>Large organizations with formal meeting-tracking requirements.</td>
</tr>
<tr>
<td>Microsoft Schedule+ 1.0</td>
<td>• Simple, easy-to-use interface.</td>
<td>• Doesn’t work off-line.</td>
<td>Users who already have Microsoft Mail installed.</td>
</tr>
<tr>
<td></td>
<td>• Layers onto Microsoft Mail.</td>
<td>• Requires Microsoft Mail.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Easy-to-use meeting-proposal features.</td>
<td>• Lacks many features found in most other programs.</td>
<td></td>
</tr>
<tr>
<td>Now Up-to-Date 2.0</td>
<td>• Handsome on-screen and printed calendars.</td>
<td>• Lacks repeating events.</td>
<td>Small- to medium-sized businesses or workgroups.</td>
</tr>
<tr>
<td></td>
<td>• Excellent interface design.</td>
<td>• Doesn’t work off-line.</td>
<td>PowerBook users.</td>
</tr>
<tr>
<td></td>
<td>• Good support for working off-line.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Well-designed network event-sharing features.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WordPerfect Office 3.0</td>
<td>• Good meeting-proposal and network schedule-checking features.</td>
<td>• Too many windows.</td>
<td>Users seeking an all-in-one office-automation system.</td>
</tr>
<tr>
<td>Calendar module</td>
<td>• Good value.</td>
<td>• Complex codes for repeating events.</td>
<td>Budget-conscious users.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Difficult to use off-line.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Plain calendar views.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Multipurpose support is difficult to implement.</td>
<td></td>
</tr>
</tbody>
</table>

*Table 1: Pros and Cons of Group Scheduling Software*
simple alarms, and you can use a notes field to enter private comments about a day’s activities.

Schedule+ includes a scrolling list of the users on your local Mail server, which you can use to view another user’s schedule (to see schedules of users on remote servers, you must select their names from a dialog box). Check the name of a user, and you’ll see that person’s schedule. Check several users’ names, and you’ll see gray bars drawn through the times when one or more of those users is busy. To propose a meeting, you check the names of the people you want to invite and select a time that’s free on everyone’s schedule. When you want to send a meeting request, Schedule+ opens a special Mail form, addressed to the people you’ve checked and indicating the times you’ve selected. Your recipients receive your proposal as they would any other Mail message, and they can automatically book the proposed meeting into their own schedules or view their schedules first to check the meeting’s day and time. If you try to book a meeting that conflicts with an existing appointment, Schedule+ will ask you if you want to replace the existing appointment.

There’s no automatic notification of who plans to attend your meeting, however. You have to rely on the people you invite to RSVP, or you can examine their individual schedules.

You can establish resource schedules by having your Mail administrator set up resources as users (set up an account for the conference room, for example). Schedule+’s proxy features let you easily log on to one account’s Schedule+ file without logging off of your own Mail account, so you can send a meeting request to several people and to the conference room and then log on to the conference room’s schedule to book the room.

Schedule+’s printing options are sparse. You can print a day, week, month, or whatever range of dates you’d like on a single page. You can’t customize the predesigned form, however, so you may slice off appointments if you print in other than the daily view.

Just as Mail’s server-to-server communications features make it easy to send messages to remote users, Schedule+ lets you check schedules and book meetings with remote users.

**Now Up-to-Date: Innovative Beauty**

When it comes to interface design, Now Software’s Now Up-to-Date 2.0 is the class act of all network schedulers. But NUD’s focus is on maintaining personal and group calendars. It has no meeting-proposal and -acceptance
features. Not that NUD can't be used to schedule meetings, but it requires all users to check for meetings and adjust their schedules to accommodate them.

NUD just looks and feels right. You can design multiple custom monthly and weekly calendars that look like real calendars on-screen and that print equally well. And NUD's design is an elegant combination of attractiveness and information (see Figure 4).

NUD lets you create many kinds of calendar items: holidays, special events, appointments, dated and undated to-dos, Post-it-type notes, multiday banners, and graphic elements. You can create any number of categories to which you can assign your events — personal, business, travel, project-related, and so on — and you can assign colors and type styles to the events in each category. You can also define sets that display only the categories you specify, enabling you to quickly switch from viewing business-related categories only to viewing business and personal ones, for example. NUD gives you many ways of viewing your schedule, as well — from yearly, monthly, and weekly views to daily and multiday timelines to wonderfully customizable list views (see Figure 5).

NUD uses a calendar file that resides on your own Mac and contains your entire schedule, so if you go on the road, you can take your calendar file with you and view and edit it whenever necessary. Moreover, NUD doesn't create a separate file for alarms. You simply tell the Reminder control panel (a successor to Now Utilities' AlarmsClock) to look for alarms within your calendar file, and Reminder notifies you by means of a dialog box or notes in your menu bar.
Group Scheduling Software

NUD takes a unique approach to server use. You don’t share your calendar file or use E-mail to send appointments but rather create public categories of events, which then reside on the server. NUD users on your network can add this category to their calendar files. Once you access a public category, its events become incorporated into your calendar file and any alarms specified in the public events are automatically incorporated by Reminder. If you have write access, you can change any event in a public category. At intervals you specify, NUD looks to the server to see if anyone else has made changes to a public category and updates your calendar file as necessary.

If you take your calendar file off the network — on a floppy disk or PowerBook, for example — you can make changes to public categories; whenever you reconnect to the server, either by docking your PowerBook or via AppleTalk Remote Access, NUD automatically updates both your own calendar file and the server version, if necessary. If, when you reconnect, NUD discovers that you’ve modified a public event that someone else has also modified, it gives you the option of deleting your modified event or saving it to an Unreconciled Events category, so that you can consult with the other concerned parties.

NUD supports a great variety of print formats and paper sizes. Because you can customize NUD’s list views, printouts of these views are extremely useful if you want to see only specific fields of information or only certain types of events — including comments NUD doesn’t print in other views. You can also export information to a Sharp Wizard electronic organizer.

WordPerfect Office: All-in-One

As a group scheduler, WordPerfect Office 3.0’s Calendar module lies somewhere between Schedule+ and Meeting Maker. Like Schedule+, WordPerfect Office Calendar is mail-based. In fact, Calendar is one of four DAs that make up Office: there’s also E-mail, a database program, and a notepad. Calendar’s scheduling and meeting-proposal features are more sophisticated than those of Schedule+, but nowhere near the level of Meeting Maker’s. Calendar sometimes appears less than the sum of its parts, however, because its attractive features are often offset by WordPerfect’s awkward interface.

Calendar is server-based and supports multiple servers that can communicate much more easily than Meeting Maker’s servers can. As with Meeting Maker, Calendar users and resources live on its server, but Calendar’s resource options aren’t as extensive. Although you must be logged on to the server to check others’ schedules and send and receive meeting proposals, you can use the Office Calendar module when you’re off-line. However, you have to use some care in managing your data files, because Calendar doesn’t automatically reconcile conflicting information on the server and your local Mac, and it’s all too possible to wipe out information you want to preserve.

Calendar uses a sparse scheduling window. On the left are two (or three, if you have a large monitor) small monthly calendars (see Figure 6). On the right, you see a three-part box into which you can enter a memo for the day, appointments, and to-do items. You enter appointments by simply typing next to a displayed time, or you can use a simple dialog box to specify exact starting and ending times and alarm options. You can set up overlapping appointments, which Calendar does a tolerable job of indicating, and you can enter very simple to-do items and prioritize them. Clicking next to a to-do item marks it as done; Calendar automatically carries over any undone to-dos to the next day.

Calendar also has bare-bones weekly and monthly views that show your appointments for any given day. You can resize these windows and open an appointment’s dialog box by double-clicking on it, but you have no other formatting or display options.

Calendar has powerful functions for scheduling repeating appointments, but to take advantage of them, you must create formulas by using a baffling language to specify when you want events to repeat. WordPerfect tries to make formula creation a bit more user-friendly.

On the Horizon

Team Agenda, from MacVONK (the distributor of Ragentme), arrived too late to be included in this article. The program holds a lot of promise, although it may be a bit overdesigned. Team Agenda keeps copies of your personal-schedule file on both a network server and on your own Mac, so you can disconnect from the network and automatically synchronize the two files when you reconnect. The program’s networking features seem especially robust and comprehensive — from meeting proposals and scheduling to proxies and group holiday calendars.

WordPerfect Office 4.0, due out sometime this summer, promises to address the program’s confusing multiplicity of windows with a more integrated design. It will offer better calendar views and (finally!) a method of scheduling repeating events that avoids the baffling command language required by WordPerfect Office 3.0 Calendar.

Postal Development has announced a network scheduling module for its DayMaker 2.0 personal information manager. This module promises, by means of serverless, distributed scheduling, to let every DayMaker user on a network see the schedules of other DayMaker users who’ve made their schedules public.

Also, by the time you read this, ON Technology’s new MeetingMaker XP should be available. This major upgrade lets you edit your schedule off-line and automatically reconcile it when you reconnect to your network. XP has a real monthly calendar view and lets you track personal and group to-do items. It also supports multiprofile scheduling between Windows PCs and Macs on the same network.

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Secondary Events

Many programs on the market offer some degree of network scheduling capabilities but don't quite make the grade.

**True Multiuser Programs**

**CalScan**

Version 3.0 of RBC's CalScan has just about every feature you could want in a scheduling program: multiple views, proxies, appointment proposals, and conflict resolution. And CalScan is cross-platform. It's just as cumbersome on Macs as it is on PCs. CalScan is built on a run-time version of FoxBASE, which may explain its interface—a cluttered collection of dialog boxes with endless radio buttons and check boxes, plus just plain ugly schedule and appointment lists.

Worse yet, CalScan has no alarms function at all. With its overly elaborate procedures and stilted terminology, CalScan is a program only a bureaucrat could love. Make that like.

RBC, Inc., Two Colonial Place, 2101 Wilson Blvd., Ste. 801, Arlington, VA 22201; 703-243-9550 or 703-243-7854 (fax). Version 3.0. $399, five users; $499, ten users.

**Connections!!**

Concentrix Technology's Connections 2.1 has more features for keeping track of your life than you can shake a stick at. It has well-thought-out, server-based group-calendar features that let you define proxies, check others' schedules, and easily reconcile your personal calendar file with the network one. Unfortunately, Connections can't overcome the fact that it's a series of linked HyperCard stacks. Its displays look clumsy, and the program is painfully slow—even on a Quadra 950.


**Smart Schedules!!**

Smart Schedules takes its job very seriously. Unfortunately, its oddball "coat hanger" views of each diary's (that is, calendar's) events make Smart Schedules fussy and overdesigned, and its alarms work only when the program is running.

When you exchange events with other Active Memory users, each person can accept them for their events file or reject them, and Active Memory can alert you whenever you receive an event. Parts of Active Memory's design are quite elegant, but its lack of true calendar-style views makes the program less than ideal for people who need to plan their schedules over long periods of time.


**DateBook!!**

DateBook lets you share and edit a calendar file on a network volume, but you can't have more than one file open at once. You can look at your personal schedule or your group's schedule but not at both at the same time. There are no proxy or meeting-proposal features. (DateBook Pro, which will replace DateBook, has the same multiuser limitations.)


**Easy Alarms!!**

Easy Alarms 2.0.4, from Essential Software, is a deceptively simple calendar program with promising—and potentially dangerous—network features. You can share and edit multiple calendar files and send alarms directly to other users (if they're logged on to the network). The sent alarms go directly into designated calendars, but recipients aren't notified when this has happened. That's the danger. With Easy Alarms' powerful scripting language, it's all too easy for someone to create and send an alarm that, when triggered, will instantly shut down your Mac! (Version 2.1 of the program, now shipping, is functionally identical to version 2.0.4 but adds support for X10 home-automation devices.)

Essential Software, 28 Mulford Ave., P.O. Box 402, Staatsburg, NY 12580; 914-889-8365. Version 2.0.4. $99, single user; $299, five users; $499, ten users.

**Smart Alarms!!**

Version 3.1 of JAM's venerable Smart Alarms comes with a DA called Appointment Diary, available in a multiuser, networkable configuration, which is cumbersome to install and use. Although many users can have the same networked diary file open at once, only the first person who opened it can actually write changes to it. Don't forget to close your groupwork's file before going to lunch.

JAM Software, 843 W. Main St., Meriden, CT 06450; 203-630-0055 or 203-686-1900 (fax). Version 3.1. $90, single user; $170, four users; $299, eight users.

Although it offers excellent event-tracking capabilities, Active Memory doesn't have a useful monthly or weekly calendar view. The small monthly calendar at the lower right corner of this screen is the closest Active Memory comes to looking like a calendar program.

With tools and buttons galore, Smart Schedules takes its job very seriously. Unfortunately, its oddball "coat hanger" views of each diary's (that is, calendar's) events make Smart Schedules fussy and overdesigned, and its alarms work only when the program is running.
Group Scheduling Software

by providing a dialog box with pop-up menus for accessing formula commands.

To schedule appointments for networked users, you must use still more windows (see Figure 7). First, there’s a window for scheduling the event, where you enter the names of the users and the resources necessary for the meeting. (If you’re connected to a server, you can call up lists of users, groups, and resources on your server or on other servers your server is connected to.) You also enter the name of the event and its location and specify the starting and ending times. The program provides an Explanations text field, in which you can enter any other information.

If you’re connected to your server, Calendar’s handy Busy View (yes, another window) shows you, hour by hour, when the users to whom you’ve addressed the request are free or busy and when the needed resources are available. It draws black bars through the hours when invitees are busy and gray ones through the times when they have pending appointments. Assuming that you do find a time when all the people and resources you want are free, you double-click on the time to automatically enter it into the event-scheduling window. Clicking on the Send button sends the request.

When you receive a meeting request, Calendar pops up a notification message. To read and respond to a request, you go to the In half of Calendar’s In/Out Box (still another window) and open the request. The event-request window lets you accept or reject a request. If you accept, the meeting time is automatically placed into your calendar file. You can also see who else has already accepted or declined, along with their reasons. Requests you’ve sent show up in the Out half of the In/Out Box. For any request you’ve sent, you can see a list of who’s accepted or rejected, and their reasons. If your invitees are dragging their feet about getting back to you, you can renotify them of the meeting.

Calendar offers only two limited, predefined print formats. However, it does let you design your own formats, so if you don’t mind running some trees through your laser printer, you’ll eventually come up with something that fits your needs.

Pick of the Month

It’s difficult to pick a clear winner here, because no single program has all the features we find desirable in a network scheduler. Meeting Maker leaves much to be desired as a personal scheduler, but it is the master of proposing meetings and tracking responses, especially in large, formal workgroups. Its level of detail may tell you even more than you need to know.

Microsoft Schedule+ lacks features that most other scheduling programs have. The lack of repeating events is a major shortcoming, and the program is also minus weekly and monthly views. Although Schedule+ is very simple to learn and use, you should consider it only if you already have an investment in Microsoft Mail, and then only after seriously weighing the alternatives.

Now Up-to-Date has the best interface by far and the best support for off-line use — vital for PowerBook users. Small- to medium-sized groups (as many as about 50 people) in an informal environment should find that these pluses outweigh the program’s lack of formal meeting-proposal features.

WordPerfect Office’s Calendar has an attractive blend of features (especially considering the rest of the Office package), including useful meeting-proposal capabilities, but its cluttered, multiwindowed interface; Spartan views; and clunky repeating options limit its appeal.

When you call in all the cards (or appointments, in this case), Now Up-to-Date holds the winning hand.

Table of the Month

Eric Taub is a New York-based writer who’s discovered that the more scheduling programs you have open simultaneously, the later you get.

<table>
<thead>
<tr>
<th>Table 2: Group Scheduling Software</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Meeting Maker 1.5</td>
</tr>
<tr>
<td>List price</td>
</tr>
<tr>
<td>Address</td>
</tr>
<tr>
<td>City, State</td>
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<tr>
<td>Phone</td>
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<tr>
<td>Fax</td>
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</tbody>
</table>

* Price is for complete WordPerfect Office package; Calendar module is not available separately.
INTRODUCING NEW COOLSCAN.™

TO BE A GIANT AMONG SCANNERS, YOU DON’T HAVE TO BE BIG. OR EXPENSIVE.

Don’t let Coolscan’s small size (or price tag) fool you. This new slide scanner from Nikon delivers detail so sharp and color so vivid, others seem pale by comparison.

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Time taken to create: 1 minute
Keystrokes required: 6

Use the calligraphic or pressure-sensitive tool—as well as a full range of drawing tools—to design your font from scratch.

Now shipping, with over one billion fonts.

Fonts are like money; the more you have, the more you're able to do. Just think what you could accomplish if you had access to an infinite number of fonts.

Fontographer 4.0, the type manipulation and design program from Altsys, gives you that.

And more.

Fontographer actually lets you open copies of your fonts and—for without drawing a thing—automatically modify characters and add new ones, turning your existing typefaces into entirely new personalized PostScript "language and TrueType" fonts.

Logical one-step commands make font customization quick and easy. With our new version of Fontographer, anyone can blend two fonts to make a brand new one. Vary italic angles. Automatically space and kern any font. Autotrace scanned images to create new characters. Or instantly increase and decrease type weight.

Fontographer also lets you incorporate graphics into your fonts. Imagine a company logo or your signature as a keystroke.

Here's one we recently added to this font: our "1/2" review rating from MacUser. According to MacUser's Bruce Fraser, Fontographer is the "tool of choice for creating fonts on the Macintosh."

Fontographer's straightforward interface means you can be creative without being confused.

In fact, the hardest part about using Fontographer may be dreaming up names for all your new creations. But just in case you do need some help, we offer free, unlimited, technical support.

To purchase, contact your local dealer or call us at 1-800-477-2131.

Ask us about our Windows version.

Fontographer always opens a copy of your existing font, keeping your original intact.

Blend two fonts to create a third.
Time taken to create: 2 minutes
Keystrokes required: 5

This font "THabitat" was created in Fontographer by Joe Traven of Traveyfaces, Inc.

Blend two fonts to create a third. Time taken to create: 2 minutes. Keystrokes required: 5.
Illuminate your manuscript: The Auguste Racinet Historic Ornament s, from Classic Archives, is not your ordinary clip art. Based on Racinet's 1873 book of ancient, oriental, and medieval art, this CD-ROM contains 25 Scitex-scanned 300-dpi CMYK images and 72-dpi equivalents. Each page of tapestry, tile, window, and marquetry patterns can be used in its entirety or disassembled into separate motifs. Luminous colors, beautiful designs, truly stunning. 203-847-0930. $249.

Free fonts — almost: In case you haven't noticed, TrueType isn't going away, and technologies such as QuickDraw GX mean that this format will be around for some time. Moreover, high-quality TrueType fonts keep flooding the market at rock-bottom prices. Case in point: Microsoft's TrueType Master Set for the Macintosh, which contains 102 fonts for $99.95. In addition to 35 based on the original core fonts, it includes the extended Lucida family (from the respected Bigelow & Holmes foundry) and 45 publishing-oriented faces such as Gill Sans Ultra Bold and Onyx. 206-882-8080.

Fonts, glorious fonts: If you yearn to design fonts but feel daunted by the complexity of top-notch programs, take another look at Fontographer. Version 4.0 is a complete overhaul: Altsys streamlined the interface, adding automated operations for freshman font fiddlers and packing in more than 200 power-user features for professional designers. Here are a few of the highlights: Borrowing from the Altsys-developed Aldus FreeHand, Fontographer 4.0 offers a complete drawing environment for creating outlines, including the ability to edit in Preview mode; a tool for adding polygons and star bursts to logos; and robust paint tools for editing bit maps. You can also eliminate clunky contours with Clean-Up Paths, a feature that removes extraneous Bézier control points and adds them where necessary. Because spacing is one of the trickier aspects of type design, Fontographer 4.0 offers three levels of metrics control geared for pros and beginners (try the foolproof Auto Space and Auto Kern, each with Easy and Advanced settings). The packaging has been given a much-needed face-lift too. 214-680-2060. $495. * If all you really need is a new logo, check out LOGOstormer! 2.0, a nifty $89 application for quickly creating iconic logos and ornaments. Type designer Jonathan Macagba made LOGOstormer! as simple as possible for creating logos, letting you combine pre-drawn elements or your own PICT files. 215-829-1558.

By Pamela Pfiffner
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CIRCLE 225 ON READER SERVICE CARD.
When Adobe Systems announced PostScript Level 2 in 1990, a new laser printer driver was just around the corner. Three years later, it's here — almost.

By Bruce Fraser

It's been a long three years since Adobe Systems announced PostScript Level 2 along with promises of new features and faster printing. PostScript Level 2 printers have been available since August 1991, but after some initial excitement, the vast majority of users found that there was little they could do with a Level 2 printer that they couldn't do with a Level 1 printer — at least, not unless they enjoyed using a text editor to hand-code PostScript files. Although most PostScript-printer vendors have now moved to Level 2 printers, the advantage for users has been nebulous — a matter of unspecified future benefits. The reason? A lack of software that supports Level 2 features.

One key piece of software that's long overdue is a Level 2-aware Chooser-level driver. On the Mac, the printer driver performs two tasks: It takes output from an application, converts it to a form the printer can understand, and sends that information to the printer. The LaserWriter driver, which can be used for all PostScript output devices, converts the application's output to PostScript code, which it then sends to the driver. Hence, to get Level 2 PostScript code, we need a Level 2 driver. Applications that create their own PostScript code, such as Adobe Illustrator, use the driver merely as a pass-through mechanism to send the code to the printer. Those applications will show only a very slight speed gain, if any, from the new driver, but most other applications should derive significant gains.

The driver has taken much longer to develop than was originally promised by Adobe and Apple — so much so that whenever either company announced a slippage of the ship date to this or that quarter, the almost automatic response became "of which year?" Well, at press time, the Level 2 driver still hadn't shipped, but we have received final beta versions, and the shrink-wrapped software should be available by the time you read this.

The new driver will come in two forms, one from Apple and the other from Adobe. The Apple version is Apple LaserWriter Printer Driver 8.0; the Adobe version is called PSPrinter 8.0. Functionally, the Apple and Adobe drivers are identical. PSPrinter will be available directly from Adobe for $24.95. Apple pricing hadn't yet been set at press time but is expected to be similar to Adobe's. According to Apple, LaserWriter Printer Driver 8.0 will be available on AppleLink. It may also be available on other on-line services licensed to distribute Apple software, and it will ship with forthcoming new Apple PostScript Level 2 printers.

Was it worth the wait? We ran some benchmark tests, using PSPrinter 8.0, to see what you can expect in this initial version. (Because Apple's LaserWriter Printer Driver 8.0 is based on the same code, you can expect similar results from that driver.) We must stress that the benchmark data presented here is preliminary, because it isn't based on shipping software, but the driver has been so long in coming, and so much
Figure 1: You can configure Adobe’s new PostScript Level 2 printer driver, PSPrinter, to automatically select the correct PPD (PostScript Printer Description) for your printer. This one-time operation involves clicking on Setup in the Chooser (a) and then clicking on Auto Setup. The driver queries the printer in order to find matching types; it’s smart enough to recognize that the RealTech Laser uses the same PPD as the Dataproducts LZR 960, for instance (b).
PPDs are small files that incorporate descriptions of a printer's features, including paper-handling options such as multiple trays and optional extras such as envelope feeders and duplexers. To gain full control over such features from the Print dialog box, you need a PPD for your printer. Here is the only difference between the Adobe and Apple packages: The Apple version of the driver will ship with PPDs for Apple PostScript printers only. The Adobe version, on the other hand, will ship with all currently available PPDs, so owners of non-Apple printers and those who use a wide range of printing devices may find the Adobe package better suited to their needs. However, if you install all the PPDs that ship with PSPrinter, the Printer Descriptions folder will take up 4.7 megabytes of disk space, so you may want to custom-install only the particular PPDs you need.

Once you've installed the driver, the next steps are to select a printer and configure the driver to work with it by choosing a PPD for that printer. The driver remembers the setup for all printers you configure, so you need to set up each printer only once. You can have the driver do this automatically, by clicking on Setup in the Chooser and then clicking on the Auto Setup button in the resulting dialog box.

The driver remembers the setup for all the printers you configure, so you need to set up each printer only once.
The driver then searches the Printer Descriptions folder for a PPD that matches the selected printer type; by querying the printer, it recognizes, for example, that a RealTech Laser printer is the same as a Data-products LZR 960 and selects the correct PPD.

There are limits to the driver’s smarts, however: The Apple LaserWriter IIg has several different PPDs—one for each of its different RAM configurations; when you are printing to a LaserWriter IIg, the driver not only fails to select the correct configuration but also tells you it can’t find a match.

At that point, clicking on the More Choices button gives you the option of using the Generic PPD, which supports most features other than printer-specific ones, or manually choosing a similar printer’s PPD. In the case of the LaserWriter IIg, you have to choose the correct PPD manually, which means that you have to know how much RAM your printer has. Fortunately, there’s a way to find out: The new driver’s Setup dialog box includes a Printer Info button; click on that button, and the driver queries the printer and then displays details of its configuration, including the amount of RAM installed (see Figure 2).

Once you’ve completed the setup, your driver is ready for use.

**Setup and Print**

You’ll notice slight differences between the Page Setup and Print dialog boxes and their previous versions. In Page Setup, the dogcow is gone, replaced by a page image containing a more dignified lowercase a, which now appears in both the Page Setup and the Page Setup Options dialog boxes (see Figure 3). The outer rectangle represents the edge of the paper, and the inner, dotted rectangle represents the printer’s maximum image area. The page image also changes orientation to reflect the state of Portrait or Landscape modes and the Flip Horizontal, Flip Vertical, and Invert Image settings. The papersizes are now on a pop-up menu; the sizes offered depend on your current PPD selection.

A major addition to the Page Setup dialog box is a Layout pop-up menu, which allows you to print thumbnails of your pages either 2 Up, where two document pages are printed at a reduced size on a single sheet, or 4 Up, where four pages are reduced to print on the same sheet. The Page Setup Options dialog box contains the same options found in the previous version of the driver, with the addition of the Help button that’s present in all PSPrinter dialog boxes.

The Print dialog box now lets you print the first page from one paper source and the remaining pages from another if you’re using a multitray printer.

**Figure 3: The Page Setup dialog box sports a new look. The letter a—which replaces the dogcow—matches the page-image orientation. A major improvement is the introduction of 2 Up and 4 Up layouts for printing thumbnail versions of documents.**
selected.) Application-specific options also appear in the Print dialog box.

The Options button allows you to choose whether or not to print a cover page and whether to print in Color/Grayscale (the default) or Black and White. A new option, Calibrated Color/Grayscale, provides a closer color match to the Apple 13-inch RGB monitor on Level 2 printers. It also allows you to set printer-specific options such as selectable resolution, FinePrint, and PhotoGrade where applicable. In future versions of the driver, we hope to see support here for ColorSync, Apple's system-level color-management technology (see "Get­
ing Color in Sync," March '93, page 165).

PostScript-error reporting in previous driver versions was limited to a message that flashed on the screen for a few fleeting moments. The new driver provides a little more flexibility, offering three error-reporting options. The default, No Special Reporting, provides no detailed information about the PostScript error. Summarize on Screen displays a message describing the error — this option is disabled when background printing is turned on. Print Detailed Report sends a report describing the error to the printer for hard-copy documentation. True, these are welcome improvements, but we would also like to see an option that allows detailed reporting to the screen when background printing is turned on.

Printing to Disk

In PSPrinter, the print-to-disk options have been greatly expanded (see Figure 5). First, you're given the choice of creating a PostScript Job file, which can be downloaded to a PostScript printer, or an EPS file, which can be placed in another application such as a page-layout program. EPS files can have one of three preview options: Mac Standard, which produces a 1-bit, 72-dpi preview; Mac Enhanced, which provides a scalable PICT preview that can be scaled without jaggies; or No Preview, which is intended for transfer to other computer platforms.

You can choose between ASCII and binary encoding for files. The default, ASCII, is necessary for files to be readable when opened on other computers. Binary encoding (available when background printing is turned on) is more appropriate for print-to-disk options and is useful for applications such as page-layout programs. Binary encoding is also a welcome improvement. We would also like to see options for controlling the source of the preview. For example, you might wish to see a black-and-white preview or a color preview for a PostScript file. You might also wish to see a grayscale preview for a color EPS file.

The Options button allows you to choose whether or not to print a cover page and whether to print in Color/Grayscale or Black and White.
ASCII, creates the most-portable files, because any application or device that understands PostScript should be able to read ASCII PostScript files. Binary encoding creates much smaller files and hence speeds printing, but the destination printer must be able to handle binary encoding or the files won’t print. All Level 2 printers support binary encoding. Most Level 1 printers don’t. You can find out if your printer supports binary encoding by using the Printer Info button in the Setup dialog box.

You can set the level of PostScript compatibility for print-to-disk files. Level 1 Compatible, the default, creates a file that’s compatible with all PostScript printers. Level 2 Only creates PostScript Level 2 code: It can be understood only by Level 2 printers but prints to those devices faster than Level 1 code does.

The final print-to-disk option deals with font inclusion. You can choose None (no fonts), which is fine when you know that all the needed fonts are available on the device where the file will be printed or previewed; All, which includes all the fonts in the document that are available on the host Mac; or All But Standard 13, which includes all the fonts in the document except the core set of 13 typefaces found on virtually every PostScript printer since the original LaserWriter.

The print-to-fax option works only with PostScript printers equipped with fax capabilities. The support for this feature is fairly rudimentary: When you choose Fax as the destination, the Print

![Figure 5: When you're printing files to disk, PSPrinter lets you choose from several file and preview options as well as whether or not to include fonts in the PostScript file. You can also elect to use the ubiquitous ASCII encoding or the more efficient binary encoding.](image-url)

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Figure 6: We put Adobe’s PSPrinter 8.0 through its paces to get a preliminary idea of how this beta-version printer driver would affect performance on monochrome PostScript Level 1 and Level 2 printers and on color Level 2 printers. We compared its times with those of the existing Apple LaserWriter 7.1.2 driver. The most-noticeable speed gains were with files that contained large bit maps (especially the fax). The results of the font-download test on the Level 1 printer and the Word test (not shown here) on both monochrome printers were less remarkable.

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Under the Hood

That pretty much covers the most-obvious differences between PSPrinter and its predecessors. Many of the other important differences are under the hood, and all you see of them as a user is a speed improvement. The faster speed is attributable to several factors. First of all, PSPrinter produces more-efficient PostScript code than previous drivers. Simple calculations have been moved from the printer to the host computer: Instead of sending $3 \times 3$, for example (or in PostScript parlance, $3 \ 3 \ mul$), the driver sends the value 9. These changes speed up all PostScript printers, Level 1 and Level 2 alike.

When it's printing to Level 2 printers, the driver can usually reap the benefits of Level 2 features. Binary encoding results in files that are 15 percent smaller than their ASCII equivalents and thus faster to send. Level 2 operators are also more efficient. For example, the instructions for drawing a filled rectangle take only one line of code in Level 2, compared with nine in Level 1. And PSPrinter uses RLE (run-length encoding) compression on monochrome and gray-scale bit maps to further reduce the amount of time it takes to send data from the host to the printer. Level 2 code also makes for much smaller print-to-disk files.

In our tests, PSPrinter turned in shorter print times than the LaserWriter 7.1.2 driver, whether with a Level 1 or a Level 2 printer (see Figure 6). On the Level 1 printer, the most-significant speed increases were with the presentation and Photoshop files, which contained large bit maps. On the monochrome Level 2 as well as the color Level 2 printer, however, we saw significant speed increases across the board. The smallest reduction in printing time, about 8 percent for a ten-page Word document using printerresident 12-point Times Roman (not shown in Figure 6), was mostly attributable to binary encoding. For most types of documents, we saw reductions of around 25 to 30 percent on the monochrome printers and 10 to 15 percent on the color one. The largest reduction was when printing a fax-modem document—a series of large bit maps—from FAXstf to a Level 2 printer; in this test, the new driver took half as long as the old one.

We noticed only two differences in the output from the old and new drivers. When printing a color document to a monochrome printer, the new driver gives much-better-looking results. However, it does so at the expense of fidelity to the...
original. A gradient fill in the original color document was translated by LaserWriter 7.1.2 to an ugly but unmistakable gray-scale gradient fill, whereas PSPrinter rendered it as a flat gray. This may be problematic for some people, but we suspect that most will prefer PSPrinter's output.

A potentially more serious anomaly surfaced, ironically, with our simplest test file, the ten-page Word document. It had page numbers at the top of each page, which printed correctly when we used the old driver but appeared only on the first page when we used the new one. Adobe acknowledged that this quirk was probably a bug in beta software.

PSPrinter isn't quite everything we'd hoped it would be. We'd like to see more flexibility in the paper-handling options and better fax support. The omission of ColorSync support is perhaps the biggest disappointment. But based on this first look, we suspect that everyone who has a Level 2 printer will benefit from the new driver. If you're still using a Level 1 printer, the incentive to upgrade is less clear-cut. If a significant part of your printing contains bit maps, you'll notice a substantial speed gain. For most other jobs, the gains are so slight as to be almost unnoticeable. But the ability to print two-page and four-page thumbnail layouts and the increased flexibility of the print-to-disk options may provide sufficient incentive to make the move. PSSDriver is an encouraging, albeit long overdue, first step. We hope it spurs developers to take advantage of some of Level 2's more advanced features.

**PSPrinter is an encouraging, albeit long overdue, first step. We hope it spurs developers to take advantage of some of Level 2's more advanced features.**

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Bruce Fraser has been writing about PostScript Level 2 for three years and about printers for even longer.
Entering the Third Dimension

Craft a complex still life by combining simple lathed objects and geometrical shapes in Infini-D.

By Janet Ashford

Intimidated by 3-D? Don’t be. With today’s intuitive 3-D programs, you can create stunning illustrations with ease. By building complex objects out of elementary shapes, applying ready-made textures, and adding light sources and backgrounds, you can create convincing realizations of still lifes, interior designs, and architectural renderings.

Artist Chuck Carter, of Cyan, in Spokane, Washington, used Specular International’s Infini-D to construct a still life of objects on a tabletop, drawing on the program’s primitive-shapes tools (for creating cubes, spheres, columns, and so on) and its lathing and extrusion functions. Although the result looks like a daunting one to achieve, the scene isn’t difficult to assemble once you’ve mastered a few basic 3-D concepts.

Carter offers this advice to novice modelers: When creating your objects, think like a photographer. Keep the shapes simple, and use surface attributes to make them stand out. Study objects on your own shelves to see how they’re made; using the correct details enhances realism. Then, when arranging those objects in a scene, think like a designer. Consider the direction of objects (for example, the way handles, arrows, and other lines are pointing), and make use of the negative space between objects to develop your composition. Keep lighting simple but effective. A well-directed main light source adds drama to even the most rudimentary scene.

Janet Ashford is coauthor of the forthcoming Desktop 3D.

To create a realistic still life, Spokane artist Chuck Carter applies ready-made and scanned textures to objects constructed from simple shapes. He creates each element of the still life in a separate document and then copies and pastes it into a single model scene. After arranging light sources, he renders the model with ray tracing, a sophisticated rendering method that reveals in detail all the colors, textures, and other properties such as reflectivity and transparency that have been applied. The result is what Carter calls a “super-superrealist” illustration.

1 Constructing the Clock

Each object in the still life is made up of several smaller, simpler objects grouped together. The alarm clock, for example, consists of 21 objects, each of which is named and listed in a pop-up menu attached to the object (a). Some objects, such as the bell clappers, are constructed with Infini-D’s column and sphere tools, which create geometrical primitives. The bells, on the other hand, are simple lathed objects. The Infini-D interface allows Carter to see the clock in several views — such as top, camera, front, and right (b) — simultaneously.
Disassembling the Clock
Ungrouping the clock's elements and moving the pieces apart by using Infini-D's horizontal and vertical plane tools (H-Plane and V-Plane) provides a clear picture of how the clock is made. Shown here is an exploded view of the clock in Wireframe mode (a) and a camera view of the clock in Shade Better mode (b).

Creating a Lathed Object
To create the bells for the clock, Carter opens Infini-D's Lathe workshop and uses its drawing tools to make a flanged outline. He then specifies that the outline be lathed 360 degrees, with 12 polygonal sides. The straight sides smooth out when ray tracing is applied; the more sides there are, the rounder the object will look. A wire-frame view of the lathed object appears in the Workshop window.

Applying Surface Maps
Carter applies Infini-D's brass and copper surface maps to the metal parts. Then, to create a realistic clock face, he imports two graphics created in Adobe Illustrator and Photoshop: a color PICT map with numbers, texture, and graphics (a), and a bump PICT map, which lends a relief texture to the clock face (b). Carter applies the two maps to a squashed cylinder behind the transparent glass cover of the model clock face. He adjusts their size to fit, using Infini-D's Surface Composition dialog box.

Creating the Lamp
To fashion the lamp, Carter again turns to the Lathe workshop to create the base, body, and other elements. He assembles them (a) and then applies color maps (b) and bump maps (c) to the lamp body. Only the lamp base and body are visible in the camera view, but the light source within the lamp's "light bulb" shines on the objects around it.
STEP BY STEP

6 Stacking the Deck
To make the playing cards, Carter scans actual cards (a) and then applies them in Infini-D as surface maps to slightly extruded rectangles. To fan the deck — shown here in wire-frame view (b) — he duplicates the first card, rotates it, and positions it above the original. This “child” card is then linked to its “parent.” Using the Duplicate as Child command creates copies with the same rotation and repositioning relative to the last-used parent.

7 Creating the Tabletop
A table with the look of intricate inlay adds a special touch of realism and refinement to the scene. Using Photoshop, Carter combines scanned marble and wood textures into color maps (a) and bump maps (b) for the table. He then applies them to a slightly extruded square, using Infini-D.

8 Adding Final Details
After creating the cup and globe with the same methods he used to make the other objects, Carter adds finishing details to the tableau. To a wall behind the scene, he applies a wallpaper pattern generated in Illustrator and Photoshop (a). Adding a reflection map to the environment around the scene enhances realism by reflecting its rudimentary landscapelike color gradations in the shiny surfaces of the objects (b).

9 Rendering the Model
To complete the still life, Carter composites all the objects into a single scene before final ray tracing. In Wireframe mode, each object is rendered by a grid of lines showing the averaged color of its associated texture map (a). Other rendering options include Shade Fast (b); Shade Better (c); or Shade Best (d), which is closest to how the final ray-traced image will look. Objects within the scene can be rotated or repositioned at any time, and the scene can be viewed from any camera angle.
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By Stephan Somogyi
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When you decide it's time to connect your local network of Macs with the ones at your company's other sites across the country, be prepared: It's not exactly a plug-and-play proposition. AppleTalk may be great for networking local workgroups, but it just wasn't designed for WANs (wide-area networks). In particular, it wasn't meant to handle wide-area routing and the complications that occur when you send data across a vast Internet to distant sites.

Fortunately, help is on the way from not one, but two, sources. The first is Apple. An Apple team has been busily designing a new routing protocol called AURP (AppleTalk Update-based Routing Protocol) — a protocol that's available with the new Apple Internet Router (version 3.0) — to handle WAN connections. In addition, a group of vendors that includes Cayman, Cisco, Novell, Shiva, and Wellfleet is developing its own wide-area protocol, code-named Dr. Pepper, which will soon be available as a router option.

If you're building a large Internet or expanding the one you have, you'll want to know how these new protocols can help solve your WAN routing problems and which one is better for your needs.

**WAN Performance**

First, let's go over some background. AppleTalk's routing protocol, RTMP (Routing Table Maintenance Protocol), was designed to handle routing in local workgroups rather than over WANs. Its limitations include the following:

- There's no way to resolve conflicts between two routers that have contradictory information — a likely occurrence in a large company Internet that has multiple managers.
- Its information-exchange scheme requires routers to broadcast information such as node numbers and names every ten seconds, creating overhead traffic that becomes unmanageable when two or more large campus internets are joined over WAN connections.
- It has no provisions for managing network security, although some vendors have devised their own methods to protect zones and devices from intruders.
- Its limitation of 15 hops, or routers in series along a path, between any two of the nodes on the Internet is unrealistically limiting number for many corporate internets that exist today.
- Its routing algorithm is based on the number of hops (that is, it assumes that the best path is the one with the fewest hops) rather than on characteristics such as speed, utilization, and reliability. These characteristics can be more important than the number of hops in picking the best path between two distant sites.

These limitations of RTMP don't mean it's obsolete, however. Both AURP and Dr. Pepper take the approach of supplementing RTMP rather than replacing it. Routers within each site's Internet can still use RTMP as their internal-routing
Figure 1: When Network Numbers Collide

Anchorage

Let 6 = 2006
Let 10 = 2010

Cleveland

Let 6 = 3006
Let 10 = 3010

Figure 1: When you start connecting networks in far-apart locations—say, Cleveland and Anchorage—over wide-area links, you may find that some network numbers (such as 6 and 10 here) occur in both sites, which can lead to routing confusion. Fortunately, the new AURP and Dr. Pepper wide-area-routing protocols allow network hiding, so you can exclude conflicting networks rather than share them over a wide-area link (a). AURP has additional features, such as the option of remapping network numbers so they don't conflict with network numbers at the sister site (b). Each protocol is designed to run alongside AppleTalk's RTMP in external routers that connect to similarly equipped routers at the sister site, and each allows tunneling of AppleTalk through IP and PPP.

Two Approaches

AURP and Dr. Pepper use similar strategies, but their results have some notable differences.

The Similarities. AURP and Dr. Pepper use similar strategies for improving wide-area AppleTalk routing:

- They use proven methods—that is, existing protocols that perform well for WANs—to send AppleTalk information between campus internets.
- They define the standard methods and data formats for encapsulating AppleTalk information inside each of the wide-area protocols selected.
- Their routers translate AppleTalk information between RTMP and the wide-area protocols, using these standard methods of encapsulation.
- They define additional management and security features for routers as needed to improve the routers' performance and also to make them easier to use.

The Differences. Although the strategies for these two protocols are similar, the data formats they define for encapsulation of AppleTalk within wide-area protocols are different, which means that Dr. Pepper and AURP are incompatible with each other. Although it's possible to have both kinds of external routers in your WAN or even in your local campus network, an AURP router cannot be paired with a Dr. Pepper router to form a WAN connection.

The differences in the feature sets of the two protocols reflect the divergent visions of the two design teams (see Table 1). The AURP designers set out to make a highly sophisticated wide-area-routing protocol with a rich set of features for WAN designers and network managers—features so powerful that they must be used carefully. In contrast, Dr. Pepper aims to be a simple, no-frills wide-area-routing protocol that meets a more particular need: creating an easy, reliable AppleTalk connection between two points in a WAN.

A Sample Scenario

Let's say that you are in charge of your company's main AppleTalk internet, in Anchorage, Alaska, and that you have been asked to construct wide-area AppleTalk links to your company's other division, in Cleveland, Ohio (see Figure 1). Your company already has a WAN operating between these sites, routing IP (Internet Protocol), but AppleTalk routing over this WAN was not allowed before.

In an all-too-realistic scenario, let's also say that the AppleTalk internets at the two sites were built by independently operating network staffs with no technical coordination between them, so the proposed wide-area internet has network-number conflicts. In this case, each site has networks numbered 6 and 10. To activate an RTMP link between these
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two sites, either you or your counterpart in Cleveland will have to remove the conflict by reconfiguring the local router connecting these networks — if such a reconfiguration is feasible.

With AURP and Dr. Pepper, however, your options are expanded. Perhaps only a portion of each site’s networks need to be shared and these portions do not include conflicting network numbers. In this case, you can use either of the new protocols, because both AURP and Dr. Pepper allow you to select which networks to share over the wide-area link and which to exclude.

If, however, you want to share networks 6 and 10 in Cleveland with all the networks in the Anchorage site and changing the network numbering scheme is impractical, you don’t have a choice. You must use AURP in your external routers, because only AURP can remap the conflicting network numbers between the sites. In Anchorage, Cleveland’s networks 6 and 10 can be remapped by Anchorage’s external router (running AURP) to avoid the conflict. If you want, you can even specify a range of network numbers you’d like the AURP external router to use when it remaps the conflicting network numbers.

AURP also has other features you might want, such as an option to cluster several networks so they appear to routers at the other site to be just one network. For example, you can configure the AURP external router in Cleveland so that it represents the entire Anchorage internet as a single extended network. If you do this, the Cleveland RTMP routers — the internal routers that aren’t directly connected to routers at the Anchorage site — will not need as much memory, because they will need to know about only this single extended network, which contains all of the Anchorage zones.

Another handy feature offered by AURP is hop-count reduction, which allows you to send data to networks that are more than 15 hops away (AppleTalk’s limit). You can also use this feature to help your router pick better paths for wide-area routing. For example, if you have a fast link with many hops and a slow link with fewer hops, you can have the external router artificially reduce the number of hops along the fast route to make it preferable.

**Protocol-Product News**

At press time, Apple had just come out with a router supporting AURP: version 3.0 of Apple Internet Router ($499); it requires AppleTalk/IP Wide Area Extension (also $499). Apple Internet Router is software, not hardware; it runs on a Macintosh that’s simultaneously connected to one or more networks and routes AppleTalk over LAN (local-area network) and modem connections. With AppleTalk/IP Wide Area Extension, a

<table>
<thead>
<tr>
<th>Feature</th>
<th>AURP</th>
<th>Dr. Pepper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support for tunneling AppleTalk through the wide-area-routing protocols IP and PPP</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Network hiding, so you can select which networks are shared or excluded over the wide-area link</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Individual-device hiding by name and type</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Network-number remapping to avoid network-number conflicts between sites</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Clustering of remapped network numbers to conserve router resources (so that several networks at a distant site can appear to your local RTMP routers as a single extended network)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hop-count reduction to allow internets with more than 15 hops (routers along a given path) and to provide a way to force routers to choose a particular path over others</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Modem callback for increased security</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Data compression for increased throughput</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
network manager can make a link encapsulating AppleTalk inside IP to a similar AURP-equipped router at a distant site. The link between the sites can occur either over a dedicated connection controlled by the company’s network staff or over a nationwide network, such as the Internet, that routes TCP/IP (Transmission Control Protocol/Internet Protocol) traffic. IP determines the path by which the encapsulated AppleTalk information travels between the sites.

Apple Internet Router is easy to set up and offers the full AURP feature set. It also includes an SNMP (Simple Network Management Protocol) module for network management. This router’s apparent ease of use is deceptive, however. By using some of AURP’s more advanced features without careful planning, you can easily create chaos in your WAN. With the hop-count-reduction feature, for example, you could potentially create an endless loop in a redundant network (a network with multiple paths between any two sites) unless you thought through all the possibilities first.

Setting up a complicated AppleTalk WAN with AURP does require a good deal of planning — but then, creating any kind of WAN has always required a lot of planning. At least now you have more-powerful tools to work with.

### Each protocol lets you select which networks to share over wide-area links and which to exclude, but only AURP can remap conflicting network numbers.

Pick a Protocol

Although it’s too soon to evaluate how AURP and Dr. Pepper compare, it’s not too soon to think about which best meets your wide-area-routing needs (see the “WAN Planning Wisely” sidebar).

Which vendors will support these protocols? Most vendors are reluctant to commit to AURP and are expressing support only for Dr. Pepper. If AURP receives any kind of market acceptance, however, router vendors will probably change their minds and incorporate AURP into their routers as well, perhaps as an added-value feature. With the large number of router vendors now in the marketplace, no vendors can afford to be left out of the competition by not offering a feature the others have — or they might end up as WAN-vendor wannabes.

Kurt VanderSluis is president of The Network Group, a training and consulting firm in Seattle.

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**WAN Planning Wisely**

Which protocol will you want to use in your external routers? Obviously, if you need the extra features AURP offers (see Table 1) — for example, if the networks you’re connecting have number conflicts or if you need to go farther than 15 hops between routers — you should go with AURP.

If you don’t need AURP’s extra features, your existing router setup may be a deciding factor. For example, if your router vendor supports only one of the protocols, you’ll probably choose that protocol rather than buy new routers. If your router vendor supports both protocols and you don’t have a lot of experience with either protocol, you may want to ask your vendor which protocol generates more tech-support calls.

In considering ease of use, bear in mind that Dr. Pepper has fewer features than AURP does and is less complex. This means that Dr. Pepper will probably have fewer gotchas — the types of problems unforeseen by designers, not experienced by testers, and found only from use in the real world. If you go with AURP, you should allow for extra time in your planning and debugging process to handle AURP’s complexity.

Bear in mind that AURP versus Dr. Pepper doesn’t need to be an either/or proposition. Although each type of external router, AURP or Dr. Pepper, can be paired only with another external router of the same type at the sister site, there’s nothing to stop you from having both types of connections in your WAN wherever they make sense.
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Apple Opens Up

Macintosh Easy Open makes the Mac open files it used to balk at — and opens the door to better system-level connectivity for PC users.

By John Rizzo

Who would have thought it: Apple is finally starting to build connectivity right into its system software. "What?" you may say. "Hasn't Apple always stood for easy connectivity — plug-and-play and all that?"

Sure, but connectivity with other Macs (or with peripheral devices) and connectivity with non-Apple computers are two different things. Where cross-platform connectivity is concerned, Apple's system software hasn't been all that accommodating. For the most part, Apple's policy has been to leave the building of connectivity software to third-party developers — giving us Macs with floppy-disk drives that can read DOS disks and a Finder that can't.

This policy has turned around and bitten Apple, as the company has attempted to succeed in an Intel-dominated world. Without complete PC compatibility in the box, new Mac users (as well as potential first-time Mac buyers) don't realize just how PC-compatible the Mac can be. This ignorance keeps Macs out of PC-dominated organizations.

Confronted with this problem, Apple is moving away from its old leave-it-to-the-free-market policy and becoming more of an all-inclusive connectivity provider — taking advantage of System 7's expandability to add important connectivity capabilities on a basic level. These capabilities include the cross-platform QuickTime (QuickTime for Windows was released last fall); the soon-to-be-released Apple Open Collaboration Environment (AOCE), for E-mail and directory services; and the recently released Macintosh Easy Open, a boon for file translation.

Unlike QuickTime, Macintosh Easy Open doesn't ship with system software. It's due to be added in the next major system release, but for right now, you can get it (free) only with new versions of certain file-translation programs. Along with Apple's other system enhancements, it's likely to help Apple's budget problems and narrow your connectivity deficit as well.

Software Socialism

The more suspicious among us might smell software socialism in this strategy, in which the state provides everything, but quality and innovation suffer because of lack of competition. However, Apple's approach with Macintosh Easy Open demonstrates that it's possible to provide standardization and universal functionality in system software while still having third parties create vital pieces of the pie.

Macintosh Easy Open lets you open documents, including PC files or Mac documents, for which you don't have an application. But Macintosh Easy Open doesn't translate the documents itself; it helps the Finder give you a selection of applications and translators you can use to open the documents. The task of translation is left to applications that open other formats and to translator products that are Macintosh Easy Open-savvy, such as the latest versions of DataViz's...
MacLinkPlus/PC and MacLinkPlus/Translators; Mastersoft’s Word for Word/Macintosh; Equilibrium Technologies’ Debabelizer; Kanda Software’s CAD-Mover; and Apple’s XTND translators, originally developed by Claris.

Read My Bits: No New Interfaces

Macintosh Easy Open provides the two essential ingredients of system-connectivity software: universality, or the ability to work with any program, and transparency, which means it works without adding another interface for users to learn. Because Apple holds the key to the Mac ROM, these are ingredients no third-party software vendor can provide.

Not that third parties haven’t made attempts in the area of file translation. Claris tried to achieve universality and transparency when it developed the XTND translators (now owned by Apple), which worked from within an application’s Save As window. However, they worked only within Claris applications and a few others (when Claris convinced the developers to add XTND). These translators also didn’t work with the Finder. DataViz took a shot at transparency with version 6.0 of its MacLinkPlus products, which let you double-click on a DOS file from the Finder. However, double-clicking just opened the translation program and you had to take things from there.

With Macintosh Easy Open installed as an extension to System 7, the process is much less complex: the Mac knows which Mac and PC formats are supported by the applications and translators you have on your hard disk. If you double-click on a file created with an application you don’t have, Macintosh Easy Open looks for another way to open the file. For instance, if you double-click on a file in Adobe Photoshop’s native format but you don’t have Photoshop on your hard disk, you won’t get the usual “application could not be found” message. Instead, you might get a window displaying a list of applications that support the native Photoshop format, such as Color It!, from Timeworks. Click on a supporting application, and the file opens. Of course, you could have opened the file with Color It! right from the start, but only if you’d known that Color It! supported the Photoshop format — and if you’d known that’s what format the file was in.

In addition to showing you which other applications can open a file for which you don’t have the creator application, Macintosh Easy Open lists any translators you have available for opening it. For instance, if you double-clicked on a WordPerfect for Windows document, you might get a choice of translating the file with WordPerfect for Macintosh or using whatever translators were on your hard disk (MacLinkPlus or XTND, perhaps) to convert the document to WordPerfect for Macintosh or other formats, such as Microsoft Word.

Once you’ve chosen the translation you want, the file is converted and opened in the application you selected. If you don’t like the results — perhaps because the translator you chose lost some formatting — just quit and start again with another translator. The original file is always retained. If you try to open the same type of file later, Macintosh Easy Open remembers the last translation you used and highlights that translation in the selection dialog box.

Like XTND, Macintosh Easy Open also works from within applications. When you issue the standard Open command in an application, you get a list of all the files, not just those the application can open. “So this is a feature?” you might ask, as you scroll through the hundreds of files on your hard disk. Well, sort of. It does let you select foreign files, ordinarily unavailable in the Open window, but you can’t narrow the selection when you want to.

Drag and Convert

Macintosh Easy Open makes it possible to translate documents without opening them. To translate a group of documents to the format of a particular application, you can select the documents in the Finder and drag them on top of your application. A list of translators specific to the application then pops up.

You can also create a script, called a document converter, that automatically translates files to a particular Mac or PC format, using the translator package, application, or technology you specify (such as MacLinkPlus or XTND). To set up a document converter, double-click on Macintosh Easy Open’s converter file and choose a format and translator. Macintosh Easy Open changes the name of the document-converter file you’ve created to indicate the destination file format — for example, “to WriteNow
Document.” To translate a file to that format, just drag and drop it on top of the document converter. If the file is in a format your specified translator can handle, a new converted file appears, with the original filename followed by “(converted).” You can also drag and drop multiple files simultaneously, but the files must be of the same type.

**Proliferatin’ Info**

When you boot your system with Macintosh Easy Open, System 7 collects detailed information about the file type of each document on your hard disk. This information adds 2K to 3K to each file’s size. You might think that these tiny file expansions could add up to a couple of megabytes if you had a thousand or so files on your hard disk, but the actual cumulative effect is much less. The reason is that files on hard disks don’t always fill up the blocks that are assigned to them, so some of the Macintosh Easy Open data will fit into this ordinarily wasted space.

All this information collection and storage has a plus side: You get more information about files in the list (non-icon) views of folders. Normally, the Finder presents fairly generic information in the Kind column — for example, “Excel document” or just “document” for PC files. Macintosh Easy Open tells you much more, with Kind information such as “Excel Toolbar,” “Stuffit Archive,” or “AppleLink Package.” And PC documents are identified by their applications — “WordStar Document” and “WordPerfect PC,” for example. This extra information in the list view remains even when you turn off the translation in the Macintosh Easy Open control panel.

**Don’t Stop Thinking**

Macintosh Easy Open gives Mac users the foreign-file ease of use they’ve long deserved (although it still needs to be built in to every Mac, not just made available with third-party programs).

Let’s hope Apple maintains its momentum and gives us more of the connectivity features we need at the system level. A built-in DOS-disk-mounting utility is obvious, something Apple should have had when it introduced Macintosh floppy-disk drives that read DOS disks. We could also use a built-in extension that let Macs read the IPX protocol, so that Macs could connect to Novell NetWare servers simply by plugging in to a NetWare network. And while we’re at it, how about AppleTalk Remote Access for PCs, so we can use PowerBooks to dial in to desktop PCs.

Of course, we do have to be careful of what we ask for here. Do we really want a Windows version of Macintosh Easy Open with the acronym MEOW? 😐


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Publisher: Berkeley Systems Also available: After Dark 2.0 UTO119 $29 and More After Dark UTO230 $25.

$219*

After Dark 2.0/More After Dark Bundle

$155

$42

Circle 156 on reader service card.
Suitcase by Fifth Generation Systems lets you organize your growing collection of fonts. Dirs, F-keys and sounds into any number of separate "suitcase" files outside your already bogged down system file. So your computer will operate at peak performance, unburdened by the bloated system that can slow things like application launches down to a crawl.

Monotype 57 Fonts is a collection of 57 of the best PostScript typefaces money can buy—all original designs from the world-renowned Monotype Typeface Library—not cheap imitations. (Publisher: Monotype)

**ADDED BONUS!!**
Kaboom! is a 150 wild and wacky sounds that you can add to the everyday functions of your Mac. Amaze your friends and colleagues with the sounds of traffic jams, screams, and ringing phones—even famous soundbytes from "Twilight Zone," "I Love Lucy," Ronald Reagan and more! Never send for a simple beep again! (Publisher: Nova Development)

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FREE TYPEFACES!
WHEN YOU ORDER SUITCASE FOR ONLY $59!

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Cachet
Cachet, Editor's Choice for "Software Product of the Year"-MacUser, lets you edit desktop color images in a remarkably intuitive and accurate way. With Cachet's unique Full-To-Reference feature, you'll never make another printing mistake because you adjust the on-screen colors of your image to match a reference image that has already been printed. Other features include MultiChoice, a quick way to correct color, and MultiColor for matching color to any printer and more! (Publisher: Efi)

$399

IntelliDraw
IntelliDraw is the fastest, most innovative new drawing program—so unique that it actually does much of the drawing for you. Professional-looking technical diagrams, bar charts and engineering graphics, architectural renderings, flow charts, org charts, space plans, logos, maps, forms, presentations and much more are all a snap to draw. Create symmetrical graphics instantly with the exclusive Symmetron™. Ready-to-go clip art and smart templates, plus an instructional videotape, gets you started immediately! (Publisher: Aldus, $295)

$199

PowerPoint 3.0
PowerPoint 3.0 makes it easy for presenters to have complete control over their presentations, from initial ideas through powerful end results. It has all the tools you need—word processing, graphing, outlining, drawing and presentation management. And it is designed to take full advantage of the capabilities of QuickTime and System 7.0, including Publish and Subscribe, AppleEvents, and Balloon Help. That's because the PowerPoint presentation graphics program was designed especially for business people like you who need to communicate important ideas. With PowerPoint, you have the power and the flexibility to create presentations that are as strong as your ideas. (Publisher: Microsoft, $295)

$295

Wallpaper
With the prize-winning Wallpaper decorator program for your desktop, you can jazz up your screen with large patterns in up to 256 colors, grayscale or black and white. Includes hundreds of desktop patterns, or create your own with Wallpaper's expanded tools. Just drag and drop patterns into place and try creation after creation. You can set Wallpaper to change patterns among your favorites and/or create new patterns from any format. Recommended by the major Mac magazines. (Publisher: Thought I Could, $37)

$37

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(Expect to receive your first issue within 4-6 weeks.)
Have a nice day: Emoticons, the typographical characters that represent smiles :-(, winks :-) and other nontextual communication have become an essential component of E-mail etiquette. If you want to get up to speed on smileys, you can now choose between two guides. Seth Godin’s The Smiley Dictionary, from Peachpit Press, comes with plenty of examples (did you know that :-) represents Ronald Reagan?) as well as coupons for sample time on CompuServe and America Online. 510-548-4393. $6.95. ♦ David Sanderson’s Smileys, from O’Reilly & Associates, has 650 examples of typographic emoting as well as a tie-in smiley contest with a $500 prize. :-)) 707-829-0515. $5.95.

Famous-designer rodent: Quick, who’s “the best-known designer of our time”? If, like the folks at Moustrak, you answered Luigi Colani, designer of “aeroplanes, cars, furniture, bathrooms,” then you’ll want to wrap your hand around the Sicos Colani Mouse. What sort of mouse does a man who designs bathrooms put his name on? Expect no frills (one button) and no thrills (no software), but you do get to choose between right- and left-handed models in two colors: plain-old platinum (shown here) and black, which of course looks faster. A small M on the bottom momentarily made me think that the Colani mouse came in different sizes (wouldn’t it be great if you could buy mice in as many sizes as T-shirts?), but then I realized that the M stood for Macintosh. 702-884-1925. $79. ♦ And where would a designer mouse be without a designer mousepad? The Flatpad, from Mango Industries, has one significant feature: It stays flat. Stiff. Unbending. Not floppy. If your desktop (your real desktop) is as crowded as mine, you can just plop a Flatpad down on top of the papers and rev up your Colani. 415-328-9661. $14.99.

Butterflies aren’t free: But they’re not too expensive either if you get Butterflies of the World, from REMedia. The first in a continuing series of ZooGuides (the next volume will cover whales and dolphins), the CD-ROM includes photographs of 250 species of lepidoptera from 15 families. An attractive interface provides access to educational information and some QuickTime movies. 619-549-8285. $59.95. ♦ Another CD-ROM package that shows off the power of the medium is Sightlines, from DiscMore Productions. This two-disc set contains more than 24,000 photos relating to works of art and architecture (disc 1) and to the earth and earth sciences (disc 2). And every picture is in 24-bit format. 403-450-2734. $295.

Less-is-more department: Two scaled-down products for PowerBooks: Wallpaper, the utility that lets you install fancy desktop patterns, now comes in a special $59.99 Zebra Edition, with hundreds of patterns designed for black-and-white screens. Already got Wallpaper? You can get just the black-and-white patterns for $15. 212-673-9724. ♦ Kensington’s NoteBook Traveler Compact is a PowerBook case that isn’t much bigger than the PowerBook itself, which makes it perfect for short trips or commuting. 415-572-2700. $79.95.

By James Bradbury
For years, capability and affordability were mutually exclusive features of laser-quality printers. But the new microWriter™ PS23 from Texas Instruments has changed all that. Now you can get sharp, crisp laser-quality images, rapid 5 page-per-minute operation and the reliability of LED technology. All in one very affordable printer. Thus enabling you to print more. Produce more. Do more. In other words, to extend your reach. The new TI microWriter PS23. It can make a small business look a lot bigger. And a big business look a lot smarter. For more information and your nearest dealer, please call 1-800-527-3500.

EXTENDING YOUR REACH WITH INNOVATION™
Things for Looking Up

Add the right tools — from encyclopedias on-disc to edutainment software — and your Mac becomes an incredible learning machine.

By Bob LeVitus

Putting reference works such as dictionaries and encyclopedias on a computer has always seemed like a great idea. Why, then, have so many attempts to do so resulted in mediocre products? Because, to be successful, an electronic reference must offer benefits, such as multimedia technology and search capabilities, you can't get from the equivalent paper-based version — especially because the paper version is usually cheaper (and doesn't require electricity). Until recently, I hadn't seen many electronic reference works that even came close to achieving that goal. But that's beginning to change, especially as CD-ROM packages start to enter the mainstream.

The New Grolier Multimedia Encyclopedia, for instance, is a CD-ROM that contains the entire 21-volume Academic American Encyclopedia — 33,000 articles (about 10 million words); thousands of pictures, illustrations, and maps; and hundreds of audio clips, video clips, and animated sequences.

The Grolier encyclopedia's interface is straightforward and easy to learn. A floating palette provides icons for different views, indexes, and search tools. The indexes use an outline metaphor. Every item — articles, indexes, pictures, movies, sounds — appears in its own movable, resizable window, so you can have several items on-screen simultaneously, arranged in any way you choose. If an article has an associated map, video clip, picture, sound clip, or animation, you can see that element with a single click.

Finding topics in the Grolier encyclopedia is easy. You can search for a word or combination of words. Every word on the disc is indexed, so search speed is good even on slower Macs, and the search options are simple but effective. There are also separate, searchable indexes for article titles, maps, video clips, sound clips, pictures, and animations.

In addition to searching, two other ways to explore the encyclopedia are available: the Knowledge Tree and the Timeline. The Timeline is a chronological list of events since the dawn of history. You double-click on any event to see a list of related topics. The Knowledge Tree is an outline based on six branches of knowledge: the arts, geography, history, science, society, and technology.

I have a few minor quibbles. The encyclopedia doesn't include enough multimedia segments — sounds, movies, and animations. And I'd love to see better keyboard support, as many commands can be issued only with the mouse. Finally, there aren't enough hypertext links. Although you can easily search for any word in the text, more hypertext links would make exploring even better and more rewarding.

From A to Z

Another good electronic reference I've recently looked at is the Random House Webster's Electronic Dictionary & Thesaurus College Edition. This one comes on floppy disks, and a full installation uses up about 8.5 megabytes of hard-disk...
Lightweight LCIII is heavyweight winner

The LCIII packs the speed and punch of the IIe in a compact unit. Fast, versatile and affordable, the LCIII brags a 25 MHz 68030 processor and 32 bit data bus. The expansion slot allows you to use large monitors, Ethernet and even run your kids' Apple II software with an optional card.

This leased system includes:
- LCIII • 12 MB RAM • 230MB HD
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- Extended Keyboard w/Quickkeys Light
- NEC Silentwriter Model 95 Printer

This MacFriends service scores TKO (technical knock out)

MacFriends service department decimates the competition with an unbeatable combination punch of knowledge, experience, large inventory of the best products and exclusive QuickKey care service. "Biz, Govt. and Ed. P.O.'s accepted"

No Value Added

For an example of a program where the added value of an electronic version is more questionable, consider Your Personal Trainer for the SAT, from Davidson & Associates. This package is supposed to help students get a better score on the all-important college entrance examination, the SAT (Scholastic Aptitude Test). Although it may deliver on that promise, so can much more less expensive how-to-take-the-SAT books.

Your Personal Trainer for the SAT consists of four main modules: Assessment, Vocabulary, Reading, and Math. The Assessment module is a practice test: Students read the questions in the included How to Take the SAT workbook and then answer them on-screen. The program tabulates the scores and prepares a personal training schedule based on individual strengths and weaknesses. Students can also compare their practice test scores with the national average or the average for a particular college or university.

The other modules — Vocabulary, Reading, and Math — are drills and skill-building activities based on actual SAT questions licensed from the Educational Testing Service. Students always have access to question-specific hints, test-taking strategies, advice from a trainer, and a glossary of definitions and formulas. Questions appear on-screen with a choice of five answers. With the pencil tool, students can cross out answers they know are incorrect before they select the correct answer, which is supposed to be a good habit. There's also a game — Block 1600 — based on SAT test-taking strategies.

Where an encyclopedia or dictionary can clearly benefit from the multimedia technology and powerful search capabilities a computer provides, Your Personal Trainer for the SAT doesn't seem

### Table 1: Electronic References

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to be significantly more effective than the equivalent printed book would be. Sure, it scores your tests quickly, evaluates your strengths and weaknesses, and includes a strategy game, but are those features worth two or three times the cost of a book? I'm not convinced. What's worse is that the program has some bugs. A book might not be as flashy, but it'll never hit you with a "not enough memory" or "Type I" error either.

That's Edutainment

I've written about edutainment software here before. It fascinates me. When I was in school, computer-assisted learning was still science fiction. We did things the old-fashioned way—we read textbooks. Now, I'm not saying it's time to throw out the textbooks, but I really believe that learning a subject can be faster and easier if you also have interactive educational software that's fun to use.

A case in point is Fun Physics, an inexpensive subset of the Eddy Award-winning Interactive Physics II. Let's face it: Conventional physics instruction can be grueling. The subject matter is complex, and physics experiments are frequently difficult to perform or hard to visualize. By using Fun Physics, an interactive physics laboratory on-disk, students can observe dozens of included experiments on-screen or design and run their own experiments. It's easy, fast, convenient, and much more fun than classroom physics ever was. Knowledge Revolution, 15 Brush Place, San Francisco, CA 94103; 800-766-6615 or 415-553-8153. Version 1.2.0. $99; site license for entire school, $995.

For younger students, Swamp Gas Visits Europe is an animated interactive game that teaches them about European countries, capitals, cities, and famous landmarks. The graphics are beautiful; game play is engaging and entertaining; and the maps are surprisingly up-to-date, considering the recent instability in Europe. Physical geography is learned by memorization, and memorization is usually boring. That's why Swamp Gas Visits Europe is such a stunning example of interactive edutainment software that makes learning easier and more enjoyable. In-Line Design, 308 Main Street, Lakeville, CT 06039; 800-453-7671 or 203-435-4995. Version 1.0.1. $59.95.

Another exquisite edutainment program is The Geometric Golfer, a unique game that uses geometric transformations as golf clubs and geometric shapes as the ball and hole. It's the cleverest program of the bunch, taking a complex subject — geometric transformations (translation, reflection, dilation, and rotation) — and making it easier to understand and enjoyable to explore. Even if you think you hate geometry, you're likely to find the golf game addicting. MECC Software Development, 6160 Summit Drive N., Minneapolis, MN 55430; 800-685-6322 or 612-569-1500. Version 1.0. $69.

All three of these programs work on almost any Mac, run in 1 megabyte (or less) of RAM, require a minimal amount of hard-disk space, and support black-and-white as well as color. If you or your child want to learn more about the laws of physics, European geography, or geometric transformations and want to have some actual fun while you're learning about them, Fun Physics, Swamp Gas Visits Europe, and The Geometric Golfer are just the ticket.

Bob LeVitus was a student once. Since then he has written several books, including Dr. Macintosh's Guide to the On-Line Universe and Dr. Macintosh, second edition.

By using Fun Physics, students can observe dozens of included experiments or design their own. It's easy, fast, and more fun than classroom physics ever was.
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Ten Ways to Longer Life

Your battery can be the bane of your PowerBook existence — unless you know how to take charge.

By Henry Bortman

Batteries can be a real drain. I used to think Apple was outright lying when it said I could expect two hours of steady work from my PowerBook 170 battery. I could never seem to get more than 45 minutes out of mine.

But in a little more than a year of PowerBooking, I've learned a few tricks that have helped me keep my PowerBook up and running longer than I ever imagined possible — even longer than Apple's expectation. They are based on using a 170 and 180 and should therefore be applicable to the 140, 145, 160, and 165c models as well. PowerBook 100 and Duo 210 and 230 users may find that not all the solutions offered here are relevant.

1. Condition your batteries. NiCad batteries, the kind used in most PowerBooks, suffer from something called a memory effect. If you partially discharge NiCads (say, for 20 minutes), recharge them, partially discharge them again (another 20 minutes), and then recharge them, they start to think they're incapable of holding more than a 20-minute charge. Conditioning forces the battery to discharge completely and eliminates the memory effect.

There are two ways to condition your PowerBook batteries: the dumb, cheap way and the smart, expensive way. The dumb, cheap way is to run your PowerBook off its battery until it literally shuts itself off. I don't mean goes to sleep; I mean off. Kaput. This is cheap, obviously, but it's dumb, because you probably have better things to do with your PowerBook than use it as a conditioner for batteries.

The smart, expensive way is to get a conditioning charger. Unfortunately, Apple hasn't seen fit to market such an animal. Fortunately, Lind Electronic Design (LED) has. Its BC-4070 battery charger ($89.95) has a conditioning option. Put your battery in and press the discharge button, and the charger will fully discharge your battery before it recharges it.

I try to condition my batteries once a week. The LED charger can do a deep discharge and a full recharge overnight. LED (612-927-6303) also sells the SBC-1 Supercharger ($139), a conditioning charger that does the job even more quickly. If you haven't bought a charger for your PowerBook's batteries yet, don't buy Apple's, buy one of LED's.

2. Give your processor a rest. The PowerBooks have power-management software and hardware that slow their processors down to a crawl when you're not working. The processors come back up to speed instantly when you move the mouse or type; you don't even notice they've been resting. The battery savings are tremendous. Automatic processor-resting is on by default. The only time you may want to turn it off is when you're using your modem. Leaving the processor-rest option on when telecommunicating (while running off your battery) can cause line disconnection.

3. Downshift your processor. Most PowerBooks let you choose between running at maximum processor speed (25 megahertz or 33 megahertz, depending on the model) or...
reduced speed (16 megahertz). You use less juice when you run at reduced speed. With most applications, you won't notice the difference in the Mac's response, but you'll extend your battery's life by slowing the processor down.

3. Use a battery-management utility program. Such a utility can give you more flexibility than Apple's PowerBook control panel does for setting things such as disk spindown, backlight dimming, and system sleep. My favorite is CPU ($99), from Connectix (800-950-5880 or 415-571-5100).

A unique feature of CPU 2.0 is an automatic processor-speed switch. With the auto-speed switch activated, your PowerBook automatically goes into slow-speed mode when you're running off the battery. With Duos, it switches to slow-speed mode whenever you unplug the AC adapter. With the other PowerBooks, you have to restart to switch speeds, but CPU will automatically boot your PowerBook at the slower speed if you start up with the AC adapter unplugged.

5. Turn off your backlight. When a flashlight is on, you use up its battery. When it's off, you don't. Your PowerBook's backlight works the same way. If it's too dark to see your screen with the backlight off, turn it to the minimum brightness setting.

6. Spin down your hard disk. On most Macs, your hard disk spins all the time. But it takes energy to spin the disk, and that energy comes from your battery. The PowerBooks have software and hardware to stop the disk from spinning when it's not in use. If you use one of the battery-management utilities, you can set how long your PowerBook waits before it puts the hard-disk drive to sleep. Anywhere from 30 seconds to 2 minutes is a good setting. Even if your software accesses the disk frequently and even though it's annoying to have to wait while the disk spins up, if you're trying to squeeze as much work time as possible out of your battery, your disk should be spun down except when it's reading or writing data.

7. Use a RAM disk. If you have enough memory to set aside a megabyte or two for a RAM disk, set one up before you embark on a long battery-powered session — such as a transcontinental flight — and copy to it the applications and documents you will use while the computer is unplugged. With well-behaved applications and a RAM disk, you should almost completely be able to avoid accessing your hard disk.

Of course, if the only copy of your files is on a RAM disk, you run the risk — if your Mac crashes — of losing hours of work. So stick a floppy disk into the PowerBook's internal floppy drive (sorry, Duo users don't have this option), and occasionally save the file to the floppy disk. Saving a file to a floppy disk puts only a minimal drain on the battery.
Don’t use Microsoft Word. The PowerBook-hostile Word is notorious for hitting the disk constantly. Such as when you press the Delete key. Or the left-arrow key. Or type more than two lines of text. Or click the mouse button. Even putting the Word application on a RAM disk doesn’t alleviate this problem. Word frequently accesses special files that live within your Mac’s System Folder.

Microsoft was sensitive to this problem when it released Word 5.1. It didn’t do anything about how frequently the program accesses the hard disk, but it added a battery icon to the ribbon of formatting icons that sits at the top of Word documents, so you can see how quickly you’re draining the battery. Thanks, guys.

Keep your spare batteries fully charged. Yes, I said batteries. If you run your PowerBook off batteries much of the time, you should have three batteries. You can go through two fully charged batteries, and then some, on a work-intensive transcontinental flight.

Another option is LED’s APP-3 Auxiliary Power Pack ($99.95). Instead of using NiCad batteries (or NiHy, if you’re a Duo user), it uses plain-vanilla D cells. Eight of them. It’s good for eight to ten hours of continuous PowerBook use. Of course, you have to throw the D cells away after you’ve used them. So this solution doesn’t get the Earth First stamp of approval. But if you’re in a cab on the way to the airport and realize you forgot to charge your PowerBook batteries the night before, you’ll have the option of picking up some batteries at the terminal newsstand.

Get a Utilitron PowerSwap. One of the dumber things Apple did in designing PowerBooks — the now-defunct 100 was an exception — was not to include a small internal battery that could keep your PowerBook sleeping peacefully just long enough for you to swap out a drained main battery and insert a fully charged one. PowerSwap provides this function externally. It’s a small adapter that plugs in to the AC-adapter port of the PowerBook and to which you attach a standard 9-volt battery. You plug it in, put your PowerBook to sleep, swap batteries, and wake your Mac back up.

This nifty gizmo saves you from having to reboot. Rebooting isn’t that big a deal, you say? It is if you followed Tip 7. It can take several minutes of precious battery-charge time to recopy all of your application and document files to your RAM disk and then open and rearrange them on your Mac’s desktop after shutting down and rebooting. PowerSwap saves you the trouble.

Batteries are a drag. But until some genius comes up with battery technology that works a lot better than what we’ve got today, you’ll live a far less stressful life if you take a few precautions.

Henry Hortman is MacUser’s technical director.

With the click of a single button, Safe & Sound® finds and fixes over 100 of the most common disk problems, including viruses.

And at a suggested retail price of only $49.95 at your Macintosh dealer, it’s easy to buy as it is to use.

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TechWorks offers an extensive line-up of Macintosh performance enhancement products. Each product, like a great work of art, is built to stand the test of time. See your Mac and your favorite software perform its best. Invest in TechWorks performance enhancements.

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Pump up that PowerBook with TechWorks PowerRAM! Upgrades available for every PowerBook model, from the 100 to the 16Cs. Choose your size, from 2MB all the way to 20MB (PowerBook Duos).

**CACHE CARDS & FPU's**

Satisfy your need for speed with TechWorks Cache Cards and FPU's.

**Performance Products**

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**TechWorks Accelerator Speeds**

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<td>NUBUS/15 MHz</td>
<td>WITHOUT ACCELERATOR</td>
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- 11795 InTouch/Managing Your Money Bundle... 65.
- After Hours Software ... 30 day MBG
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  - 11576 DATEBOOK PRO 3.0 ........................ 49.
  - 11559 TOUCHBASE PRO/DATEBOOK PRO Bun. 99.
- Amaze, Inc.
  - 3682 The Far Side Daily Planner 2.0 ........................ 39.
  - 8465 IN CONTROL 2.0 ........................... 85.
  - 11545 IN CONTROL 2.0/ Dynexode Bundle......... 99.
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2878 PowerPlan 3.0 .... 295. 10065 Upgrade 125.
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<td>Spaceward Ho! or 2499 Strategic Conq.</td>
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<td>(French, German, Italian &amp; Spanish)</td>
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<td>Tense Tutor ea. 33.</td>
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<td>Tetris 22.</td>
<td>3017 Wordprocessors 1.0. 26.</td>
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<td>StudyWare</td>
<td>ACT, GMAT, GRE or SAT Prep ee. 99.</td>
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<td>Spectre Supreme 40. 11537 LAN 2-Pack 52.</td>
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**VIDEO AND SOUND MONITORS, MUSIC, ANIMATION**

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<th>Category</th>
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<td>MediaVision</td>
<td>60 day MBG</td>
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<td>Pro Audio Spectrum 16 Mac—The state-of-the-art audio enhancement! Available in LC &amp; NuBus configurations. Coupled with its spectrum sound bundled software, this is the most complete sound solution available $329.</td>
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<td>Coda Music Technology</td>
<td>MusicProse 2.1</td>
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<td>Envisio</td>
<td>Quick-Mac... 39. 11480 Sixth St... 639.</td>
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<td>Macromedia</td>
<td>SoundEdit PRO</td>
<td>199. 7681 Action! Mac... 349. 4956 MacRecorder Sound System PRO... 239. 5087 Macromedia Director... 789.</td>
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<td>Interplay Productions</td>
<td>MacRecorder Sound System PRO... 239. 5087 Macromedia Director... 789.</td>
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<td>Nova Development</td>
<td>Pro Audio Spectrum 16 for Mac... 329.</td>
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<td>Passport Designs</td>
<td>Passport Producer 299. 8250 Encore 379.</td>
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<td>Insignia Solutions</td>
<td>SoftPC Professional 3.0/RapidTrak Bundle—Run high-end PC software on your Mac at high speeds with SoftPC Professional 3.0 and RapidTrak the high performance disk formatting and management software... $195.</td>
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2321 CD-ROM Caddy ... 11. 2533 (6 Pack) ... 49.
4084 America Alive! 75. 8057 Porta Drive 619.
Creative Multimedia Corp.
11001 The Complete Works 19. 11004 Audubon 45.
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Recharge it: Until Apple develops a solar-powered PowerBook, frequent fliers are reduced to searching for the smallest, fastest, and best ways to recharge those short-lived batteries. Lind Electronic Design has a new option, most notably the Twin Traveler Charger ($69.95), an easy-to-pack unit that lets you charge two PowerBook batteries, using the AC adapter while the PowerBook is still plugged in, so you can keep working while you’re recharging your batteries. And for superfast charges, the SuperCharger ($139) is designed to condition and charge the batteries as quickly as possible (it skips the trickle-charging common to other chargers). 800-659-5956 or 612-927-6303.

Finders keepers: If you want to find files more quickly, you’ll need to get a commercial utility to replace the Find DA that came with your system software. There are a lot of them out there, but I’m a sucker for the newly upgraded shareware utility FindPro III; using this product is one of the speediest and most flexible ways to find files on your Mac desktop. You can configure the utility to launch when you press Command-F in the Finder. An added bonus: You can download FindPro III free this month from ZiffNet/Mac (MacUser’s on-line service). See the masthead in this issue for details on how to get on-line. (By the way, AppleLink users can now download MacUser utilities as well as read the week’s top MacWEEK and PC WEEK stories and check out MacUser and MacWEEK product reviews. For more information, call the AppleLink Online Services HelpLine, at 408-974-3309.) Unfortunately, FindPro III isn’t able to search for text within a document, which is often the easiest way to locate files. If you need that capability, take a look at the $39.95 Alki Seek (800-669-9673 or 206-286-2600) or the $89 Retrieve It!, the first product Claris (408-987-7000) introduced under its Clear Choice label.

Print it: Here’s an easy and inexpensive way to turn your trusty ImageWriter II into a color printer: Just add a four-color ribbon, install MicroSpot’s MacPalette II 2.3 driver ($69), and you’ll be able to print spiffy color pages (by means of a color-dithering technique), even in the background. There’s also an AppleTalk version of the driver, available for $249, which lets you share your ImageWriter with other users. 408-253-2000. Do you feel like a lone Macintosh user in a PC world? GDT Softwork’s PowerPrint/NW ($499) enables you to access just about any PC-compatible printer on a Novell network. 800-663-6222 or 604-291-9121. You’ll be able to squeeze a little more life out of your printer’s toner cartridge if you use Working Software’s Toner Tuner ($49.95). This extension adds a control to the Mac’s standard Print dialog box that lets you make lighter copies when you’re printing draft pages. 408-423-5696.

By Victoria von Biel
The Best Connections

Still trying to figure out how to use your modem and telecom software?
Here are eight ways to close the communications gap.

By Gregory Wasson

If you have a Mac, a modem, and telecommunications software, the world's your oyster. You can download free programs from an on-line service, send electronic mail to your pal in Texas, transfer DTP files to a service bureau — you can even stop battling traffic and telecommute to your job. But before you can do any of these wondrous things, you've got to figure out how to use that software.

Telecom software is notoriously hard to use, and setting it up for the first time can be a hit-or-miss affair. You have to specify such nonintuitive options as parity, data bits, stop bits, and baud rate. And once you've set the software up, using it can be frustrating unless you know a few secrets. Of course, you could slog your way through your software's manual, but to get you up and telecommunicating ASAP, we've translated the options you'll find in a telecom-settings dialog box (see below) into plain English. (Note that your telecom program will probably require you to make these settings in more than one dialog box.) Then read on for tips on the most frustrating telecom problems. If you're still trying to decide which telecom software is right for you, see "Making Connections," February '93, page 100.

### Baud rate

The baud rate, sometimes referred to as bps (bits per second), controls the transfer speed. The bigger the number, the faster the transfer. Never set your baud rate higher than your modem or the remote system is capable of using.

### Parity

The parity setting is an old form of error checking that ensures that a file has been transmitted properly. It's seldom used today. The setting should almost always be None, although some non-Mac systems may expect Even.

### Data bits

This setting represents the size of each character in a transmission, so that the receiving computer knows how many characters have been sent. The setting is usually 8 for Macs; if you communicate with a mainframe or PC, you may occasionally use a setting of 7.

### Stop bits

These are signals sent to the receiving computer to tell it that a character has been transmitted. The standard setting is 1, and it's unlikely you'll use any other value.

### Duplex

The duplex setting controls whether you see on-screen what you type during an on-line session. The Full setting usually lets you see your typing. If it doesn't, change the setting to Half. You can make this change while you are on-line.

---

Use MacBinary format for:

- All files except type 'TEH1'
- Rll files except type 1

Modem init command: 

```
ATv1e
```

<table>
<thead>
<tr>
<th>Baud rate:</th>
<th>2400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parity:</td>
<td>None</td>
</tr>
<tr>
<td>Data bits:</td>
<td>8</td>
</tr>
<tr>
<td>Stop bits:</td>
<td>1</td>
</tr>
<tr>
<td>Duplex:</td>
<td>Full</td>
</tr>
</tbody>
</table>

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218 July 1993 MacUser
**Download Blues**

The most common telecom problem is downloading a file, only to get an error message when you try to open it. There are two frequent explanations. First, you downloaded the file with MacBinary turned off, so the special MacBinary formatting was not stripped off when you downloaded the file. (MacBinary is the format that packages all the different elements of a Mac file so that it can be transferred intact, and it must be stripped off before a Mac can read the file.) You can download the file again with MacBinary turned on or use a utility that strips off the MacBinary envelope. StuffIt Deluxe, from Aladdin Systems, has a MacBinary translator built in; a shareware alternative is BinHex 5.0 (available in the Download & Support Forum of ZiffNet/Mac as file BINHEX.BIN, in Library 1).

The other possibility is that the file is compressed and you don't have an application for expanding it.

**Putting the Squeeze On**

Files that are transferred by modem or made available through on-line services are almost always compressed so that they take up less space and take less time to transfer or download.

Once you have a compressed file (usually identified by the letters SEA, CPT, or SIT at the end of the filename), you must decompress it before you can use it on your Mac. StuffIt Expander, a freeware utility from Aladdin, decompresses files in Compact Pro, StuffIt, and AppleLink formats. It's available through all on-line services (filename STUFEX.SEA, in Library 1 of the ZiffNet/Mac Download & Support Forum). If you also want to compress files, you'll need the full versions of compression programs such as StuffIt Deluxe or the shareware Compact Pro.

**Person to Person**

Although many people transfer files exclusively through on-line services such as CompuServe or America Online, you can also transfer files from Mac to Mac (for example, to send a file from a remote computer to someone in your office). You'll need to talk to the person on the other end first so that you can agree on common settings for bits per second, parity, data bits, stop bits, and protocol. Unless you make these prior arrangements, you may be in for a frustrating experience.

Decide whose modem will be calling and whose receiving.
The person whose modem will be receiving the call should launch a telecom terminal program and configure it to auto-answer (there’s often a menu command for this). The modem will then answer the incoming call, and you’ll be able to type messages back and forth or send and receive files.

**PC or Not PC**

Some people use a PC at work to download Mac files and then transfer those files to their Mac at home. But — surprise! — the files don’t open. Again, the likely culprit is MacBinary. PC telecom programs don’t understand MacBinary format, so when you download a Mac file to a PC and then bring it over to your Mac, the MacBinary envelope is still there, and you must find a way to strip it off.

**It’s in the Script**

Most Mac telecom programs with a terminal-emulation interface, such as Hayes’ Smartcom or Software Ventures’ MicroPhone II, offer scripting features, which let you do such things as automatically retrieve electronic mail or download files from an on-line service and then log off. Although scripting can look complex, don’t let that keep you from taking advantage of this powerful tool. Programs that have scripting options almost always include a learn mode that makes the program actually write the script for you as you perform the manual actions you want to automate — no need to learn scripting commands or complicated syntax.

**Quicker CompuServe**

CompuServe or ZiffNet/Mac's subscribers should use CompuServe’s CIS B Plus file-transfer protocol for downloads, because it can cut download times in half. CompuServe’s Navigator and CIM (CompuServe Information Manager) use this protocol as the default. In a terminal program such as ZTerm or MicroPhone II, you must select CIS B Plus as a setting. Unfortunately, MicroPhone’s implementation of CIS B Plus can be unreliable. If you use MicroPhone II or if your terminal program does not support CIS B Plus, a great alternative is Raymond Lau’s shareware QB DA. On ZiffNet/Mac it’s available as file QBDA.SIT, in Library 2 of the Download & Support Forum.

**Put Call Waiting on Hold**

If you have call waiting active on your telephone line, you must deactivate it before you begin an on-line session. You do this by adding *70 before the telephone number your modem is to dial — for example, *70,408,555-3478. The code varies from *70 in some locales, so check with your local phone company.

Once you’ve come to grips with using your modem and telecom software, it’s time to have some fun. There’s a wide world of information — and a convenient alternative to faxes and phone calls — waiting for you.

Contributing editor Gregory Wasson is the author of The MacUser Guide to Shareware (Zin-Davis Press) and a sysop on MacUser’s on-line service, ZiffNet/Mac.

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CIRCLE 122 ON READER SERVICE CARD.
On-line services or bulletin-board systems that rely on a DOS-like command-line interface usually make writing and editing messages on-line very difficult, because you must use awkward commands that are foreign to most Macintosh users — if you’ve ever accessed CompuServe through a terminal-emulation program, you’re all too familiar with this dilemma. But you can avoid the problems involved with on-line editing by using a text editor such as Baseline’s Vantage or the shareware program miniWRITER (see figure).

The secret to easy on-line message writing is to keep the text editor open in the background and compose your messages in it, editing them as you normally would in a Mac application (using cut-and-paste and so on). When the message is ready, just copy it to the Clipboard, switch to your telecom session, enter the service’s message-composing mode, and paste the message in.

The shareware DA miniWRITER lets you strip out smart quotes and accented letters, which most on-line services cannot accept, and makes it easy to keep each line to a predetermined length — important because some on-line services can’t display more than 80 characters per line.

On The Other Hand, There’s Relisys!

You’ve got to hand it to Relisys. They keep making high-quality monitors with extremely affordable price tags. Need an example? Take the two monitors pictured above. Both are color monitors with very similar features. However, the Relisys VividVIEW 14 sells for about $200 less than the Apple monitor.

<table>
<thead>
<tr>
<th>Features</th>
<th>Relisys</th>
<th>Apple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dot Pitch</td>
<td>0.28 mm</td>
<td>0.26 mm</td>
</tr>
<tr>
<td>Horz. Scan Rate</td>
<td>30-50 kHz</td>
<td>35 kHz</td>
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<td>Vert. Scan Rate</td>
<td>49-89 Hz</td>
<td>66.7 Hz</td>
</tr>
<tr>
<td>Resolution</td>
<td>640 x 480</td>
<td>640 x 480</td>
</tr>
<tr>
<td>Non-Glare Screen</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Control Nobs</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

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The Mac IIfx

Once the top of the Mac line, the IIfx is still a sturdy — and fast — machine with plenty of options for upgrading.

Until the introduction of the Quadra series, the Macintosh IIfx was the fastest Mac you could buy. Its vital statistics are impressive, including a 40-megahertz 68030 CPU; a math coprocessor; a fast, built-in 32K RAM cache; dedicated input/output (which takes some of the load off the CPU); and a special SCSI controller.

All this makes the IIfx fast — on paper, at least — but it also makes it the quirkiest Macintosh Apple has ever produced, and you have to take its unique configuration into account when you upgrade.

Take SCSI, for example. As with any other Mac, you can attach as many as six external SCSI devices to an IIfx. However, the unique SCSI configuration requires that you use a special black terminator included with the IIfx (if you bought your IIfx secondhand and don’t have the black terminator, you can get one from any computer dealer). In addition, if you have any SCSI devices that are internally terminated (certain scanners, hard drives, or tape systems, for example), the internal termination must be removed.

Theoretically, the IIfx’s special SCSI/DMA (direct memory access) controller should give you transfer rates as high as 3 megabytes per second with a high-speed drive. However,

By Tom Petaccia

The IIfx has six NuBus slots, so you can add a video-capture board, a Fast SCSI-2 card, or a 33-megahertz 68040 CPU accelerator to achieve Quadra-like speeds.

Add more RAM. The IIfx has eight SIMM slots divided into two banks of four slots each, so upgrades must be done in groups of four. Also, the IIfx uses special SIMMs that cost slightly more than the SIMMs used in most other Macs.

For more storage space, replace your internal hard drive with a larger-capacity internal drive, add an external drive, or replace the internal drive with a larger-capacity unit and then buy a case from APS for the old internal drive so you can use it as a backup external drive.
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THE MAC WORKSHOP

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Bill Cosby knows high blood pressure increases risks of heart attack and stroke. So, have your blood pressure checked regularly, exercise, cut down on salt and take your medication. To learn more, contact your nearest American Heart Association. You can help prevent heart disease. We can tell you how.

The Ilfx has no internal video, so one of your six NuBus slots will be taken up by a video card. If you have a monochrome or gray-scale card, consider moving up to 8-bit color. Color can improve your productivity and make your screen more aesthetically pleasing. Simple 8-bit-color cards (256 colors) cost $300 to $700; 24-bit-color cards (16 million colors) start as low as $700 and can go to $2,000 and higher.

With all of its quirks, the Ilfx is a good performer as it is. If you add RAM and get a larger hard drive, you can expect years of good service for less than $1,000. But if you want to upgrade to Centris or Quadra 68040 speeds and video capabilities, you will easily spend $3,500. For that price, you may as well buy a new, fully equipped Centris 650.

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How Butterflies Transform

The butterfly passes through several stages in its lifetime: the egg, the larva, and the adult. The egg is laid on a leaf of a plant, and the larva feeds on the plant. In its larval stage, it goes through several moults during which it produces its so-called pupal case. The pupa remains inside the case until the adult butterfly emerges.

The transformation of a caterpillar into a butterfly is a magical event. The adult butterfly emerges from the pupal case with its wings, ready to fly. The transformation process is known as metamorphosis.

ScanMaker II

A revolutionary scanning system that makes any document look its best. ScanMaker II is a scanning system that provides exceptional image quality and performance. It is designed to deliver the best possible images, with high resolution and precise detail.

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DocuMorphosis™ is a scanning system that allows you to transform your documents into images that are crystal clear, with all the rich color and fine detail of the original. It is the perfect solution for businesses and professionals who need to scan and store documents electronically.

Microtek

Microtek is a leading manufacturer of scanning systems and related products. The ScanMaker II is just one of the many high-quality scanning systems that Microtek offers. Microtek is committed to providing the best possible solutions for your scanning needs.

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OCR (Optical Character Recognition) is a technology that allows you to scan documents and convert them into editable text. This is particularly useful for businesses that need to digitize documents and store them electronically.

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Tip of the Month: NowMenus 4.0.1

When using the Desktop Pop-Up feature in NowMenus, if you inadvertently access the menu, you will select (and launch) the first item in the Desktop Pop-Up menu. To avoid this, simply go into the NowMenus control panel and insert a separator as the first item in your Desktop Pop-Up menu. Now if you inadvertently pull up the Desktop Pop-Up menu, you only select the separator and nothing happens.

Charlie Jones
San Francisco, CA
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 Many such collections have only 25 characters plus the alphabet in uppercase and lowercase and numerals 0 to 9. For example, you won't get a bullet (Option-S) and many other symbols.

Microsoft Works 2.0 databases sort only one field. To sort multiple fields, use a series of sorts. Sort the least significant field first. Example: In order to sort states alphabetically, ZIP codes within states, and names within ZIP codes, sort on names, then on ZIP codes, and finally on states.

If you have trouble lining up a tab in the ruler bar with the intended position, get Nisus. It shows you a vertical line on the page as you drag the tab, so you know just where the tab will be.

Where are the reversed-out numbers 2, 3, and 4 in Zapf Dingbats? The 2 is Option-N and then Shift-A. The 3 is Option-N and then Shift-A. The 4 is Option-N and then Shift-O.

If you must open your compact Macintosh (Plus, SE, or Classic) and don't have a case cracker handy, you can substitute either a large binder clip (the kind with straight, not rounded, sides) or a 1-inch spring clamp. It works, but you should be very, very careful.

### Reader Tips

**FileMaker Pro 2.0**

FileMaker Pro will launch automatically at startup if you place its alias in the Startup Items folder. However, you are then stuck with a FileMaker Pro dialog box prompting you to open a data file, and the startup process halts. If you just want FileMaker Pro to launch and stay in memory, follow these easy steps:

1. Create a FileMaker Pro data file with no fields but with a simple script that incorporates just one step: close.
2. In FileMaker Pro Preferences, select this script to be performed as soon as this data file opens.
3. Place an alias of this data file in the Startup Items folder.

Now, whenever you start up your Mac, FileMaker Pro will launch, opening the data file you just created. The data file will close after one or two seconds, and the startup process will continue, leaving FileMaker Pro in memory for later use.

Andrew G. Belivanakis
Chicago, IL

**LaserWriter Pro 630**

Although Apple’s Pro 630 printer lets you print at 600 dpi and get good grays without resorting to using an imagesetter, PageMaker output will look as though it was printed from a 300-dpi printer unless you know this secret. Select as the target printer an imagesetter AFD (Adobe Printer Description file) or the AFD for any other printer that supports 600 dpi or higher. Print. You’ll get a dialog box telling you to change the AFD if you have trouble printing. Just click on OK, and go for it — it works!

PageMaker relies on AFD files to use the more advanced features of your printer. So until an AFD comes out for the Pro 630, this technique provides you with an easy workaround.

Kele McGlohon
Savannah, GA

**Floppies**

Take it from me, you ought to think twice about carrying unprotected floppy disks in purses and wallets. Aside from all the dust and dirt that collects in there, many purses and wallets have magnetic clasps that can damage a disk. Ever since the magnetic clasp on my purse scrambled the data on my floppy disks, I've
On location with Chris Callis:

New York advertising photographer Chris Callis utilizes Macintosh-based digital imaging in the creation of complex in-camera photo-compositions:

"In this particular series of shoots for BMW Europe I had six models, four stylists, two assistants, two truckloads of lighting, props, custom camera gear, and only one Macintosh equipped with PLI storage products. We used Kodak’s DCS 200” digital camera to provide real time preview of what we were creating on film.

The client and I viewed the Macintosh screen to direct lighting and model placement via radio. On jobs like this, there is no chance for error and second rate equipment. I’m glad that I chose PLI storage products which have performed flawlessly...even on location using generator power!"

On buying equipment, Callis has some advice: "I buy all of my PLI and Macintosh gear from Ken Hansen Photographic. When it comes to imaging knowledge and support, the Ken Hansen crew run circles around any computer vendor, plus their prices are right in line."

"As the Nation’s leading supplier of digital photography systems, we are proud to offer PLI’s wide range of high quality products. From internal 3.5” Opticals to Mini Arrays and CD ROM multisession drives. Only PLI offers the products and support that meet our customer demands."

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- 88 MB Removable 19ms Access time, 2 Yr. Warrant, includes free cartridge $498
- 88 MB Removable 19ms Access time, 2 Yr. Warrant, includes free cartridge $598
- 105 MB Removable 19ms Access time, 2 Yr. Warrant $748

Optical Drives from NuDesign
- 128 MB 3.5" Series II fast, good tech support, easy-to-use Free Cartridge $888
- 128 MB 3.5" Series III fast, good tech support, easy-to-use Free Cartridge $998
- 256 MB 3.5" Series III fast, good tech support, easy-to-use Free Cartridge $1598
- 600 MB Hyperspace 5.25" 20ms Access time, MB/sec Transit, Free Cartridge $2598

Optical Drives from NuDesign
- 2.1 Gig with SoftBackup, includes Free 80mb DAT $998
- 2.1 Gig with Retrospect, includes Free 80mb DAT $1048
- 2.1 Gig with SoftBackup, includes Free 80mb DAT $1248
- 5.0 Gig with SoftBackup, includes Free 80mb DAT $1398
- 5.0 Gig with Retrospect, includes Free 80mb DAT $1448
- 5.0 Gig with SoftBackup, includes Free 80mb DAT $1648

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Toshiba 3401 "Kodak photo CD"
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Prometheus Modems
- Pro Ultima Home Office $398
- Promodem 144i $288
- Promodem 144e $288
- Promodem 24e $138
- Promodem Mini 2400 $89

Zoom Modems
- Zoom Faxmodem PBK $129
- Zoom Faxmodem PKT $129
- Portable $149
- Zoom Faxmodem FTX $188
- Zoom Faxmodem FTX.32 $298

UMAX Scanners - All Color Scanners Ship with Photoshop V 2.5
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Sarah Meltzer
Watertown, MA

**Nisus**
You can keep style sheets and named rulers as a glossary entry, making them always available in any document. When you paste the glossary entry and then immediately delete it, the styles and rulers remain while the associated text is deleted.
Tony Armendariz
Gilroy, CA

**System 7 Trash**
For those who have a large monitor and hate dragging floppy disks and files all the way down to the Trash, here’s a simple and useful tip: Drag the Trash icon straight up until it’s close to your hard-disk icon but won't get in the way of floppy-disk icons. To find the right position, insert a disk in the floppy drive while you’re positioning the Trash. That done, dragging a disk icon to eject it is a fast finger fidget, requiring neither arm movement nor aiming.
Franklin D. Sykes
Elkton, MD

**QuarkXPress 3.1**
When you are importing TIFF files into QuarkXPress that have images containing white space between objects, the objects have a tendency to get jaggy edges when the background selected for the file is None. To get clean images, select the background as Any color and the shade as 0 percent. The image will not be transparent, but those annoying jagglies will be diminished considerably.
Christopher Klonowski
Lisle, IL

**PageMaker 4.2**
Two tips that make using PageMaker easier: First, to check which PageMaker import filters and additions you have installed, press the Command key as you select About PageMaker from the Apple menu.
Second, if you have multiple dialog boxes open, you can OK them all in one fell swoop by pressing the Option key when you click on OK in the first box.
Luis Muench
Miami Beach, FL

**Word 5.1**
If you indent a paragraph in which you've applied shading, the shading indents with the text. Here's how to keep the shading from indenting:
Select the paragraph. From the Insert menu, choose Text to Table. In the Insert Table dialog box, choose the Convert From Paragraphs option. Choose Paragraph from the Format menu. Under Indentation, type the measurement you want. From the Format menu, choose Border. In the Shading box, type or select the percentage of shading you want.
Karen R. Noel
Cincinnati, OH

**Suitcase**
You've just renamed your hard disk, and suddenly Suitcase can't find any of your suitcases. Here's what to do:
Change the disk's name back to what it used to be, open all of your suitcases, and then quit Suitcase.
You can now rename your hard disk and go back and close those suitcases you don't need.
Andrew T. Laurence
Irvine, CA

**ClarisWorks**
Here's a quick way to get up and running in ClarisWorks and completely bypass the Open dialog box. First, open a word-processing file and set the font, point size, margins, and so on. Then, before you type anything, use the Save As command and

---

**Shareware to the Macs.**

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find and open the Claris folder inside the System Folder. Name your file ClarisWorks WP Options, and save it as a Stationery file in the Claris folder. You’ve now created new default settings for the word-processing module.

Next, make an alias of the Claris Works WP Options file you’ve created and place it in the Apple Menu Items folder. To start up ClarisWorks with a new word-processing file, just select this alias from the Apple menu. Use the same process to create default settings for the other ClarisWorks modules.

Jeff Shaw
Buffalo Grove, IL

Photoshop
If you scan material that has a white background (for example, a line drawing), it can be difficult to know when the background on your scan is really clean. Sometimes “dirty whites” with rogue pixels show up only when you print a laser proof.

You can avoid this by leaving the Monitors control panel open. As part of the image-editing process, briefly turn the screen depth to black-and-white (or even from 256 colors to 16). Any dirty-white areas show up as spots and are easy to remove by editing or by adjusting the brightness and contrast levels.

If you have QuicKeys, you can use the ScreenEase extension to switch the screen depth. Try the shareware utilities PixelFlipper and Switch-A-Roo (they’re available from on-line services and user groups).

Doug DuBosque
Molalla, OR

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2-year Warranty 3-year Warranty

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Includes Fujitsu’s 5-Year Warranty

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Battery-powered portable case for PowerBooks

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Return of the Dead Folder

Q. Ever since I installed System 7, I have been having difficulty with a folder called Move & Rename, which isn’t visible in the Finder but appears in some Open and Save dialog boxes. I scanned this folder once, but it keeps coming back. On the advice of a Mac guru, I used ResEdit to try to remove it, but it still won’t go away. Is there any way I can get rid of this pesky invisible folder? And if I do, will it cause any serious problems?

Juli L., Gioia
Ivyland, PA

Andy: First off, this “Mac guru” you dug up is full of beans. Was he or she wearing the official, motorized propeller beanie, by any chance? I thought not. Then again, some guru I am. The first time I set eyes on the Move & Rename folder, I thought I should take it literally, so I moved it to another folder and renamed it.

Anyway, I assure you, the invisible Move & Rename folder is just one of those bizarre and frightening things that, inexplicably, is completely normal, much like many current celebrities I am not cruel enough to name here. Like the similarly semi-invisible Desktop files and Trash folder, the Move & Rename folder is just a folder the Mac uses for its own housecleaning (see Figure 1). Specifically, it’s used during file sharing for — you guessed it — moved and/or renamed items the Mac has to keep an eye on. Usually it’s empty, so unless you vent your anger at a particularly bad moment, trashing the folder will do no damage. But it’ll just keep coming back, like mildew in a shower. Unless you crave constant reminders of the

Q. Is there a way I can get my Mac to start up with an application instead of with the Finder? I’d rather be able to go right to my word processor when I start up, as I can with my DOS PC.

Dr. John Greenwood
New York, NY

Andy: Here’s the easy answer: If you’re running System 7, all you have to do is toss the objects of your affection or their aliases into the Startup Items folder inside your System Folder.

No matter what they are — applications, documents, control panels, sounds, whatever — they’ll open automatically at the end of your Mac’s startup process.

Question answered. But because I see I still have a couple of inches to go before I hit the bottom of the page here, I’ll go for bonus points. If you have multiple items in your Startup Folder, the last item in the folder, alphabetically, will be the “active” (topmost) item when the Mac has finished starting up. So if you want to be able to start working in DiscoWriter without having to click LambardsDraw into the background, toss a tilde (~) in front of the former to force it to load last. Second, if you want your Mac to automatically reopen any documents that were open when you last shut down, you can use an Apple menu manager such as Microseed’s HAM to automatically reopen, the next time you start up, any documents that were left open when you shut down. Finally, because your Mac takes several minutes to start up (owing chiefly to the truly pathological number of extensions I’ve installed), I’ve made the last item to load in my Startup Items folder a sound file. This way, when I hear an unprintable quote from the fine film Repo Man, I know it’s time to put down the comic book and get to work.

Figure 1: Haunted by the usually invisible Move & Rename folder? Rest assured that it’s harmless, so don’t even think about throwing it away — the system creates it when file sharing is turned on and uses it to keep track of files that are shared with other users.

* ... But Were Afraid to Ask

Granted, the word basic doesn’t always herald good news. Look at basic cable TV, for example. You get nothing interesting, unless you like to while away the hours watching people fish on TV. And Basic Instinct, although a real crowd-pleaser nuditywise, never even came close to the craftsmanship of plot and character development in 9½ Weeks.

But here at Help Folder, we like to believe that turning our attention to at least one basic, simple question each month can do nothing but good to everyone concerned. So send those easy questions on in! To protect your identity, we’ll say you’re the guy who manufactured George Washington’s false teeth.

Q. If there is a way I can get my Mac to start up with an application instead of with the Finder? I’d rather be able to go right to my word processor when I start up, as I can with my DOS PC.

D Norton VolumeSaver Drive Options

Cancel

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**Squashing Word Files**

**Q.** I was surprised recently to see that a small Microsoft Word file — only a few paragraphs long — occupied 2.8K of disk space. The file was once large, but then I cut quite a bit out. Could it be that because I have the Allow Fast Saves option turned on in the Preferences dialog box, the data I cut was never purged from the file? It shrank to 10K when I saved with the Save As command.

**Now I'm wondering if I have other unnecessarily large Word files on my disk. Is there any way to automatically search for and perform a Save As on old files?**

- Robert Erick

- Argonne, IL

- **Bob:** You've discovered a phenomenon we've mentioned before in this column — using the Save As command instead of Save can shrink certain files. Files can be cut way beyond the size they should be if a program uses some type of "fast" save routine to reduce the time it ordinarily takes to save a document. PageMaker and Word are two programs that have this ability, and each lets you disable it in the Preferences dialog box.

There is no easy way I know of to automatically search for and perform a Save As on old files that need slimming down. Finding the files is relatively easy: Use any find-file utility, such as No Hands Software's Magnet or FindPro II (available from MacUser's on-line service, ZiffNet/Mac), and search for Microsoft Word and/or Aldus PageMaker files.

Once you've found all of your Word or PageMaker files, though, it gets more complicated. If I don't know of a fast, easy way to open each file, issue a Save As command, and then close each file, you could create a script with CE Software's QuickKeys or UserLand Frontier, but it would take some time to get it just right. If you plan to perform this little exercise frequently, it *might* be worth it.

A more efficient technique would be to search for Word or PageMaker files larger than, say, 100K (DiskTop, File Director, and Magnet all let you do this easily) and then manually perform a Save As only on these bigger files (see Figure 2).

In future, remember that there's a trade-off between faster saves and smaller files. If you can remember to issue a Save As command when you've finished working on a file, you get the best of both worlds. If you can't remember, you'll have to decide which is more important to you — faster saves or smaller files.

**Andy:** You see, it's a classic philistineism such as this that has led me to adopt TeachText as my main word processor. No bloated files, and you can open and work with files created with older versions (heck, you can work with files created with newer versions, a trick those slick-haired college boys and girls at Microsoft have only a toehold on). Best of all, because there's an imposed 32K limit on the amount of text you can slap into a TeachText file, you can close down the office and get into bed with a big mug of Ovaltine much, much earlier than you could with Word, which forces you to keep writing until the job's done, regardless of file size.

**Type 1 Behavior**

**Q.** Every time I start working with one of my favorite applications, it quits and I get the message, "The application unknown has unexpectedly quit due to an error of type 1." I have tried starting up with all of my extensions off, but I get the same message (although once or twice, it said that it was a type 2 error rather than type 1). What do these error messages mean?

-Harold Smoliar

-via the Internet

**Andy:** Harold, I'm going to confirm what you and thousands of Mac users have suspected ever since those error IDs started cropping up: They're the Mac equivalent of the Magic Eight Ball, the wacky, fluid-filled divination tool. Much as the Magic Eight Ball will tell you, "Situation unclear, try again later" and "All indications point to yes," the Mac occasionally spits out error messages picking a number more or less at random and don't care about human nature to wildly interpret its vague message to fit whatever situation is at hand.

The most ubiquitous error codes are, of course, System 6's ID 1 and ID 2, which System 7 users all know and revere as bus errors and address errors, respectively. Address and bus errors are almost entirely the fault of code that doesn't play nice with other software, so the obvious cure is to run the problematic application with all extensions turned off (hold down the Shift key as you boot). By adding extensions and apps one at a time, you'll be able to isolate the software that's causing problems.

Another option is to run a diagnostic program such as Teknosys' Help! or Maxa's Alert!, which contain huge databases of known software conflicts and can analyze your hard disk for apps and extensions that are known enemies.
### Top Products, Prices and Service

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<td>Conner</td>
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**Modems**

<table>
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<td>PROMETHEUS</td>
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<tr>
<td>Ultima Home Office</td>
<td>$398</td>
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<tr>
<td>Promodem 144i Internal for Powerbook 4.4/14.4ASI Fax w/V.42 &amp; V.42 bis</td>
<td>$258</td>
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<td>Promodem 144e ext.14.4/14.4 SR Fax w/V.42 &amp; V.42 bis</td>
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<td>Promodem 24e ext.24/96SR Fax w/V.42 &amp; V.42 bis</td>
<td>$118</td>
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<tr>
<td>Promodem Mini 2400 - 2400 BPS mini, data only</td>
<td>$79</td>
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**Scanners**

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<tr>
<td>UMAX All Scanners include free software</td>
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<td>UC1200s - Color w/free Photoshop v.25</td>
<td>$2948</td>
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<tr>
<td>UC840 - Color w/free Photoshop v.25</td>
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<tr>
<td>Transparency Unit</td>
<td>$698</td>
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<tr>
<td>Auto Document feeder</td>
<td>$398</td>
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<tr>
<td>LG600 - Grey scale w/free Typerader OCR, OFOTO &amp; Publish It</td>
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**Accelerators**

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<td>Powercache Adapter</td>
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<td>Fast Cache IIs</td>
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<td>Fast Cache Quadra</td>
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<td>Fast Cache Q 950</td>
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<td>33 MHz Turbo 040</td>
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<td>Fast Cache Turbo 33-128k</td>
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**Optical & DAT Drives**

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<tr>
<td>Toshiba 3401 External Drive 200ms, multisession, DualSpeed, SCSI-II</td>
<td>$448</td>
</tr>
<tr>
<td>Texel DM-3244 External Drive 265ms, multisession, DualSpeed, SCSI-II</td>
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**Reference Bundle**

- The New Grolfer Multimedia Encyclopedia
- World Atlas • CIA World Fact Book
- Education Bundle
  - MACalendar 7 Education & Games for System 7
  - Mayo Clinic • U.S. History
- Childrens Bundle
  - Interactive Storytime • USA Atlas
  - Velveteen Rabbit & Other Children's Classics
- Entertainment & Games Bundle
  - Animals - San Diego Zoo • Lucas Game Pack
  - Guinness Book of World Records • Sherlock Holmes
- Clip Media & Fonts Bundle
  - Font Fun House • Font Pro Vol. 1/The Essentials
  - Publish It 2.0 with Clip Art Fonts • Color it!

**Media**

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<td>44mb DAT</td>
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<td>8mb DAT</td>
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<tr>
<td>16mb DAT</td>
<td>$62</td>
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</table>

**We carry most Mac Memory, Please Call for prices!**

**Memory**

<table>
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<th>Model</th>
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<tr>
<td>Visatec 512MB</td>
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<tr>
<td>256mb External</td>
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<tr>
<td>1mb External</td>
<td>$1348</td>
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</tbody>
</table>

**Contact Information**

- Hours: 7:30 - 5:00 Mountain Time • Technical Service and Order Tracking 7:30-5:00 Mountain Time 406-256-5806
- Visa, Mastercard, Amer. Express, COD, Telecheck Approved Check, Gov., Corp., Gov., P.O.'s welcome. All new drives, preformatted with latest stable system software.
- Factory warranty, bracket, cables and software included. 30 Day Money Back Guarantee. Return Authorization number required for returns. Prices, terms and availability subject to change without notice.

**Circle 173 on reader service card.**
If errors persist, then it's possible that one of your apps or extensions or even the System file itself is corrupted. When this happens, the only recourse is to remove those apps and reinstall them from your original installation disks. In fact, reinstalling all of your software once every four to six months goes a long way toward preventing problems.

Bob: By the way, when you reinstall the offending program, remember to trash its Preferences file if it has one (look in the Preferences folder inside the System Folder). Doing this can work like a charm when you're having problems.

If that doesn't work, reinstall your system software. Before you do, remove any fonts you've installed in the System file, by dragging them to a new folder. And don't forget to trash your System file and Finder before you reinstall the system software; otherwise there's a good chance that the Installer will merely attempt to install some new resources in the old System file and Finder, which may still be corrupted.

If that doesn't do the trick, it could be that you recently upgraded your system software and that the program you're having trouble with isn't compatible with the new system software. Either upgrade to a newer version of the program (if one is available), or go back to using the older version of the system software.

Andy: As long as we're still talking about reinstalling software, here's another gem of advice that is often overlooked — don't ignore your hard disk's software driver. The reason for this is that if it's woefully out-of-date, the software driver can cause a lot of trouble. So if you haven't reformatted your disk with a new driver in a couple of years or if you have several volumes, each formatted with different software, it could be helpful to reformat everything with a modern, universal formatter such as Casa Blanca Works' Drive7.
The Naming Game

Q. Is there any way to change the name of a file while it is open?

Barbara Freedman
Lindenhurst, NY

Bob: I don't know of a program or a technique that lets you change the name of an open file, but that's just as well when you think of all the havoc that might result if it were possible. The next-best solution is to try Super Boomerang, part of the excellent Now Utilities collection, from Now Software. Super Boomerang tames the Open and Save dialog boxes by remembering which files and folders you've used recently, to make it easier for you to find and open files. It also lets you duplicate, rename, or delete files from within the Save or Open dialog boxes (see Figure 3).

There are two ways you can use Super Boomerang to make renaming files easier. One is to save a second version of the file, using a new name, and then use Super Boomerang's Delete option to trash the older file. The second method is to close the file and then use Super Boomerang's Rename option to change the file's name. Either way, you'll save a trip back to the Finder.

Andy: How about renaming the file before you open it? Too easy? OK then, here's another strategy: Keep all of your daily work in one folder and view the files by date. You can then change the names of the most-recent files.

Our 32-Bits' Worth

Q. I'm using an LC II with System 7.1 and 4 megabytes of RAM. I turned on 32-bit addressing in the Memory control panel recently, and now one of my old applications doesn't run. Because I plan to install 10 megabytes of RAM (the LC II's limit) eventually, I'm concerned that I may have problems using all of it. If I can't upgrade a program so that it works with 32-bit addressing on, can I turn 32-bit addressing off to run that program? And if I do turn it off, will my Mac think it has only 8 megabytes of RAM, leaving 2 megabytes in the ozone?

Michael Brown
Deer River, MN

Bob: As you have discovered, turning on 32-bit addressing allows you to discover which of your programs are "32-bit dirty" before you install your new RAM. Turn on 32-bit addressing, and test all the programs you use most to find out which ones need an upgrade.

If you can't upgrade a particular program, you can certainly turn 32-bit addressing off (you'll have to restart your Mac, though). And yes, if you do this with 10 megabytes of RAM installed, your Mac will think it has only 8 megabytes of RAM.

Let me finish by saying that it is generally agreed that you can never have too much RAM. Many programs run better if you increase their RAM allocation in the Finder's Get Info box (select the application, and then choose Get Info from the File menu or type Command-I). And you can have more programs open at the same time if you get more RAM. Try it; I can guarantee you'll like it.

Desktop Dynamo

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CIRCLE 69 ON READER SERVICE CARD.
File compression is a fact of life on-line. Because small files download faster than do large ones (thus saving you money), almost every file you come across on a BBS (bulletin-board system) or on-line service — from the humblest freeware extension to the mightiest commercial software demo — is stored in a compressed form.

The overwhelming majority of compressed files on-line are in one of three formats. Aladdin Systems (408-761-6200) provides two of the formats — the one used by the older StuffIt 1.5.1 and the newer standard used in StuffIt Deluxe 3.0. The third standard is from the Compact Pro shareware utility.

To find out which standard works best, we compressed a variety of files in each format as well as in AppleLink's package format and in ZipIt's Zip format (commonly used by PCs). Although the degree of compression depends on the type of file — from more than 60-percent compression for plain text files and simple spreadsheets to less than 20 percent for complex PICTs and QuickTime movies — the different compression formats were remarkably consistent. AppleLink and StuffIt 1.5.1 offer the least compression, and Compact Pro, ZipIt, and StuffIt Deluxe 3.0 offer the most. The latter three formats shave 10 to 15 percent more from a file's size than AppleLink and StuffIt 1.5.1 do.

But the very best compression was provided by StuffIt Deluxe 3.0, which cuts a file's size by as much as 5 percent more than do its closest rivals. This consistent edge in compression led ZiffNet/Mac to adopt StuffIt Deluxe 3.0's format as its standard compression format. This format is available in the commercial product, StuffIt Deluxe 3.0, as well as in its shareware version, StuffIt Lite, reviewed on this page.

For more information, check out our test data online. Simply download the file CMPDAT.SIT from Library 7 of the Download & Support Forum.

StuffIt Lite (filename STUFEX.SEA, Library 1) is an ingeniously designed decompression utility that can decompress StuffIt Lite 1.5.1 and Deluxe 3.0 archives, AppleLink packages, and Compact Pro archives. Expander is omnivorous: It can happily digest self-extracting archives as well as ordinary compressed files, and it can process multiple files, folders, and formats simultaneously. It's also unobtrusive (it supports drag-and-drop under System 7) and adaptable. For no-frills, no-fuss file decompression, Expander is just about perfect. Moreover, it's a modest 92K to download and absolutely free.

Sending StuffIt files to a colleague with a PC? As a first step toward making StuffIt a cross-platform standard, Aladdin has created UnStuff/PC, a freeware utility that decompresses StuffIt archives on PCs. The new version, 1.1 (now available on-line), can decipher MacBinary-encoded files. Without this capability, the contents of StuffIt archives would be incomprehensible to a PC.

Unfortunately, UnStuff/PC still has a ways to go. Version 1.1 can't handle self-extracting StuffIt archives, and because it's a DOS program, locating and decompressing downloaded archives is a tedious process. Unless you use a shell such as Norton Desktop for Windows (which provides drag-and-drop capability), you'll have to wait until Aladdin gets around to creating a Windows version for UnStuff/PC to become any easier to use.

By Mark Simmons

FREE! FIND FILES FAST

Shrink Your Files

Unstuff Your PC
How to Buy Mail Order Products

Research The Company
Well-established companies tend to be reliable, but if you’re not sure how well established a company is, it pays to do a little research and ask a few questions.

Know What You Want
Know exactly what you want before you call. Magazines, on-line forums, and user groups are all good places to seek advice.

Check Compatibility
To avoid having to return merchandise, find out whether the product you’re interested in is compatible with your system.

Pay With Credit
Whenever possible, use a credit card. Some credit-card companies do such things as double your warranty or give you a refund if you find a lower price elsewhere. If you have a problem, your credit-card company will deal with the mail-order company.

Confirm Prices
Confirm the price when you place your order, including delivery charges. Some companies will waive the delivery charge.

Delivery Methods
Ask about delivery methods — find out what carriers are used, how fast they are, and how much each one costs. Record delivery information.

Return Policies
Because you’re buying sight unseen, make sure the company has a return policy you’re comfortable with. Find out if you’re responsible for paying shipping charges on returned goods and whether you’ll be charged a restocking fee.

Check Packing Slips
Before you use your new merchandise, make sure it’s exactly what you ordered — the correct model or version number, for example. It’s easier to return goods before they’ve been unpacked.

Repair/Replacement Services
If you’re buying hardware, find out how the company handles repairs or replacements.

Technical Support
Technical support varies from company to company. Make sure you know what help is available.
Connect Your Mac To Your TV Or VCR!

Why limit your ideas to the confines of a computer screen? The amazing Mac DisplayLink converts RGB (from your Mac's display) to NTSC (television standard) supporting composite and high resolution S-video. Your presentations, demonstrations, video games, animations, graphics, Photo CD images and QuickTime movies will look crisp and vivid on TV, recorded to VCR or displayed through a video projector.

The Mac DisplayLink is the low cost way to achieve big-screen impact! Training, marketing, sales and point-of-purchase materials jump to life! Video communications become much more powerful. The Mac DisplayLink reproduces all the colors generated by your Mac, from grayscale to “millions of colors.” Easy to install and a snap to use.

INCLUDES FREE Macromedia's Multimedia Software! Shipped with DisplayLink

The self-contained housing holds computer/video cables and AC adapter. Includes everything you need to get the show on the road fast. Supports 8*24, 8*24GC, the on-board video of the Quadra and Centris line or any NuBus machine with appropriate video card. A handy computer/video switch enables you to easily switch between computer display and video output without changing cable connections.

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Four serial ports located on the back of the unit can be characterized as either “printer” or “modem.”

System Ports

Two more serial ports on the back are software defaults—always either “printer” or “modem.”

ADB Ports

Four additional ADB ports and the connection for an optional ADB power supply are conveniently located here.

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90MB And 150Mb Removables

Bernoulli is the professional’s choice for reliable storage. QuickTime movies, graphics, multimedia presentations and desktop publishing projects all need one thing: lots of disk space! Bernoulli has broken the portable hard disk barrier with its state-of-the-art 150MB removable drive. This device is lightning fast and includes look-and-feel software. Choose the 150MB or 90MB models.

Bernoulli’s reliable, rugged drives have won the praises of the press, garnering awards from MacUser, Macworld, Byte, Publisher, InfoWorld and others. You’ve no wonder—Bernoulli removable drives have a 99% customer satisfaction rating! Bernoulli technology operates as fast as a hard disk—without the risk of a head crash, thanks to Swiss scientist Daniel Bernoulli. In fact, Bernoulli disks can survive an impact of 1000Gs (equivalent to an 8-foot drop).

Both the new Mac Transportable 150 and 90Mb models feature incredible 30MBps fast, 18ms access times and up to 40MBits per second transfer rates. The Mac Transportable 150 reads and writes 120MB and 90MB disks, plus also reads 44MB disks. The 90MB model also reads 44MB disks. You can’t beat a Bernoulli!

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S hiva pioneered the advanced dial-in remote networking techniques for AppleTalk networks—and today, their second-generation networking products handle the most demanding jobs in corporate America.

LANRover/E Use your AppleTalk Remote Access dial-in software from anywhere in the world to call the office and get on the network: just like you were sitting at your office desk. Plug in your existing modem to the LANRover/E, plug in the LANRover/L to the nearest LocalTalk cable and you’re ready.

TeleBridge Plug in your existing modem and the Telebridge is your connection to not only dial-in and dial-out communications but also network-to-network connections whereby two distant LANs can be connected as one.

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MicroWriter FS23...$898
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Procom CD Drive MultiSession...$599
QMS 860 HammerHead...$3998

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Aldus Freehand 3.1...$369

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Artisan 6000C Item # TAM12...

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UMAX UC 830 Item # UMAX10...

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The Perfect Solution for Moments of Ultimate Frustration!
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Common Ground lets anyone view and print your documents without creating application or font text and graphics can be searched, copied, and pasted into other documents, saved in PICT or text format for easy editing. Item # NCHS11

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Automates any file-related task by creating agents to synchronize files between 2 Macs, schedule backup, update shared files or intelligently move files around a network. Item # NCHS10

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<table>
<thead>
<tr>
<th>Drive Description</th>
<th>Price</th>
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<tr>
<td>Spin/DEC DSP 3105 1 GB Drive (internal)</td>
<td>$1249.00</td>
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<tr>
<td>Spin/Seagate ST-11200N 1 GB Drive (internal)</td>
<td>$999.00</td>
</tr>
<tr>
<td>Spin/Fujitsu M2694 FA 1 GB Drive (internal)</td>
<td>$1399.00</td>
</tr>
</tbody>
</table>

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Small footprint. Small price tag: under $1000. It accepts ISO standard 128 MB capacity 3.5-inch cartridges compatible with other machines. Exclusive 2-yr warranty.
The Spin 3.5 Optical Drive w/cart. $999.00

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If it’s your job to archive a ton of files, choose one of our Spin DATs. Standard DAT holds 2 GB. Compression model, up to 8 GB. Includes Dantz Retrospect®, version 2.0
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There’s a Spin Zero Footprint drive for every application. They include everything you need to get up and running. Check this chart for specs and prices.

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Minimum requirements: SE 30, 2.5MB RAM, System 5.0.5.

$96.
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Move to IntelliDraw from any other drawing software. It’s so unique it actually does much of the drawing for you. Professional-looking flow charts, maps, and more are all a snap with IntelliDraw. Create symmetrical graphics instantly with the exclusive Symmetry feature. Diagrams are effortless with “sticky” connector lines. Change one “master” object and all linked objects are altered. (#6191, Aldus)

Minimum requirements: Mac Plus, 3MB RAM, System 6.0.5, 4MB RAM under System 7.

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Get a top-of-the-line fax/data modem at an amazingly affordable price! The SupraFAXModem V.32bis features 14.400 bps communications with up to 57.600 bps throughput with another modem that supports both V.32bis and V.42bis data compression. And it maintains downward compatibility with the millions of V.32, 2400, 1200 bps modems already in use. (#4017, Supra)

Minimum requirements: Mac Plus.

$32.
MacAcademy Videos
Learn programs the easy way. Videos let you see each technique on the Mac screen. MacAcademy videos have no blurry screens, no paid actors reading scripts, and no frills. Each features one of their top trainers recreating the classroom atmosphere. Macworld readers chose MacAcademy as the top trainer in the nation in 1992. (MacAcademy)

S32. System 7.1 Tape #1 (#6554), S32. PowerBook #1 - In The Office (#5828)

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The MacFG 24Xp Color Interface Card maximizes the display performance of FGe series monitors with 24-bit color. (#5918, NEC)

$56. MultiSync 4FGe
$41. MacFG 24Xp Display interface module slot
Get a $100 manufacturer’s rebate when you buy both the monitor and card. Expires June 30, 1993.

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Minimum requirements: Any Mac running System 7, 2MB RAM.

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Is your hard disk bursting at the seams? Get TimesTwo! An easy, one-time installation expands your disk capacity as much as 150 percent in minutes. Unlike file compression products, TimesTwo works by transparently compressing disk blocks, not files. So when you move a file from your TimesTwo hard disk to another device or across a network, it arrives in its original form. TimesTwo is compatible with all Mac software, including file recovery programs, and works with all SCSI disks. See for yourself why TimesTwo was a 1992 MacUser Editor's Choice finalist! (#5233, #5600, Golden Triangle)

Minimum requirements: Mac Plus, 2MB RAM, System 6.0.4.

$89.

Retrospect 2.0
Retrospect provides powerful backup and storage management. If your hard disk crashes, Retrospect can restore it to its pre-disaster state and get you back up to speed in minutes. (#6048)
Retrospect Remote is centralized backup and archive software for Macintosh networks. Complete automation allows for daily, automated backup of ten Macs to a single storage device. (#6050, Dantz Development)

Minimum requirements: Mac Plus, 2MB RAM, System 6.0.5, a hard disk, 4MB RAM under System 7.

$145. each

Infinity 105
The Infinity 105 is the smallest and fastest removable SyQuest drive available. It provides sustained data transfer rates of up to 1.75MB/sec. and access time of 14 ms. It allows you unlimited storage capabilities by simply adding additional 105MB 3.5" cartridges. The Infinity 105 is an ideal storage device for animators, on-line editors, and users of interactive multimedia who need to take their shows on the road. It's about the size of a paperback novel so it's a perfect portable storage solution. And it can also be daisy-chained to other devices for desktop use with an external power supply. (#6255, FLI)

$748.

$148.*

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Minimum requirements: Mac Plus, 2MB RAM, System 6.0.2, a cassette player, 4MB RAM under System 7.

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DataPlace + 85MB Drive
The longer you own your Mac, the more you'll find yourself wanting more hard drive space. All DP+ drives feature a sturdy case, two metal-clad SCSI connectors, external fuse, easily accessible SCSI ID switch, manuals, cables, a two-year warranty, and instant technical support from Mac's Place. Plus you get MacTools 2.0, DP Formattor Plus, SpaceSaver, and Kaboom! SE. FREE. (#5278, DataPlace)

$998. DP+ 240MB (#9155)

$19. SyQuest 105MB 3.5" Cartridge (#6236)
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You can paste QuickTime movies into your documents and share data via Publish and Subscribe through this full-featured suite. And it handles graphics, too. Edit, size, scale, and crop graphic images with ease. The tool palette and drawing commands let you create and edit graphics in WordPerfect! You also get Grammarat 5 FREE. It checks spelling, grammar, and punctuation against 58 rules. (#4111)

LetterPerfect is a streamlined version of WordPerfect that requires less memory and disk space. It's perfect for Classic, LC, and SE owners needing formatting, page layout, and word processing tools. Create columns, format with the Ruler, and add graphics.


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Aldus PageMaker 5.0

The long-awaited 5.0 is here! A few of the new 5.0 features: incremental rotation of text and graphics, built-in color separation, multiple open publications, and interruptible screen redraws. If 5.0 isn't released when you call, order 4.2 to get it on the rebate with your System 7 Upgrade purchase. Then you'll get an upgrade to 5.0 FREE from Aldus as soon as it's available. (#6287, Aldus)

$583.*

S.A.M. 3.5

S.A.M. is the only program that scans automatically at preselected times. It scans files, folders, and volumes for known and unknown viruses, reporting infections caused by known viruses. S.A.M. even scans compressed files, no matter what type of compression software is used. And it now has a color interface that makes it easier to use. (#5591, Syantec)


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Apple Font Pack

When you've finally found the right words, make sure you've got the right font. This is a carefully chosen selection of 43 TrueType fonts. They're expertly crafted to provide excellent results—maximum legibility on screen and crisp output on paper. The Apple Font Pack includes new display, text, and symbol faces to give you a wide range of type choices. (#5248, Apple Computer)

Minimum requirements: Mac Plus, System 7.0, a hard disk.

$51.*

Microsoft Excel 4.0 or Word 5.1

The number-one selling spreadsheet for the Mac now makes spreadsheet tasks easier than ever before. With Excel 4.0 you can produce a spreadsheet fast using features like drag-and-drop to move information or autotool to intelligently project trends. Create multiple "what if" scenarios and use the Scenario Manager to view them all at the same time. (#4356)

Word 5.1 gives you a unique customizable Toolbar. So you just click buttons to do common tasks in one step—like checking spelling and adding bullets. You can even change the buttons to best suit the tasks you do most. And with drag-and-drop editing and the built-in grammar checker, you'll polish up documents in no time. (#5567, Microsoft)


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FileRunner

"FileRunner may be the best file synchronizer around. Its interface for selecting files is clear and simple," says MacUser (May, 1993) And FileRunner is the only file synchronization software that synchronizes file deletions. It also identifies and transfers updated and new files to all your Macs, not just two. FileRunner protects data with its exclusive Overwrite Safeguard. If the same file has been changed on more than one Mac, Use FileRunner on floppy, removable hard drives, cartridges, AppleShare servers, or remote disks with AppleTalk Remote Access. It also includes Vires virus detection software. Get FileRunner FREE with Field Assistant. Look for Field Assistant in this ad. (#6168, MBS Technologies)

Minimum requirements: Mac Plus, 1MB RAM, System 6.0, a hard drive, 2MB RAM under System 7.

*Price after $15 rebate. System 7 purchase required.

$43.*

Macintosh PC Exchange

Now you can conveniently work with PC files from 3.5 or 5.25 DOS and Windows disks on your Mac. Just insert the disk into your Apple SuperDrive or compatible floppy disk drive. Subdirectories on the disk appear as folders, and data files as documents. You can open, change, and save DOC documents just like they were Mac files. (#4709, Apple Computer)

Minimum requirements: SE/30, 2MB of RAM, hard drive.

*Price after $15 rebate. System 7 purchase required.

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Minimum requirements: SE/30, 2MB of RAM, a hard disk.


$194.*

$479* Aldus PageMaker 4.2 (#40241)

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Minimum requirements: SE/30, 1MB RAM, System 6.0, Quickdraw capability.

$62.

So You Want To Be A Rock And Roll Star
Ever want to be a rock and roll star? Here's your chance. So You Want To Be A Rock And Roll Star teaches you to play guitar and keyboard. You even get your own professional backup band. You can play or just sing along karaoke-style. Songs include "Dock Of The Bay," "Stand By Me," and four more. (#5744, Interactive Records)

Minimum requirements: LC, 4MB RAM, System 6.0.4, CD-ROM drive, 256 RGB monitor.

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Minimum requirements: Mac SE, System 6.0.4.

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Get a FREE membership to the Bose Express Music Catalog, a limited edition sampler disk, and $50 in coupons toward CDs when you buy Bose speakers from Mac's Place! The Bose RoomMate Computer Monitor provides room-filling sound for your computer system - perfect for desktop multimedia use or listening to CDs. (#6107)

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Minimum requirements: Mac Plus, 1MB RAM, a CD-ROM drive.

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PowerBook Battery and Charger
The PowerBook Battery runs 25 percent longer between charges than the original 140/170 PowerBook battery. And it's built better. A hard plastic cover protects the plates from getting dirty and any poor contacts from short circuiting. The PowerCharger charges quickly and keeps your batteries from losing capacity like they can if they're not exercised over their full charge range. (#5726, BTI)


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Daymaker 2.0
Daymaker 2.0 is not only dramatically faster than before, it's filled with new features. The most requested is the "recording events" function. Now you can name special events and have them automatically inserted into your calendar at regular intervals of your choosing. And all your Daymaker printouts can now show headers, footers, page numbers, plus date and time info. (#5261, Pastel Development)

Minimum requirements: Mac Plus, 1MB RAM, System 6.0.4, a hard disk.

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- Quadra 800
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- 8MB M1567LL-A $239
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- 32MB PN N/A $1999

Quadra 700 (Low profile)

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Call for any memory upgrade not listed.

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- 16MB M4164LL-A $999

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- 6MB PN N/A $399
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SyQuest
Capacity Description Internal External
120MB MC7120/15MS $219 $279
213MB MC7213/15MS $289 $369
340MB LT340/13MS $579 $639
540MB MXT540/8.5MS $899 $969
1240MB MXT1240/8.5MS $1429 $1499

Quantum drives feature 100,000-200,000 hrs MTBF and a two year warranty.

Seagate
Capacity Description Internal External
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1050MB ST11200N/10MS $1099 $1169
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2100MB ST42400N/11MS $2399 $2549
2750MB ST43400N/11MS $2999 $3199

Maxtor
Capacity Description Internal External
120MB MC7120/15MS $219 $279
213MB MC7213/15MS $289 $369
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- Add SuperMac 17" trinitron display, Apple extended keyboard & System 7.
- Complete System $3795

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- FO34sy - 24-bit board: $505
- CD-Express, CD-ROM: $355
- CD-ROM CDR-74: $625
- MultiMedia Gallery: $805
- SilentWriter 59P Printer: $1999
- SilentWriter 59X Printer: $1579
- SilentWriter 59T Printer: $1819
- ColorMate PS-40 Color Printer: $2499
- 2nd upgrade for printers: $95

### TOSHIBA
- Formatted Capacity
  - 072mb: 12.5ms 3.5" HH: $999 / $1059
  - 123mb: 12.5ms 3.5" HH: $1239 / $1299
  - 213mb NEW: 12.5ms 2.97" HH: $545 / $645

### FujiFilm
- Formatted Capacity
  - 51.8mb: 3.5" HH: $789 / $849
  - 1.0gb: 3 ms 16" HH: $2245 / $2345

### TEAC
- Model Speed Size External
  - 128mb 4ms 3.5" HH: $975

### ARCHIVE
- Model Speed Size External
  - 2.0gb Standard: $999
  - 4.0gb: 8.0gb Compression Turbo: $199 / $116

### MAC SYSTEMS
- Date: 2/1/94
  - 2-480: $2199 / $2599
  - Powerbook 145/40-4/40: $2049 / $2399
  - Powerbook 160/40-4/40: $2399 / $2899

### MICROCOOLUS
- Formatted Capacity
  - 028mb: 5ms 3.5" HH: $1239 / $1299
  - 056mb: 5ms 3.5" HH: $1299 / $1359
  - 071mb: 5ms 3.5" HH: $1299 / $1359

### wavellite
- Formatted Capacity
  - 082mb: 7ms 3.5" HH: $1299 / $1359
  - 128mb: 12ms 5.25" FH: $629 / $689

### TEAC
- Model Speed Size External
  - 128mb 4.0ms 3.5" HH: $225

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- Quadra 700/950: $135 / $345
- Powerbook 140/170: $159 / $259 / $355
- Powerbook 160/180: $210 / $299 / $399
- Due 210/230: $210 / $299 / $399
- PC 19/4x: $59 / $139
- Co-Processors 16MHz: for LC/LL/20MHz for S$199 / $319
- NEW 32-BIT SIMMS: $CALL
- 4x/8x/16x @ 50ms: Quadra 800 $149 / $289 / $699
- 4x/8x/16x @ 70ms: Quadra 900 $139 / $239 / $533

### MAGNET Optical Drives
- Model Speed Size External
  - Taitoh IBM 35ms 1.0gb: $3175
  - 1.0gb Optical Glass Cartridge: $225

### Tape Back-Up Drives
- Model Speed Size External
  - 510mb Tape Backup Drive: $669
  - 400mb Tape Backup Drive: $669
  - 150mb Tape Cassette: $25 / $20

---

**Note:** Specifications and prices subject to change without notice. Taxes, shipping and handling included. All products sold with a 90-day warranty and can be returned within 30 days of purchase. All prices are valid until April 30, 1993.
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A213S  | 213MB SCSI 15ms | $299.00  | $375.00  | 2 Years
A245S  | 245MB SCSI 15ms | $319.00  | $399.00  | 2 Years
A345S  | 345MB SCSI 15ms | $465.00  | $535.00  | 2 Years
A540S  | 540MB SCSI 8.5ms | $929.00  | $989.00  | 2 Years
A1240S | 1.2GB SCSI 8.5ms | $1399.00 | $1499.00 | 3 Years

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<table>
<thead>
<tr>
<th>Model</th>
<th>Formatted Capacity</th>
<th>Effective Drive Access Size</th>
<th>Special</th>
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<tbody>
<tr>
<td>DT-1624</td>
<td>160 Megas</td>
<td>4.4 ms</td>
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<tr>
<td>DT-1905</td>
<td>560 Megas</td>
<td>3.9 ms</td>
<td>3.50</td>
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<tr>
<td>DT-1624</td>
<td>670 Megas</td>
<td>4.6 ms</td>
<td>5.25 HH</td>
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<tr>
<td>DT-1598</td>
<td>1030 Megas</td>
<td>4.1 ms</td>
<td>5.25 FH</td>
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<td>DT-2112</td>
<td>1550 Megas</td>
<td>3.9 ms</td>
<td>5.25</td>
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<td>DT-1528</td>
<td>1540 Megas</td>
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<td>DT-1908</td>
<td>1400 Megas</td>
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<td>DT-1568</td>
<td>1750 Megas</td>
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<td>DT-1924</td>
<td>2000 Megas</td>
<td>3.9 ms</td>
<td>5.25 FH</td>
</tr>
</tbody>
</table>

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DT-1598 $1,529 $1,629
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<table>
<thead>
<tr>
<th>Amount of Insurance</th>
<th>Annual Premium</th>
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<tr>
<td>Up to $2,000</td>
<td>$ 49</td>
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<tr>
<td>$ 2,001-$5,000</td>
<td>$ 69</td>
</tr>
<tr>
<td>$ 5,001-$8,000</td>
<td>$ 89</td>
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<tr>
<td>$ 8,001-$11,000</td>
<td>$109</td>
</tr>
<tr>
<td>$11,001-$14,000</td>
<td>$129</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>CO•DRIVE SERIES</th>
<th>LPS SERIES</th>
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<tr>
<td>2.5” POWERBOOK DRIVES</td>
<td>3.5” LOW PROFILE</td>
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<tr>
<td>Capacity</td>
<td>Access</td>
</tr>
<tr>
<td>80mb</td>
<td>17ms</td>
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<tr>
<td>120mb</td>
<td>17ms</td>
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<tr>
<th>ELS SERIES</th>
<th>PRODRIVE SERIES</th>
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<td>3.5” LOW PROFILE, LOW POWER</td>
<td>3.5” HALF HEIGHT</td>
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<tr>
<td>Capacity</td>
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<tr>
<td>42mb</td>
<td>19ms</td>
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<td>85mb</td>
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<tr>
<td>127mb</td>
<td>17ms</td>
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<tr>
<td>170mb</td>
<td>17ms</td>
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| Capacity | Access | Internal | External |
| 425mb | 9ms | $739 | $799 |
| 700mb | 10ms | $1099 | $1159 |
| 1.0GIG | 10ms | $1219 | $1279 |
| 1.2GIG | 10ms | $1359 | $1419 |

<table>
<thead>
<tr>
<th>ClubMac 3.5” 105MB REMOVABLES</th>
<th>ClubMac 3.5” 105MB REMOVABLES</th>
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<tbody>
<tr>
<td>ClubMac 105mb External (SQ3105A)</td>
<td>$749</td>
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<td>ClubMac 105mb Internal (Q900/950)</td>
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<thead>
<tr>
<th>CLUBMAC 88c REMOVABLES*</th>
<th>CLUBMAC 88c REMOVABLES*</th>
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<tr>
<td>ClubMac 88c External (SQ5110C)</td>
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<td>ClubMac 88c Internal</td>
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<td>ClubMac 88c Dual</td>
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<tr>
<th>CLUBMAC 44MB REMOVABLES</th>
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<tbody>
<tr>
<td>ClubMac 44mb Internal</td>
<td>$348</td>
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<tr>
<td>ClubMac 44mb Dual</td>
<td>$669</td>
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<thead>
<tr>
<th>CLUBMAC 88MB REMOVABLES</th>
<th>SYQUEST REMOVABLE CARTRIDGES</th>
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<tbody>
<tr>
<td>ClubMac 88mb External (SQ5110)</td>
<td>$479</td>
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<tr>
<td>ClubMac 88mb Internal</td>
<td>$449</td>
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<tr>
<td>ClubMac 88mb Dual</td>
<td>$849</td>
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<tr>
<td>105mb / 44mb / 88mb Cartridge</td>
<td>$79 / 63 / 97</td>
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<table>
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<tr>
<th>ClubMac OPTICAL Drives</th>
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<tr>
<td>Model</td>
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<tr>
<td>CMO-M251IA Fujiitsu</td>
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<tr>
<td>CMO-3D3000 Teac</td>
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<tr>
<td>CMO-OMD6010 Epson</td>
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<tr>
<td>CMO-JY750 Sharp*</td>
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<tr>
<td>CMO-5031E Ricoh</td>
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<table>
<thead>
<tr>
<th>SyQuest Drives include a TWO Year Warranty</th>
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<table>
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<tr>
<th>Model</th>
<th>Capacity</th>
<th>Description</th>
<th>Seek</th>
<th>Internal</th>
<th>External</th>
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<tr>
<td>SyQuest</td>
<td>105mb</td>
<td>63 / 97</td>
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<td>ClubMac TAPE BACKUP Systems</td>
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<td>Model</td>
<td>Capacity</td>
<td>Description</td>
<td>Media</td>
<td>Internal</td>
<td>External</td>
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<tr>
<td>TEC7600</td>
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<td>Teac MT2ST/N50 Analog</td>
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<tr>
<td>TEC600F</td>
<td>600mb</td>
<td>Teac MT2ST/F50 Analog</td>
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<th>Media</th>
<th>Internal</th>
<th>External</th>
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<td>DAT</td>
<td>2.0GIG</td>
<td>Archive Python DAT, DDS</td>
<td>$1049</td>
<td>$1069</td>
<td></td>
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<tr>
<td>DAT</td>
<td>3.5GIG</td>
<td>Archive Turbo DAT DAT, DDS-DC</td>
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<td>$1349</td>
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<tr>
<td>DAT</td>
<td>2.0GIG</td>
<td>HP 55470A DAT, DDS</td>
<td>$1269</td>
<td>$1289</td>
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<td>DAT</td>
<td>3.5GIG</td>
<td>HP 55460A DAT, DDS-DC</td>
<td>$1429</td>
<td>$1449</td>
<td></td>
</tr>
</tbody>
</table>

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PB160-180/4/6/8/10 ............... 190/245/399/419
PB180C-4/6/8/10 ................... 239/299/399/549
PB Duo-4/6/8/10 ..................... 21/29/39/47/159

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Global Village PowerPort Gold ... 389
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PLI 650 MB Optical ................. 2,419
PLI Max Optical 16G ............... 3,449

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Battery Charger/Battery 140-180 .... 135
Global Village PowerPort Gold ... 389
PSI PowerMidi IV ..................... 438
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170 MB Turbo External ............ 519
212 MB Turbo External ............ 629
425 MB Turbo External ............ 1,339
520 MB Turbo External ............ 1,409
1 GB Turbo External .............. 1,889
Quick SSCI/NBus Card ............. 359
212MB Internal Drive .............. 489
425MB Internal Drive ............. 1,126
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#### DataPak External Sylluest Drives
- DataPak External Sylluest Drives 112MB 1,257
- DataPak External Sylluest Drives 650MB 3,019

### 105 MB Sylluest
- DataPak External Sylluest Drives 44 MB 499
- DataPak External Sylluest Drives 88 MB (R/W 44 MB) 639

### CD-ROM Drive
- DataPak CD-ROM Drive .................. 679
- CD-ROM Drive ............................ 679

### PINNACLE MICRO
- PMD 650MB Optical Drive .................. 2,875
- PMD 130 Optical Drive ................. 1,589
- Recordable CD-ROM Drive ............ 3,885

### QUANTUM
- Quantum 95 PRO .......................... 290
- Quantum 127 PRO ......................... 399
- Quantum 170 PRO ......................... 299
- Quantum 240 PRO ......................... 399
- Quantum 525 PRO ......................... 999
- Quantum 1000 PRO ............. 1,339

### F WB, INC.
- PocketHammer 120 MB Portable ......... 889
- PocketHammer 170 MB Portable .......... 749
- hammer240s ............................... 599
- hammerDisk130 Optical .................. 1,509
- hammerDisk44/88 Sylluest .............. 669

### ACCELERATORS

#### Applied Engineering
- LC030-25MHz w/128k Cache .......... 325
- LC030-40MHz w/128k Cache .......... 389
- LC030-50MHz w/128k Cache .......... 469
- LC030-60MHz w/128k Cache .......... 529

#### New Turbo 140 Accelerators
- New Turbo 140 .......................... 1,129
- New Turbo 140 w/128k Cache ......... 1,389
- FastCache Turbo 25 ..................... 259
- FastCache Turbo 33 ..................... 345
- FastCache 140 w/128k Cache ........... 279
- FastCache 140 w/128k Cache ........... 279
- FastCache 140 w/128k Cache ........... 279
- RAM Power Card ........................ 429
- RAM Power Card ........................ 429
- Disk Runner Nubus (IMB) .............. 619
WE WANT TO BE YOUR MACINTOSH SOLUTIONS PARTNER (...WE'RE REALLY NOT INTERESTED IN A ONE-SHOT SALE)

In these difficult economic times, value is the most important criteria for making a purchasing decision. We're in our eighth year of providing the best value in the Mac market. Sure, there are some companies that can give you a better price on a particular product... but will they stand behind it (and by you)...and will they even still be in business? We will. We're a subsidiary of a financially-sound public company, and have been members of the Better Business Bureau since 1987.

We offer you the best overall value, customer service, technical support, and financing options...because we're interested in being your total solutions partner...and because we'll be around to help you.

We've become known as America's one-stop source for Macintosh solutions. Why have we been so successful where dozens of others have failed? The answer is: SERVICE, SERVICE, SERVICE! Our friendly sales and customer service teams sometimes talk people out of buying more than they need. That's because we believe in building relationships and making sure you get the best solutions you possibly can, not just the products with the most bells and whistles...and that's why we're America's largest Mac mail order reseller.

Réal Provencher
Réal Provencher, President

Monitors: all sizes, brands & prices

Need help choosing a monitor? Not sure if you need one that auto-syncs? Call our friendly sales team. They're happy to answer your questions.

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* shown above

Your Hardware That Fits partner will tell you which monitors are on-board compatible, and which ones require a card or cable.
In the graphic design business, the desktop publishing hardware is changing so rapidly that it can be confusing what to buy — Jon's knowledgeable and friendly help guided me toward the right decision for my company.

— Elaine Kropveld
EKlectic Images

Real Tech 20” Trinitron Color Monitor

- Auto-syncing
- 24- or 8-bit color
- Multi-mode display
- 7 factory pre-set resolutions
- 7 programmable settings
- 1024 x 768 standard resolution
- Trinitron® tube from Sony

Real Tech 17” Multi-Mode Color Monitor

- Multi-mode
- Auto-syncs to 1024 x 768
- 832 x 624 standard resolution
- Quadra-ready

Real Tech 17” Multi-Mode Color Monitor

- Multi-mode
- Auto-syncs to 1024 x 768
- 832 x 624 standard resolution
- Quadra-ready

TOLL-FREE TECH SUPPORT
Have your customer number ready.
Call 1-800-364-MACS.
Wacom Cordless Digitizing Tablets

Precise, real-time control over graphic input...brings back the delight of freehand drawing!

Cordless, pressure sensitive stylus translates your penstrokes into line width, spray density, color changes, and other programmable effects. Paint, draw, trace, and point as naturally as if you were writing.

You can always count on our tech team. We receive dozens of customer letters praising their helpfulness and friendly attitude. They're always ready to help when you have a problem.

Seated, left to right: Paul and Craig. Standing: Chris, Tom, Dan, Mike, and Dave.

CUSTOMER SERVICE

When you order from us, you get computer experts, not clerks! All of our salespeople are trained in Apple's intensive program, as well as our own. On average, they have at least three years of Mac experience. They're ready to help you (with a smile!) both before and after the sale.

TECH SUPPORT

Our tech team is well trained, well informed, and well known for their ability to solve customers' problems with a minimum of inconvenience to the customer. We have the best tech support in the business. And it's toll-free: 1-800-364-MACS. Please have your customer number ready.

FINANCING OPTIONS

We've made it easier than ever to own our productivity-enhancing products.

- VISA and MasterCard
- corporate P.O. accounts (call for information)
- business leasing available

Our famous guarantee: If you don't like it, we'll buy it back. If you're not 100% satisfied, call for your RMA number and return the product within 30 days of the ship date. We'll refund your purchase price (minus consumables for printers).

GUARANTEE

All prices are subject to change without notice. ©1993.

1  True Lease...with 10% buy-out option
2  Installment Lease...with $1.00 buy-out option
3  Speed Lease...90- or 180-day terms, with buy-out or conversion to other leases
4  20/20 Lease...10% security deposit, 20 equal payments, 10% buy-out
5  90-day Deferred Lease...no payment for 90 days; first and last payment in advance

*All leases are subject to credit approval. All lease payments in our ads are based on the "True Lease" program at 48 months. Prices, lease prices, and rates are subject to change without notice. NOTE: Minimum lease payment is $50 per month.

HARDWARE THAT FITS • 610 S. Frazier • Conroe, TX 77301

Printed on recycled paper to show our concern for the environment.

Business leasing options:

1. True Lease...with 10% buy-out option
2. Installment Lease...with $1.00 buy-out option
3. Speed Lease...90- or 180-day terms, with buy-out or conversion to other leases
4. 20/20 Lease...10% security deposit, 20 equal payments, 10% buy-out
5. 90-day Deferred Lease...no payment for 90 days; first and last payment in advance

All leases are subject to credit approval. All lease payments in our ads are based on the "True Lease" program at 48 months. Prices, lease prices, and rates are subject to change without notice. NOTE: Minimum lease payment is $50 per month.

Toll-free information: 1-800-364-LESS

We have the best tech support in the business. And it's toll-free: 1-800-364-MACS. Please have your customer number ready.
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Don't know which card is compatible with your CPU & monitor? Call us toll-free.

Call 1-800-364-USER

INTERNATIONAL: 1-409-760-2400
IN CANADA CALL: 1-800-872-3018
FAX 24 HRS/DAY: 1-409-539-4141

**Hours: 8 am-7 pm Central Standard Time**

30-DAY MONEY-BACK GUARANTEE on all hardware except lasers, printer consumables and special orders. Same-day return is on returns. Phone return, call 1-800-364-USER. Refund if you don't like it. E-mail returns: seiko@seiko.com. Prices and availability subject to change without notice.
Scanners

Flatbed desktop scanners for 24-bit color, 8-bit grayscale, and black/white images. Ideal for mid-range output or position prints for mockups/presentations.

**MICROTEK**

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<td>600</td>
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**REALTECH**

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**UMAX**

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Color imaging solutions.
### LETTER-SIZE PRINTERS

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<td>DEC Laser 1152</td>
<td>$995</td>
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<td>300 dpi, 4 MB RAM, 6 MB RAM (expandable to 4 MB), PostScript Level 2</td>
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<td>Texas Instruments</td>
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<td>$40/month</td>
<td>300 dpi, 6 pages/min, 1.5 MB RAM (expandable to 4.5 MB), PostScript Level 1</td>
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<td>NEC Silentwriter Model 95</td>
<td>$1,469</td>
<td>$40/month</td>
<td>300 dpi, 4 pages/min, 1.2 MB RAM (expandable to 3 MB), PostScript Level 2</td>
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<tr>
<td>NewGen PS 880p</td>
<td>$2,119</td>
<td>$58/month</td>
<td>600 dpi, 4 pages/min, 1.2 MB RAM (expandable to 32 MB), PostScript</td>
</tr>
<tr>
<td>Texas Instruments</td>
<td>$2,795</td>
<td>$77/month</td>
<td>300 dpi, 16 pages/min, 2.5 MB RAM (expandable to 10.5 MB), PostScript Level 2</td>
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<tr>
<td>QMS 860</td>
<td>$4,059</td>
<td>$111/month</td>
<td>600 dpi, 6.6 ppm (letter size), 1.2 MB RAM (expandable to 96 MB), PostScript</td>
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<tr>
<td>NewGen 660B</td>
<td>$4,279</td>
<td>$118/month</td>
<td>600 dpi, 6.6 ppm (letter size), 1.2 MB RAM (expandable to 96 MB), PostScript</td>
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### TABLOID PRINTERS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
<th>Lease Price</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>NewGen PS 660B w/ Ethernet</td>
<td>$1,129</td>
<td>$31/month</td>
<td>600 dpi, 6.6 ppm (letter size), 1.2 MB RAM (expandable to 96 MB), PostScript</td>
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<tr>
<td>QMS 860</td>
<td>$4,499</td>
<td>$122/month</td>
<td>600 dpi, 6.6 ppm (letter size), 1.2 MB RAM (expandable to 96 MB), PostScript</td>
</tr>
</tbody>
</table>

### And more printers...

If you want a printer not listed in this ad, please call us toll-free.

**PORTABLE**
- Kodak Diconix 180s: $299
- Kodak Diconix 701 Inkjet: $449

**LETTER SIZE**
- NEC Silentwriter 95c: $1729
- NEC Silentwriter 97: $1769
- NEC Silentwriter 97R: $2099
- NewGen PS/660: $2699
- TI Turbo: $1499

**TABLOID SIZE**
- NewGen 660B: $4499
- Seiko ColorPoint PSX: $5999
SPECIAL SAVINGS

Lowest prices on DayStar.

Power up with ACCELERATORS

**DAYSTAR DIGITAL**

**NEW! Turbo 040**
Get the maximum in 68040 acceleration and 100% compatibility. For Mac IICi and IIsi; includes math chip.
25 MHz Turbo 040 .......... $1099
33 MHz Turbo 040 .......... 1349

**25 MHz FastCache Turbo 040** .......... 259
33 MHz FastCache Turbo 040 .......... 339

**Universal PowerCache**
Math chip available. Supports 16 platforms.
33 MHz Accelerator .......... $379
40 MHz Accelerator .......... $49
50 MHz Accelerator .......... $719
PowerCache Adapter .......... 40

**Photoshop Accelerator**
Includes PicturePress 2.5, Charger Plug-ins, and Kodak Photo CD access with clip art images.
Charger .......... $799

**RADIUS**

radius Rocket™
For the Mac II family. Includes QuickDraw and display-list acceleration software.
Radius Rocket 25i ............ $999
Radius Rocket 33 .......... 2069
SCSI II Booster .......... 249
Rocket Share .......... 419

**NEVER TECHNOLOGIES**

**NEW Variable Speed Overdrives**
A cost-efficient way to speed up your Quadra 700, 900, 950, or IIfx. Installs in the ROM socket, leaving the NuBus and PDS slots free for other upgrades.
Q700/900 Overdrive .......... $269
Q950 Overdrive .......... 269
Q950 Overdrive .......... 269

**PowerCache Adapter**

**NEW**

**POWERCACHE**

**NEWER TECHNOLOGIES**

**FUSION DATA SYSTEMS**

**PLI HARD DRIVES**

**PLI**

**Supra v.32 bis 14,400** .......... $299

**SupraFax Modems**
SupraFax Modems include STF and Microphone software, and are backed by a 5-year warranty.
SupraFax Modem Plus .......... 159
SupraFax 144 PB .......... 299
SupraFax 144 PB Plus .......... 399
MassMicro FM 24/96 Network .......... 359
MassMicro FM 24/96 Personal .......... 165
Global Village PowerPort–Gold .......... 399
Global Village PowerPort–Silver .......... 339
Global Village PowerPort–Bronze .......... 189

**MODEMS**

**Asante 10T Hub/8** (Ethernet concentrator)
Lets you use inexpensive unshielded twisted-pair (UTP) telephone wire instead of expensive coaxial cable for local area networks.
10Base-T Hub/8 .......... $255
Asante EN/SC (SCSI-to-Ethernet adapter).
For Macs without available slots.
EN/SC .......... 329
Asante MacCon 3 Ethernet card. Automatically configures to media used.
MacCon 3 Card .......... 209

**DaynaPORT E/I-T NuBus Card**
Connects Mac II computers to thick, thin, fiber optic or 10Base-T Ethernet cable systems.
Includes an RJ-45 jack for 10Base-T wiring.
DaynaPORT E/I-T NuBus Card .......... 149

**Shiva**

**FastPath SR Router/Gateways**
$1669
NetBridge .......... 589
EtherGate Router .......... 1239
NetSerial .......... 269
NetModern/E .......... 1409
NetModern v.32 (for LocalTalk) .......... 989
Hublet .......... 199
LanRover/L .......... 579
LanRover/E (4-port) .......... 1659
TeleBridge .......... 89

**Dayna EtherPrint**
Supports AppleTalk Phase 1 and Phase 2 protocols; divide your network into multiple zones.
Dayna EtherPrint .......... 335
EtherPrint Plus .......... 439

**INTERNATIONAL:** 1-409-760-2400
**IN CANADA CALL:** 1-800-972-3018
**FAX 24 HRS/DAY:** 1-409-539-4141

**1-800-364-USER TOLL-FREE TECH SUPPORT**

Have your customer number ready.
Call 1-800-364-MACS.
**PowerBook Systems**

- **PowerBook Duo 230 8/80**
  - 8 MB of RAM, 80 MB hard drive, 33 MHz 68030 microprocessor, FPU.
  - $249CJ

- **PowerBook 160 8/40**
  - $269

- **PowerBook 165c 4/80**
  - $3399

- **PowerBook 180 8/80**
  - $4359

**PowerBook Portable Docks**

- **PowerLink Presenter (8-bit)**
  - $469

- **PowerLink DeskNet (8-bit)**
  - $659

**Macintosh Ilv Business Solution**


**Quadra 800/Trinitron Intermediate Graphics Solution**

- **Quadra 800**, 8 MB of RAM, 230 MB hard drive, RealTech 20” Trinitron monitor w/RasterOps PaintBoard Li and Key Tronic MacPro Plus extended keyboard.

**Quadra 950/Trinitron High-end Graphics Solution**

- **Quadra 950**, 8 MB of RAM, 520 MB Micropolis hard drive, RasterOps 20” Trinitron monitor w/RasterOps PaintBoard Li and Key Tronic MacPro Plus extended keyboard.

**LCII System**

- **LCII**, 4 MB of RAM, 80 MB hard drive, RealTech 15” color display, and standard Apple keyboard.

**Centris 610 Systems**

- **Centris 610**, 4 MB of RAM, 80 MB hard drive, Seiko Instruments 14” Color CM1445 monitor, and Key Tronic MacPro Plus extended keyboard.

- **Centris 610**, 8 MB of RAM, 80 MB hard drive, RealTech 17” color monitor, built-in Ethernet and Key Tronic MacPro Plus extended keyboard.

**Centris 650 Systems**

- **Centris 650**, 8 MB of RAM, 80 MB hard drive, Sony 17” Color monitor, and Key Tronic MacPro Plus extended keyboard.

- **Centris 650**, 8 MB of RAM, 230 MB hard drive, 20” RealTech Trinitron monitor, RasterOps PaintBoard Li, built-in Ethernet and FPU, and Key Tronic MacPro Plus extended keyboard.

**E-Machines**

- **Macintosh IIvx**, 5 MB of RAM, 245 MB Maxtor hard drive, SuperMac 21” Platinum monitor w/video card, cache card, and Key Tronic MacPro Plus extended keyboard.

**Our Great Values + Our Great Service = 100% Satisfaction**

Talk to one of our friendly systems consultants. They’ll help you figure out the right solution for your business. We can configure any combination of CPU and hard drive with the monitor and peripherals of your choice (even if you don’t see it in this ad). That’s why we’ve come to be known as your **One-Stop Source for Custom Solutions**.

To a lot of you, we've become a trusted business partner. So when you told us we needed to offer you more storage options, we listened. Our systems engineers have worked tirelessly to design the best possible enclosure for name-brand mechanisms. The result? These drives are the value you've been looking for—priced right, and built with the quality you irreplaceable data demands.

During the past eight years, we've become America's one-stop source for Macintosh solutions. Now we can be your one-stop source for storage solutions, too. Because we're the company you can trust to give you the very best...

- QUALITY
- SERVICE
- VALUE

Stack up our drives against the "best of the best" and they'll come out on top. You can trust us to always bring you the highest-quality Mac hardware!

### Name-brand mechanisms in the highest-quality enclosure available

**WHY OUR DRIVES ARE SUPERIOR**

A. We use the highest quality name-brand mechanisms available; fully tested and burned in

B. Shielded 40 watt power supply (65 watt for FH drives) provides an additional margin of safety from electrical interference, keeping your data free of corruption

C. External fuse keeps fuse replacement simple

D. Power cable plug-in

### Limited time offer!

**Included FREE with your drive...award-winning Now Utilities (Version 4.0.1).**

Includes 7 powerful utilities: Startup Manager, Super Boomerang, WYSIWYG Menus, Now Profile, Now Scrapbook, Now Save, Now Menus. Use Now Utilities to maximize System 7's capabilities, and to simplify using your Mac.

### REALTECH SCSI-2 CARD

- Allows all NuBus Macs to communicate with newer, high-performance hard drives at substantially faster transfer rates.
- Sustained transfer rate of up to 4.4 MB per second, plus a burst transfer rate of 6 MB per second (6/10 on a Quadra). Mirrors capabilities. **$299**

### Need a really big drive, with a LOT of storage capacity? These drives offer big performance.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Internal price</th>
<th>External price</th>
<th>Formatted AC capacity (MB)</th>
<th>Average access time (ms)</th>
<th>Transfer Rate (MB/second)</th>
<th>Form Factor**</th>
<th>Warranty (years)</th>
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<td>FH</td>
<td>5</td>
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</tbody>
</table>

* Transfer rate (or throughput) depends on your Mac CPU and system configuration. For more information, ask your Hardware That Fits sales partner. **Form Factor** Low Profile (LP) = 1.5, Half Height (HH) = 3.5, Full Height (FH) = 5.25

**SCSI-2** Fast These drives are most efficient when used with a Macintosh Quadra 800, 950 or a RealTech SCSI-2 card.

Hard drives from...

LIMITED TIME OFFER!

- Now Utilities (Version 4.0.1)
- Includes 7 powerful utilities
- Startup Manager, Super Boomerang, WYSIWYG Menus, Now Profile, Now Scrapbook, Now Save, Now Menus
- Use Now Utilities to maximize System 7's capabilities, and to simplify using your Mac.

**SERVICE**

- Fast access times
- Top-level warranties on all mechanisms
- 2-year warranty on enclosures

**VALUE**

- Quality
- Service
- Value

Stack up our drives against the "best of the best" and they'll come out on top. You can trust us to always bring you the highest-quality Mac hardware.

1-800-364-USER

INTERNATIONAL: 1-408-760-2400
IN CANADA CALL: 1-800-972-3018
FAX 24 HRS/DAY: 1-408-539-4141
## REMOVABLES*

**REALTECH MAGNETO-OPTICAL**
- 128 MB Epson Drive w/1 disk (29 ms access time; 1 yr. warranty) $1069
- Drive w/Diskette 3-pack $1229

**Maxoptix Tahiti Iim Drive**
- (652/1.0 GB capacity; 35 ms access time; 1 yr. warranty) $3269

**REALTECH TAPE BACKUP**
- Includes Retrospect 2.0 backup software.
  - TEAC 135 MB Drive $499
  - TEAC 600 MB Drive $749

**REALTECH DAT**
- DDS-DC Drive (2-8 GB capacity; 1 yr. warranty; includes Retrospect 2.0 backup software) $1399
- The RealTech DAT Drive uses industry-standard DDS-DC compression on a 90-meter tape. Depending on your data, storage capacities may vary from 2 to 8 GB.

**SYQUEST**
- 44 MB Drive $389
- 88 MB Drive $599

*Includes one disk or tape

## DRIVE SOFTWARE

**REALTECH DRIVE UTILITIES**
Software is included with your drive. Disk partitioning; password protection; diagnostic testing; multiple SCSI-bus support; extensive on-line help; and more. Also included with your drive: System 7.0.1.

## REMOVABLE MEDIA

<table>
<thead>
<tr>
<th>Model number</th>
<th>Internal price</th>
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<td><strong>700 MB - 1.3 GB</strong></td>
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</table>

*Transfer rate (or throughput) depends on your Mac CPU and system configuration. For more information, ask your Hardware That Fits sales partner.

**Low Profile (LP)= 3.5 Half Height (HH)= 3.5 Full Height (FH)= 5.25**

**TOLL-FREE TECH SUPPORT**
Have your customer number ready.
Call 1-800-364-MACS.

**CIRCLE 199 ON READER SERVICE CARD.**
DGR 256REM - 1993 MacUser Bottom Line Picks
DGR 128REM - 1992 MacUser Bottom Line Picks

SETTING THE STANDARD FOR EXCELLENCE

- **128REM Turbo Epson**
  - 3.5" Magneto-Optical
  - 768 Kbps Transfer Rate
  - 34 ms Average Seek Time
  - < 1 ms Short Seek Time

- **128REM Sony**
  - 3.5" Magneto-Optical
  - 615 Kbps Transfer Rate
  - < 40 ms Average Seek Time
  - < 1 ms Short Seek Time

- **256REM MOST**
  - 3.5" Magneto-Optical
  - 1.23 Mbps Transfer Rate
  - 35 ms Average Seek Time
  - 1.2 ms Short Seek Time
  
  "The DGR MOST was not only the fastest drive we tested, but it can also store 256 megabytes of data on a single cartridge - and it is able to read from and write to 128-megabyte cartridges." MacUser Labs, April 1993

- **NEW! 650MB Sony**
  - 5.25" Magneto-Optical
  - 680 Kbps Transfer Rate
  - 79 ms Average Seek Time
  - 2.2 ms Short Seek Time
  - WORM Compatible

- **Ready to Use**
  All DGR optical drives come complete with a cartridge, cabling and driver software.

In July 1992, MacUser Labs tested every 3.5-inch optical drive on the market, and chose the DGR 128REM as MacUser Bottom Line Pick.

They were so impressed, in fact, that in 1993 they made DGR Technologies the standard of excellence by which all other drives were judged.

The result? Only more applause for DGR Technologies, the critical award winner year after year. And, more applause for optical technology, offering "virtually unlimited storage capacity." Without compromise. Because optical storage technology means the ultimate in high-capacity performance and reliability.

So break the boundaries.

Call DGR Technologies for the dealer nearest you.

**800-235-9748**

**Bottom Line Pick**

**128REM Turbo**
$1199

**128REM Sony**
$999

**256REM**
$1899

**650REM**
$1999
Two ways your SE can outperform a new Mac

NEW 33MHz Version!

Run 825% faster.

See 600% more.

THE MOBIUS 030 DISPLAY SYSTEM is the simplest, most reliable, and most economical way to pump major new life into your trusty Mac SE or Classic; a combination 030 accelerator and video card, plus a top-rated Mobius One or Two Page Display. Starting at just $399, the 25 MHz Mobius 030 is actually a Mac Iic upgrade that gives you blazing speed, on-board video, and memory expansion to 16 MB*. It's no wonder MacWeek called it "THE BEST UPGRADE VALUE WE'VE SEEN YET FOR THE SE." And the new 33 MHz Mobius 030 boosts your Mac's performance eight times, approaching the speed of a Mac Iiix—for one third the cost of buying one. This means blazing redraws in your page layouts and speedy recals in your spreadsheets. Your entire document will always appear razor-sharp and rock-solid on "THE MOST VISUALLY APPEALING" display, according to MacWorld. The Mobius 030 is a complete solution that not only supports your choice of monitor, but can be expanded for even greater performance. Want more speed? Just add our math coprocessor. More memory? There's room on the card for 1 or 4 MB SIMMs. At Mobius, we're dedicated to providing the best service and support in the industry. So give us a call now to place an order or get our free catalog. We'll show you how you can outperform a new Mac.

*Requires Connectrix™ Virtual 3.0™. Add $55 for the Macintosh Classic. ©1993 Mobius Technologies, 5835 Doyle Street, Emeryville, CA 94608, Tel (510) 654-0556, Fax (510) 654-2834. All rights reserved. Mobius 030 Display System is a trademark of Mobius Technologies, Inc. All other trademarks are property of their respective holders. Pricing subject to change without notice.

CIRCLE 171 ON READER SERVICE CARD.
Seiko 14" Color Monitor
The Seiko 14" is a color monitor with a resolution of 640 x 480 and a vertical refresh rate of 66 Hz. It features a 14" SuperTriniTron tube with a superfine pitch to maintain edge-to-edge focus and reduced glare. It comes with a one-year warranty.

#11775 $489

SuperMatch 17" Trinitron
High Quality, Low Price 24-bit Color Monitor
The SuperMatch 17" non-interlaced multisync monitor features three resolution modes: 1024 x 768, 800 x 600, and 640 x 480. This high resolution Trinitron monitor is compatible with Macs using built in video. Comes with a tilt and swivel base.

#11589 $1199

Spectrum 24 Series IV
High Quality, Low Price 24-bit Video Card
The Spectrum 24 Series IV is a 24-bit video card that has on-board QuickDraw acceleration which will speed up QuickDraw specific routines by up to 600%. Also included is hardware pan & zoom and a virtual desktop, dynamically sizable up to 4096 x 1536 pixels. This NuBus video card supports most displays.

#10268 $889

SuperMac
20" Color Displays
The SuperMac 217 is a 20" color display that uses a Hitachi tube and displays 1024 x 768 with a resolution of 72 dpi. It has a refresh rate of 75 Hz and anti-glare coating.

#1805 $1599

VideoSpigot
Pour Video Into Your Mac
The VideoSpigot Digital Video Frame Grabber is a digital-video system for making QuickTime movies. Captures full-motion video in real time at speeds up to 23.3 frames per second with 24-bit color in a 160 x 120-pixel window when used with a Macintosh Quadra. The VideoSpigot captures video in multiple sizes up to 320 x 240 resolution.

#4154 $379

Take your pick or the great deals below when you buy any CD drive above.

Make your own bundle from these great titles!

Buy any CD-R drive and pick any three
CD-ROM titles for $59. Save up to $20!

Buy any CD-R drive and pick any ten
CD-ROM titles for $129. Save up to $70!
# MODEMS

<table>
<thead>
<tr>
<th>Type</th>
<th>Price</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>External 2400 bps data/9600 bps send/receive fax</td>
<td>$106</td>
<td>Hayes compatible; automatic answer; user modifyable non-volatile RAM; 8 LED's &amp; Volume controlled speaker.</td>
</tr>
<tr>
<td>Zoom 9624V FX Modem</td>
<td>$127</td>
<td>External 2400 bps data/9600 bps send/receive fax. Supports V.42, V.42bis, MNP 2-5 &amp; 10, V.22bis. Comes with 5-year warranty.</td>
</tr>
<tr>
<td>Dove #5383</td>
<td>$99</td>
<td>2400/9600 V.42bis Fax Modem. Supports V.42, V.42bis, MNP 2·5. Ships with Microphone and STF Fax software.</td>
</tr>
<tr>
<td>Internal 2400 data/9600 bps send/receive fax</td>
<td>$285</td>
<td>Hayes compatible; automatic answer; user modifyable non-volatile RAM; 8 LED's &amp; Volume controlled speaker.</td>
</tr>
</tbody>
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# Internal Drives

<table>
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<tr>
<th>Name</th>
<th>Price</th>
<th>Features</th>
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<tbody>
<tr>
<td>Quantum Internal Drive</td>
<td>$525 MB $899</td>
<td>with RFB Hard Disk Toolkit PE Software &amp; 5yr. Warranty.</td>
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# MEMORY

<table>
<thead>
<tr>
<th>Name</th>
<th>Price</th>
<th>Features</th>
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</thead>
<tbody>
<tr>
<td>SupraFax Modem V.32/64K</td>
<td>$99</td>
<td>V.32/64K fax modem. Supports V.22bis. Comes with 5-year warranty.</td>
</tr>
<tr>
<td>SupraFax PowerBox 2400 internal fax modem for the PB</td>
<td>$50</td>
<td>Comes with 5-year warranty.</td>
</tr>
</tbody>
</table>

# Software UPGRADES

- Proof of Purchase Required: Mail or fax us the first page of your user manual.

<table>
<thead>
<tr>
<th>Name</th>
<th>Price</th>
<th>Features</th>
</tr>
</thead>
</table>
| Adobe Photoshop Deluxe CD | $199   |...
| Adobe Photoshop 2.5      | $129   |...
| Adobe Acrobat Super ATM   | $199   |...
| Microsoft Excel 4.0      | $95    |...
| Microsoft Word 5.1       | $95    |...
| Microsoft Excel 6.0      | $95    |...

# Macintosh II

<table>
<thead>
<tr>
<th>Name</th>
<th>Price</th>
<th>Features</th>
</tr>
</thead>
</table>
| Macintosh II 4 MB RAM    | $799   |...

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**Complete Systems NOW in Stock.**

- One Year Warranty
- $3 Overnight Shipping
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- NEW Hard Drives in all used Macs

### Mac IICx System 2650

- IBM 140 System 2650
- 4 MB RAM
- Apple 40 MB HD
- 8 MB RAM
- New Apple 40 MB HD
- 14" Color Monitor
- PowerPC Video Digital Color SX 4x1 Video Card
- 50 MB Extended Keyboard
- Mouse Pad
- WordPerfect Works
- Built-in Quicken
- QuickDex

### Macintosh II

- Macintosh II 4 MB 6600
- 4 MB RAM
- Apple 40 MB HD
- 8 MB RAM
- Apple 40 MB HD
- 8 MB RAM
- 12 MB RAM
- 16 MB RAM
- 18 MB RAM
- 20 MB RAM
- 30 MB Extended Keyboard
- Mouse Pad
- WordPerfect Works
- QuickDex
Our Prices Have the NEW

MAGNAVOX
A Philips Company

14" $399
17" $1245

$399
$739

Magnavox 14" Color for all Macs
14" display with 24-bit color card $829

Sigma Designs 17" Color Trinitron
17" Multi-resolution display

New Radius Precision Color Pivot
15" landscape compatible w/trinitron & center on-board video

PHILIPS

PHILIPS 15"
Multi-frequency, stereo audio inputs, minee MPR.

$599

Display/Color

Sigma Designs 15" display 1995
ColorMax 15" display 799
PowerPort 15" display (for SCSI) 629
21" SilverView Pro (mono/256) 1099
21" SilverView Pivot (12" x 16") 1099

Lap15" Pivot mono display

Sigma Designs 15" Color Trinitron

Networking

Dayna EtherPrint
Ethernet connection for printers

$329

Dayna EtherPrint

Ethernet Interfaces in Thin or 10base T
Daynaport, Mac II family, III 139
Daynaport, Mac LC, LC II/SE/ 139
MiniHub/Hubs 219/659
Pathfinder Router 599
Safe Deposit Call

Networking made easy!
Simply fax back our easy-to-complete worksheet and we'll recommend the right products and custom cabling - all at great prices. Call for worksheet & more info!

Memory Upgrades

Marco Memory Products
All SIMMs $3 Fed Ext

1 MB SIMM, 70ns 35
4 MB SIMM, 70ns 124
16 MB SIMM, 70ns 569
8 MB SIMM, 70ns (PIB 180&160) 369
Memory for new mac Call
Lifetime warranty on all SIMMs!
Due to federal tariffs, SIMM prices may change significantly. Call for latest prices!

MODems

Hayes ACCURA 144 + FAX144
V.32bbl/14.400 Data + 14.400 bps
Send/Receive Fax up to 57,600 bps data

$299

Hayes ACCURA 96 + FAX96 249
Hayes ACCURA 24 74
FREE Smartcom data communications software, Smartcom fax software and cables with every modem ($172 value)!

Drives & Storage

Procom CD Station II World's fastest CD-ROM, multimedia includes 7 popular CD titles, stereo speakers & headphones

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ATOM int/ext 120MB HD for
PowerMac & LaserWriter 690
88 Read/Write 44
450MB External Drive 999
CD Rom Int 519
CD Rom Ext 599

Removable discs
ATOM int/ext 120MB HD for
PowerMac & LaserWriter 690
88 Read/Write 44
450MB External Drive 999
CD Rom Int 519
CD Rom Ext 599

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Competition Seeing Red!

Dataproducts LZR 960
9 ppm, RISC, 35 fonts

MICROTEK
ScanMaker II with Photoshop LE
Transparency Option now available. Call for price.

Macintosh LC III 4/40 (price is for cpu only)
LC III with 14" color display & keyboard $1,649

Printers
Dataproducts LZR 965 1869
Dataproducts LZR1555 & 1560 2895
Dataproducts Jet色彩 printer Call
Texas Instruments Turbo 1449
NEW TI microWriter PS-23/PS-65 Call

Scanners
Tamarack Artisan 1200C
1200dpi, 24-bit color with full Photoshop
Tamarack Artisan 8000C
800dpi, 24-bit color with full Photoshop

MICROTEK
NEW Scanner llxe 1099
1200 dpi, 24-bit color with full Photoshop
Transparency Opt. for II & llxe Call
NEW Microtek ScanMaker 35 95 Call

Wacom ArtZ
6" x 8" ADB pressure-sensitive Tablet
12 x 12 Standard/Electrostatic 649719
12 x 18 Standard/Electrostatic 9791095
18 x 25 Standard 2725

HSC SOFTWARE
Kai's Power Tools
POWER TOOLS
The Ultimate Plug-in filters for Adobe Photoshop
"Adobe Photoshop & Kai's Power Tools together are a creative explosive! They are tools that no one should be without." -Jeff Parker, Adobe Photoshop Product Mgr

OCR
OmniPage Direct Optical Character Recognition Software
Software that's so fast and easy to use, one "click" is all you do to enter both text and numbers directly into documents and spreadsheets without retyping
OmniPage Professional OCR 629
Image Assistant 329

Alert!
Maxa Alert
Finds the source of software conflicts & fixes them!
Snooper 2.0 Software with Virex $109
Snooper 2.0 NuBus Kit with Virex 149

Mac Systems
Mac II vs Color System

Quadra Accelerator
128k, copy back cache and speeds up the Quadra 700, 900 & 950 fast words try up to 25%.
QuadCache 25 for 700 & 900 269
QuadCache 33 for 950 349

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- 8" x 10" Pad w/ Pressure Sensitivity Per 12" x 12" Electronic Tablet $695
- 12" x 18" Electronic Tablet $1039

**PII**
- 82MB/44MB Sugest Drive $649
- 44MB Sugest Drive $479
- CD ROM Drive $639
- Fast Multi Session, Photo CD, 200MB

**UMAX**
- UC 840 (400DPI w/ Photoshop 2.0) $1349
- UC 840 (400DPI) $1200

**UC 840** (400DPI w/ Photoshop 2.0)
- Photo CD Scanner Super Deal $999
- 1200 DPI Color Scanner w/ Software Interpretation, Software Bundle

**PRINTERS**
- PS 440B 400 DPI B-SIZE Laser Printer $3295/3121/c
- 660B (400 DPI B-SIZE) + CALL $1799
- 800B (600 DPI) $1999

**HEWLETT PACKARD**
- 4M 600DPI Laser Printer $1999
- Color DeskWriter 550C $729

**SEIKOSHA** Mac Printer $299

**VIDEO**
- PROMOTHEUS Rodems Fax/Data/Voice Mail $599
- PowerBook Ultima (14.4 Data/Fax + VoiceMail) $799

**ADVANCE BUSINESS CENTER**
- PowerBook 180 EXECUTIVE PACKAGE $5469/5105/5995
- PowerBook 180 4/90
- PowerBook 145 4/44
- PowerBook 40MB Int. Hard Drive Upgrade $195
- PowerBook 40MB Ext. Hard Drive (w/Battery) $999
- Connectix CPU (Great Battery-Saving Utility etc) $49
- Pilot Book Ends PowerBook Docking System $129
- Sophisticated Circuits Numeric Keypad (w/Function Keys!) $89

**TRAVELING SALESMAN**
- PowerBook 180 Traveling Salesman $1995

**ACCESSORY CENTER**
- PowerBook 145 4/44
- Targus Leather Case...
- Targus New Power Book Case...
- Targus Deluxe Leather Case...
- Targus How Power Book Case...

**UPPER SYSTEMS**
- All Systems Featured Below include the ABC Software Bundle, Syntrox GraphicsWorks, Berlitz Ultimate, UMAX Scanner & Cassette Works Drive!

**MAC SYSTEMS**

**PowerBook**
- Douglas Duo 80 SuperSystem $299 p/m on lowered
- Mac Quadra 800 with 4MB RAM, 500MB Hard Drive, CD ROM Drive
- SuperMax 174X Fonton Monitor
- UMAX UC 840 24 Bit Scanner
- Extended 101 Keyboard
- ABC Software Bundle & Cables

**CENTRIS 650 PowerSystem** $949/1586 p/m
- Mac Centris 650 with 4MB RAM, 230MB Hard Drive, CD ROM Drive
- SuperMax 174X Fonton Monitor & 16-Bit KVM
- Extended 101 Keyboard
- ABC Software Bundle & Cables

**Centris 650 HomeSystem** $969/1149 p/m
- Mac Centris 650 with 4MB RAM, 120MB Hard Drive
- V-View 14" Color Monitor
- Extended 101 Keyboard
- ABC Software Bundle & Cables

**LC III Student System** $1799
- LC III 4/80 with V-View 14" Color Monitor
- Keyboard, Mouse & ABC Software Bundle

**LC III Home System** $2999
- Mac LC III 4/80 RAM, 120MB Hard Drive
- V-View 14" Color Monitor
- ABC&B EPS Postscript Laser Printer
- Extended 101 Keyboard
- ABC Software Bundle & Cables

**Ultima Home Office** (14.4 Data/Fax + VoiceMail) $359

**PowerBook Ultima** (14.4 Data/Fax + VoiceMail) $299

**CIRCLE 175 ON READER SERVICE CARD.**
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<td>$3429</td>
<td>$3629</td>
<td>$4499</td>
<td>$5379</td>
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</tbody>
</table>

| **SPECIFICATIONS** | | | | | | | | | | | | | |
| 23MHz 80386 FPU Option | 25MHz 80486 FPU Option | 33MHz 80386 Built-in FPU | 33MHz 80386 Built-in FPU | 25MHz 80486 FPU Option | 25MHz 80486 FPU Option | 16MHz 80286 FPU Option | 25MHz 80486 FPU Option | 20MHz 80486 No FPU | 25MHz 80486 FPU Option | 33MHz 80486 Built-in FPU | 33MHz 80486 Built-in FPU |
| 16" Mono Passive Matrix | 16" 10-bit Backlight LCD | 16" 10-bit Active Matrix | 16" Color Passive Matrix | 9" 16-bit Gray Video Out | 9" 16-bit Gray Video Out | 10" 8-bit PMONITOR | Video output 8-bit 12 to 14" | Video output 8-bit 12 to 14" | Video output 8-bit 12 to 16" | Video output 8-bit 12 to 16" | Video output 16-bit 12 to 16" |
| 1 PDS | 1 PDS | 1 PDS | 1 PDS | Dock Connector | Dock Connector | 1 PDS | Dock Connector | 1 PDS | Dock Connector | 1 PDS | Dock Connector |

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- **ARTZ TABLET WITH PAINTER**
- **Y FRACTAL DESIGN**
- **ILENTWRITER 95F RASTER**
- **OPS**
- **QMS 860 HAMMERHEAD**
- **MICROWRITER T2**
- **MICROlASER GCC PLP II**
- **300DPI, Postscript Level 2**
- **CORRECTPRINT 300i**
- **600 DPI, 8ppm, Taboid 11x17, HP 550C $715**
  - **PS/1 7**
  - **PS/35 $1199**
  - **300 DPI Auto P.C/Mac Switching, 6ppm**
  - **300 DPI Dye Sublimation Monochrome Inkjet**
  - **300 DPI 9ppm, Turbo - Postscript Level 2, Personal Laser Printer**
  - **110v $3979 $1109* $7499 $379 $1379 $699**
- **SYQUEST 44 FORMAT ED $59**
- **105 FORMAT ED $99**
- **SONY DISPLAY CPD-1430 $599**
- **CPD-1694 $1029**
- **SUPRA MODEMS**
  - **V.22 bis MODEM $239**
  - **V.22 bis Mac Pack $279**
- **WACOM ARTZ Tablet with Painter VS FRACTAL DESIGN $479**
- **POWERBOOK MEMORY FREE! CONNECTIX POWERBOOK UTILITIES WITH POWERBOOK RAM**
- **RADIUS ROCKET PROFESSIONAL PACK ROCKET 33 $2479 $1499**
- **NEC SILENTWRITER 95F**
  - **300DPI, Postscript Level 2**
  - **Auto PC/Mac Switching, 6ppm**
  - **$1109* $220v**
  - **$4979**
- **PLI**
  - **INFINITY 88 / 40 TURBO $549 / $499**
  - **88MM / 44MM internal Syquest removable cartridge drive**
  - **INFINITY 88 RW44 EXTERNAL $619**
  - ** earns Syquest drive module and writes 44MB cartridges**
  - **NEW! INFINITY 105 EXTERNAL**
  - **105MB external Syquest removable cartridge drive $789**
  - **INFINITY 128MB 3.5" OPTICAL**
  - **Removable, retractable optical drive $1299**
  - **4GB DAT DRIVE**
  - **1GB DAT backup drive with Retrospect**
  - **Quick SCSI Card $279**
  - **ECR-2 Avios heater adaptor card with cable $279**
  - **MINAUDERY 1.00B / 2.00B**
  - **$269 / $799**
  - **HP 1.00B / 2.00B Intel hard drive with QIC-100**
  - **FLOPPICAL 21MB**
  - **Saves $12 on 80MB capacity, includes cartridge $379**
  - **INFINITY OPTICAL 5.25" 680MB SONY**
  - **$2499**
  - **CD-ROM DRIVE**
  - **Multi-Session Photo CD Compatible Drive $619**
  - **INFINITY 88 / 40 TURBO $549 / $499**
  - **88MM / 44MM internal Syquest removable cartridge drive**
  - **INFINITY 88 RW44 EXTERNAL $619**
  - ** earns Syquest drive module and writes 44MB cartridges**
  - **NEW! INFINITY 105 EXTERNAL**
  - **105MB external Syquest removable cartridge drive $789**
- **RATEDOPPS CORRECTPRINT 300i**
  - **300 DPI Due Substitution $7499**
- **QMS 860 HAMMERHEAD**
  - **600 DPI, 8ppm, Turbo - Postscript Level 2, $30$h**
  - **$379 $3979 $4199**
- **HP DESKWRITER**
  - **HP 950C 875**
  - **Monochrome InKjet 300 DPI**
  - **$379 $3979 $4199**
- **TI MICROLASER**
  - **PS/17 $1099**
  - **PS/35 $1199**
- **GCC PLP II**
  - **300 DPI Personal Laser Printer $699**

**COMMUNICATIONS**

- **GLOBAL VILLAGE POWERPORT GOLD**
  - **$399 14400bps Send/Receive Fax/Data Modem**
- **GLOBAL VILLAGE POWERPORT BRONZE**
  - **$169 24/96 Send/Receive Fax/Data Modem**
- **APPLIED ENGINEERING DATASTOP**
  - **Send/Receive Fax/Data modem $449**
  - **TWINCOM 24/96**
  - **$125 24/96 Send/Receive Fax/Data modem**
- **POWERBOOK 14400 FROM PRICEON**
  - **$26914400bps send/receive fax/data modem**
- **U.S. ROBOTICS**
  - **14400**
  - **$229 V.32bis send/receive fax/data modem with cable, software**
- **SUPRA 144PB PLUS**
  - **$239 / $279 PowerBook internal 14400 fax/data modem with voice**
- **HAYES ACCURA 14400 FAXMOD**
  - **$319 14400bps send/receive fax/data modem**
- **MICROTEK SCANMAKER II**
  - **$835 Color scanned, 600 x 300 dpi**
- **MICROTEK SCANMAKER UX**
  - **$1875 Color scanned, 600 x 300 dpi, Photoshop**
- **UMAX 630**
  - **$1849 Color scanned, 600 x 300 dpi, Photoshop**
- **UMAX 840**
  - **$1249 Color scanned, 600 x 400 dpi, Photoshop**
- **UMAX 1200**
  - **$2825 Color scanned, 1200 x 1200 dpi, Photoshop**
- **UMAX SCAN OFFICE 8400 4800 dpi scanner, $2825**
- **UMAX TRANSPARENCY ADAPTER**
  - **$579 Add transparency scan capability to Umax scanner**
- **ACER ARCS**
  - **CALL**
  - **Color fatted one-pass scanner, 4030 x 300 dpi**
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<td>NEC MULTISYNC 5FG</td>
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<td>ZNIX CORDLESS MOUSE</td>
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<td>MacWrite II with Spell Checker &amp; Thesaurus</td>
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<th>ZFP</th>
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<tr>
<td>40MB (3½&quot;)</td>
<td>$159</td>
<td>$219</td>
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<td>85MB (3½&quot;)</td>
<td>$199</td>
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<td>120MB (3½&quot;)</td>
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<td>127MB (3½&quot;)</td>
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<td>170MB (3½&quot;)</td>
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<td>1.2GB (3½&quot;)</td>
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Seagate

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<th>Quantum</th>
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<td>1.6GB (5/4&quot;)</td>
<td>$1749</td>
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<td>2.1GB (5/4&quot;)</td>
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<td>$1999</td>
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<tr>
<td>2.4GB (5/4&quot;)</td>
<td>$2689</td>
<td>$2839</td>
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<th>Powerbook Internals</th>
<th>Closeout!</th>
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<tbody>
<tr>
<td>40MB (2½&quot;) incl. Connector</td>
<td>$299</td>
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<tr>
<td>80MB (2½&quot;) incl. Connector</td>
<td>$499</td>
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<tr>
<td>120MB (2½&quot;) incl. Connector</td>
<td>$599</td>
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<tr>
<td>160MB (2½&quot;) incl. Connector</td>
<td>$729</td>
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<tr>
<td>Optional PocketDock Cable</td>
<td>$59</td>
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<tr>
<td>Extra T-Connector</td>
<td>$59</td>
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<tr>
<td>110V Accessory Kit</td>
<td>$69</td>
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<td>170MB**</td>
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<tr>
<td>240MB**</td>
<td>$389</td>
<td>$469</td>
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<tr>
<td>1.2GB</td>
<td>$319</td>
<td>$399</td>
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<tr>
<td>80MB PowerBook®</td>
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<td>213MB Portable®</td>
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<td>Precision 1.2GB</td>
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<td>Precision 2.1GB</td>
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| CD-ROM Encyclopedia | $49     |
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Magic Optical

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<tr>
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<tr>
<td>Magic 125MB Optical®</td>
<td>$999</td>
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<td>Magic 125MB Turbo Optical®</td>
<td>$1199</td>
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<td>Magic 250MB Optical®</td>
<td>$1799</td>
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<td>Magic 650MB Optical®</td>
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<td>Magic 125MB / 250MB Cartridge</td>
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<td>Magic 650MB Cartridge</td>
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Magic SyQuest

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<td>Magic 16xR SyQuest®</td>
<td>$95</td>
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<td>Magic SyQuest 105 Cartridge</td>
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<td>Magic AMX Modem</td>
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<td>2400bps modem, 120% Hayes compatible</td>
<td>$199</td>
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<tr>
<td>Magic VX V.32 Modem</td>
<td>$199</td>
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<tr>
<td>9600bps modem with compression to 8800bps, V.32/V.42b/NSP hardware &amp; V.34 modem</td>
<td>$239</td>
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<tr>
<td>Magic VX V.32bis Modem</td>
<td>$239</td>
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Magic FaxModems

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<tr>
<td>2400bps modem, 9600bps send &amp; receive fax</td>
<td>$109</td>
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<tr>
<td>Magic FX FaxModem</td>
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<tr>
<td>2400bps modem, 9600bps send &amp; receive fax</td>
<td>$139</td>
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<tr>
<td>Magic VFX FaxModem</td>
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<td>2400bps modem, 9600bps send &amp; receive fax, V.42b &amp; NSP hardware</td>
<td>$249</td>
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<tr>
<td>Magic VX V.32bis FaxModem</td>
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Magic PowerBook

<table>
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<td>Magic 2400bps FaxModem</td>
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<td>2400bps modem, 9600bps send &amp; receive fax</td>
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<td>Magic PKT FaxModem</td>
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<td>2400bps modem, 9600bps send &amp; receive fax</td>
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<tr>
<td>Magic 1400bps FaxModem</td>
<td>$299</td>
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<tr>
<td>1400bps modem, 14400bps send &amp; receive fax, NSP compatible</td>
<td>$299</td>
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- 66MHz math coprocessor
- PMMU/10 with Magic 19" display.

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<td>50MHz RailGun Pro System</td>
<td>$1199</td>
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*Choose from The Version

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**RailGun Pro**

Increase your Macintosh performance & video capability. 33MHz accelerators with built-in 32-bit video output, 66MHz math coprocessor, PMMU/10 for your Macintosh SE, Plus, SC or Classic.*

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<td>50MHz RailGun Pro</td>
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*Choose from The Version

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**RailGun 030**

Speed up your Macintosh SE. Plus for Classic.* With accelerator and optional 6502/10 coprocessor, PMMU/10, a built-in SCSI accelerator.

Simple user installable design.

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**Give Your Compact Macintosh up to 16 Megabytes of Memory!**

Every Magic RailGun Now Includes Free Connectix Virtual RAM.

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**Magic Memory**

Every Magic Memory Upgrade is backed by our FULL LIFETIME GUARANTEE. We stand behind every product we build. Everyday.

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**Macintosh RAM**

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- 2MB SIMMs: Starting at $65
- 4MB SIMMs: Starting at $119
- 16MB SIMMs: Starting at $549
- 4MB 72-pin SIMMs: Starting at $139
- 8MB 72-pin SIMMs: Starting at $259
- 1MB/Quadra VRAM: $59/$29

---

**PowerBook RAM**

- 6MB PB 140, 145 & 170: $269
- 4MB/6MB PB 160 & 180: $199/$289
- 8MB PB 160 & 180: $359
- 10MB PB 160 & 180: $549
- 4MB/6MB PB 165: $179/$249
- 10MB PB 165: $599
- 12MB/16MB PB 210 & 230: $799/$1999

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Incredible PostScript Price

The powerful EPL-7500, PC World’s “Best Buy” and Info World’s #1 PostScript laser printer

- 6 pages per minute
- Adobe® PostScript with 35 typefaces
- Witek XL-8200 series RISC processor
- 2MB memory, expandable to 6MB
- Parallel, serial, and AppleTalk® interfaces
- HP LaserJet Series II emulation
- 250 sheets input paper capacity

**NEW**

**LOW**

**PRICE**

BI-EPL7500

$1959

**$1919**

For under $2000!

**IBM® Laser Printer 10A**

- Adobe® PostScript® software built in
- 600 dpi with PQET • 16.7 MHz • 5MB
- AppleTalk®, Rasterport interface
- 39 Adobe® Type 1 scalable fonts
- Up to 6 ppm • 200 sh. paper cassettes
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**MAC® ADAPTER**

- Adobe® PostScript® software built in
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- AppleTalk®, Rasterport interface
- 39 Adobe® Type 1 scalable fonts
- Up to 10 ppm

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1. For how many microcomputers do you buy products? (check one)
   - (01) 1-4
   - (02) 5-49
   - (03) 50+

2. Your primary job function is: (check one)
   - (01) Administrative
   - (02) Engineering/R&D
   - (03) General Management
   - (04) MIS/DP, Communications
   - (05) Marketing/Sales
   - (06) Computer Dealer/NAR
   - (07) Systems, Programming
   - (08) Information Processing
   - (09) Other

3. For which of the following products are you involved in selecting brand/models to be bought by your company or organization? (check all that apply)
   - (01) Printers
   - (02) Plotters/Painters
   - (03) Monitors/Displays
   - (04) Network Servers
   - (05) Scanners
   - (06) Monitors/Displays
   - (07) Personal Computers
   - (08) Computer Peripherals
   - (09) Other

4. Which of the following products have you bought in the last 6 months? (check all that apply)
   - (01) Monitors/Displays
   - (02) Printers
   - (03) Plotters/Painters
   - (04) Personal Computers
   - (05) Computer Peripherals
   - (06) Other

5. If so, what function do you serve in the buying process? (check one)
   - (01) initiation, Determine need
   - (02) Selection of Brand and Model
   - (03) Selection of Source
   - (04) Authorization
   - (05) Other

6. Over the next 12 months, how much will your organization spend on computer products or services? (check one)
   - (01) over $1,000,000
   - (02) $500,000 - $999,999
   - (03) $50,000 - $99,999
   - (04) $10,000 - $49,999
   - (05) Under $10,000

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     - [ ] 05 5-24
     - [ ] 0 25 or more
   - [ ] Your primary job function is: (check one)
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     - [ ] MIS/IT, Communications
     - [ ] Marketing/Sales
     - [ ] Sales
     - [ ] MIS/IT, Productivity
     - [ ] Systems, Programming
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   - [ ] 05 5-24
   - [ ] 0 25 or more

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   - [ ] MIS/IT, Communications
   - [ ] Marketing/Sales
   - [ ] Sales
   - [ ] MIS/IT, Productivity
   - [ ] Systems, Programming
   - [ ] Other

3. 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)

4. Which of the following products have you bought in the last 6 months? (check all that apply)

5. On the next 12 months, how much will your organization spend on computer products or services? (check one)
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  - **Dennis Leavey** 212-503-5111
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  - **Chris Thomas** 212-503-5131
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  - **Paul A. Fusco** Director of Sales
  - **Nepreil Foster** Advertising Coordinator
  - **Vicki Egan** Production Manager
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DEC ......................... 80
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Apple Extended KB .... 129

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MacUser July 1993 309
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- **Quadra 900 4/0** - $3,395.00
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- **Classic II 2/40** - $659.00
- **Mac SE/30 1/0** - $949.00
- **Mac LC 2/40** - $835.00
- **Mac LC II 4/40** - $799.00
- **Mac II 2/0** - $799.00
- **Mac IIci 1/0** - $1,499.00
- **Personal LW NT** - $899.00
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- **Classic 2/40** - $579.00
- **Classic II 2/40** - $659.00
- **Mac SE/30 1/0** - $949.00
- **Mac LC 2/40** - $835.00
- **Mac LC II 4/40** - $799.00
- **Mac II 2/0** - $799.00
- **Mac IIci 1/0** - $1,499.00
- **Personal LW NT** - $899.00
- **Personal LW LS** - $479.00

### Apple Parts

- **Power Supplies, Logic** - CALL
- **Mac II Logic** - $375.00
- **Mac SE Logic** - $175.00
- **Radius 21** - $1,499.00
- **Radius Color Pivot** - $549.00

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- **System 7 Kiosk** - $45.00

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### New-Used Macs/Parts/Upgrade

<table>
<thead>
<tr>
<th>Upgrade/Parts</th>
<th>Price</th>
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<tbody>
<tr>
<td>Mac IIX to IIFx</td>
<td>$999.</td>
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<tr>
<td>Mac II to IIX logic board</td>
<td>$1299.</td>
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**Upgrade Special!!**

Mac IIX to IIFx...$999.
Mac II to IIX logic board...$1299.

**PRINTERS**

<table>
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<tr>
<th>Printer</th>
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<td>ImageWriter LQ</td>
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<td>LaserWriter Lite</td>
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<td>Personal LWriter LS</td>
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**SYSTEMS**

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<td>Powerbook 100 2/20</td>
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<td>Powerbook 140 2/20</td>
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<td>Carry bag</td>
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<td>19” Color monitor for PB</td>
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<td>Powerbook 140 accelerator</td>
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<td>SuperMac SuperView</td>
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<td>SuperMac Powerbook</td>
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<tr>
<td>Powerbook FAX/Modem</td>
<td>$699.</td>
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<table>
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<th>Product</th>
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<td>Powerbook 180</td>
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<td>Apple Printer</td>
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<td>Apple Monitor</td>
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<td>IMAX</td>
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<td>PowerBook 160</td>
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<td>SuperMac</td>
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<td>Sony</td>
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**Microtek**

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<td>Microtek</td>
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**Sony**

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<td>IMAX</td>
<td>$1499.</td>
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**Apple Powerbook 40/20 MB KB**

---

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**CIRCLE 322 ON READER SERVICE CARD**

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#### CPU's
- Call for updated pricing:
  - Mac LC II
  - Mac LC II 400
  - Mac LC II 600
  - Mac LC II 800
  - Centris 510
  - Centris 610
  - Centris 610/20
  - Centris 610/40
  - Centris 650
  - Quadra 800
  - Powerbook UMax

#### Monitors
- Apple 14" RGB
- Sony 17" 15-Color
- Monitor Gen 11x17/2000 Call
- HP Laserjet 4M
- NEC SXGA
- SuperMac 32" Color
- SuperMac 2" Color
- ColorVision II
- Revive your Precision 25

#### Printers
- SOHO B/E EM
- GCC P55 Laser
- NEC Laser
- HP Gen 11x17/2000 Call
- TechnoPrint 6x/80
- Quantum 250i
- Quantum 32i
- Quantum 105i
- Quantum 200i

#### Storage/Misc.
- 128 Optical Media Special
- Apple 80 HD Drive...
- HP 12/120 Drive...
- Quantum 250i
- Quantum 32i
- Quantum 105i
- Quantum 200i

#### Display Cards
- SuperMac 8x16 PCI
- SuperMac Thunder 4x16
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- QuantumELS
- QuantumELS
- QuantumELS

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- 32MB/120MB
- 64MB/160MB
- 80MB

**PowerBook**
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- 4MB
- 8MB
- 16MB
- 32MB
- 64MB

**COMPUTERS**
- Mac LC
- Mac LC II
- Mac LC II 400
- Mac LC II 600
- Mac LC II 800
- Centris 510
- Centris 610
- Centris 610/20
- Centris 610/40
- Centris 650
- Quadra 800
- Powerbook UMax

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- QuantumELS
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FastCache 040 0x90 128K $1199
ControlCache llsi/FPU $1199
DualPort llsi w/ FPU $119
Equalizer LC/FPU $1692/181
PowerMath LC $115
Charger $799
Ram PowerCard for 16 Mb $399

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Supra FaxModem V.32bis $899
Fax Modem V.32 $299
Fax Modem Plus $119
Fax Modem 14.4 PB Int. $395

MONITORs
PrecisionColor Pivot $999
PrecisionColor Display/20 $999
PrecisionColor Display/21 $999
PrecisionColor Display/31 $999
PrecisionColor Display/32 $999

RADIUS Rocket 33 $259

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PowerBook 140, 170 - 8MB $ 319.00
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PowerBook 200 - 8MB $ 379.00
PowerBook Duo 210, 230 - 4MB $ 169.00
PowerBook Duo 210, 230 - 8MB $ 339.00
PowerBook Duo 210, 230 - 10MB $ 379.00
PowerBook Duo 210, 230 - 16MB $ 499.00
PowerBook Duo 210, 230 - 32MB $ 659.00
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Category continues on page 321.
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Memory Direct 44mb Internal $355
Memory Direct 88mb External (SQ5110) $499
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Memory Direct 88c Internal* $569

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8x - 70NS $32
8x - 70NS $62
4x - 80 NS $126
4x - 80 NS $126
4x - 80 FX $127
4x - 80 UX $129
8x - 80 NS $275
16x - 80 $495

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4meg 140/170 memory module $169
6meg 140/170 memory module $219
8meg 160/180 memory module $349
10meg 160/180 memory module $499
12meg 160/180 memory module $629
16meg 160/180 memory module $919
20meg 210/220 memory module $1349
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Global Village PowerPort Modems

Bronze (14/48/96 S/R fax/modem) $119
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PSI PowerPort Modems

PSI PowerPort Modem [14/48/96 S/R for modem] $159
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PSI PowerPort Modem IVY (14400/9600 S/R fax/modem) $409

$145

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16meg $539 $699

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RasterOps 2xUC $2039
RasterOps 2x $1649
RasterOps paletteboard II $649
RasterOps BUX $999

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20” Color MultiScans Trinitron $6275

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SuperMatch 12 New Trinitron $4259
SuperMatch 17 Multimode (7720) $1159
SuperMatch 17T Trinitron (7725) $1059
Platinum 21 TwoPage Display (9561) $999

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Palette/Orion (24 Bit) $2515
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Fax/Cache Turbo 33 $249

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### Memory Upgrades

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### 72-Pin SIMMs

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<td>32MB (60 NS)</td>
<td>2099</td>
</tr>
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</table>

### PowerBook Memory

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>PB100/140/170-2MB</td>
<td>72</td>
</tr>
<tr>
<td>PB100/4MB</td>
<td>179</td>
</tr>
<tr>
<td>PB100/6MB</td>
<td>259</td>
</tr>
<tr>
<td>PB140/170-4MB</td>
<td>159</td>
</tr>
<tr>
<td>PB140/170-6MB</td>
<td>210</td>
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<tr>
<td>PB160/180-4MB</td>
<td>195</td>
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<tr>
<td>PB160/180-6MB</td>
<td>239</td>
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<tr>
<td>PB160/180-8MB</td>
<td>349</td>
</tr>
<tr>
<td>PB160/180-10MB</td>
<td>409</td>
</tr>
<tr>
<td>PB165C/4MB</td>
<td>202</td>
</tr>
<tr>
<td>PB165C/6MB</td>
<td>294</td>
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<td>PB165C/8MB</td>
<td>388</td>
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<tr>
<td>PB165C/10MB</td>
<td>504</td>
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<tr>
<td>PBDUO 210/230-4MB</td>
<td>199</td>
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<tr>
<td>PBDUO210/230-6MB</td>
<td>279</td>
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<tr>
<td>PBDUO210/230-8MB</td>
<td>349</td>
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<tr>
<td>PBDUO210/230-10MB</td>
<td>469</td>
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### SyQuest Cartridges

<table>
<thead>
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<tbody>
<tr>
<td>SyQuest 44MB</td>
<td>63</td>
</tr>
<tr>
<td>SyQuest 44/Preformatted</td>
<td>68</td>
</tr>
<tr>
<td>SyQuest 44/w/Diva</td>
<td>68</td>
</tr>
<tr>
<td>SyQuest 88MB Cartridge</td>
<td>99</td>
</tr>
<tr>
<td>SyQuest 88/Preformatted</td>
<td>105</td>
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### Shipping

<table>
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<tr>
<th>Service</th>
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<tr>
<td>Overnight Delivery</td>
<td>$7</td>
</tr>
<tr>
<td>UPS</td>
<td>$6</td>
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</tbody>
</table>

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PowerBook Memory
PowerBook 100 140/170  160/180  165c  Duo 210/230
2 MB  79.00  79.00  — — —
4 MB  189.00  165.00  199.00  205.00  209.00
6 MB  249.00  249.00  209.00  299.00
8 MB  —  —  359.00  385.00  359.00
10 MB  —  —  439.00  CALL —

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T.I. MicroLaser 1 MB  $49.00  99.00
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Mac Classic 1 MB Bd  55.00
68851 16 MHz PMMU  79.00
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KeHT Memory  425.00

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2 Megabyte  CURRENT
4 Megabyte  PRICING
8 Megabyte  ON ALL
16 Megabyte  SPEEDS

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4 Bit to 8 Bit Upgrade (Mac II/IIX cards)  24.00
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256K Quadra 950/8000 URAM  31.00
256K Centris/LX III URAM  31.00
512K Mac LC URAM  49.00
512K Mac IIX URAM  59.00

PowerBook Memory
PowerBook 100 140/170  160/180  165c  Duo 210/230
2 MB  79.00  79.00  — — —
4 MB  189.00  165.00  199.00  205.00  209.00
6 MB  249.00  249.00  209.00  299.00
8 MB  —  —  359.00  385.00  359.00
10 MB  —  —  439.00  CALL —

Miscellaneous
T.I. MicroLaser 1 MB  $49.00  99.00
Virtual 3.0  55.00
Mac Classic 1 MB Bd  55.00
68851 16 MHz PMMU  79.00
Mac Portable 3 Megabyte Card  425.00
KeHT Memory  425.00

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PLCC-style  68882 20 Mhz  59.00  65.00
68882 25 Mhz  79.00  79.00
68882 33 Mhz  119.00  99.00
68882 50 Mhz  149.00
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1.2GB PO-125
1.7GB PI-125
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• 5.25" drives have two year warranty

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2.0GB 1924
• Drives have five year warranty

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• Model
• Form Factor
• (ms)
• Int.
• Ext.
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520MB M2624FA
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1.2GB M2666SA
2.0GB M2682SA
2.4GB M2684SA
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Drives have two year warranty

Quantum
42MB ELS42
85MB ELS58
127MB ELS127
170MB ELS710
240MB LPS240
525MB LPS525
700MB PRO700
1.0GB PRO1050
1.2GB PRO1225
80MB Go/Drive
120MB Go/Drive
160MB Go/Drive
• PRES, LPE, PRO drives have two year warranty
• Go/Drive have one year warranty

Syquest
44MB IMS 44MB External
88MB IMS 88MB External
88MB IMS 88c External
44MB Syquest SQ400 Cartridge
88MB Syquest SQ800 Cartridge
• Drives ship with one cartridge
• Drives have two year warranty

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40MHz $480
50MHz $540
PowerCache Adapter $45

EndWrite Turbo 25/128k $264
Turbo 32/128k $335
Quadra 200/300 $759
Quadra 950 $934
25MHz Turbo 040 $1119
33MHz Turbo 040 $1309

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• UMAX scanners ship with Adobe PhotoShop software

Optical Media
600MB 5.25" $99
128MB 3.5" $40
### Hard Drives
Includes: SpotOn Formatting Software, Cables

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Speed</th>
<th>RPM</th>
<th>Brand</th>
<th>Warranty</th>
<th>Internal</th>
<th>External</th>
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<tbody>
<tr>
<td>84Meg</td>
<td>17ms</td>
<td>3822</td>
<td>Quantum</td>
<td>2 Years</td>
<td>$193</td>
<td>$269</td>
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<tr>
<td>85Meg</td>
<td>17ms</td>
<td>3600</td>
<td>Quantum</td>
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<td>$275</td>
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<td>17ms</td>
<td>3600</td>
<td>Quantum</td>
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<td>$350</td>
<td>$339</td>
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<td>$299</td>
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<td>3600</td>
<td>Conner</td>
<td>2 Years</td>
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<td>$409</td>
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<td>240Meg</td>
<td>16ms</td>
<td>4300</td>
<td>Quantum</td>
<td>2 Years</td>
<td>$349</td>
<td>$409</td>
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<tr>
<td>340Meg</td>
<td>15ms</td>
<td>3600</td>
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<td>2 Years</td>
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<td>$569</td>
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<tr>
<td>520Meg</td>
<td>12ms</td>
<td>4400</td>
<td>Fujitsu</td>
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<td>$865</td>
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<tr>
<td>540Meg</td>
<td>8.5ms</td>
<td>6300</td>
<td>Maxtor</td>
<td>2 Years</td>
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<td>$969</td>
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<td>877Meg</td>
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<td>1200Meg</td>
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<td>Maxtor</td>
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<td>$1549</td>
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<td>2060Meg</td>
<td>12ms</td>
<td>5400</td>
<td>Fujitsu</td>
<td>5 Years</td>
<td>$2299</td>
<td>$2379</td>
</tr>
</tbody>
</table>

We sell the complete lines of all brands shown. We have Disk Array Systems for incredible performance and fault tolerance.

### Syquest Drives
Includes: SpotOn Formatting Software, Cartridge, Cables

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Model</th>
<th>Speed</th>
<th>Internal</th>
<th>External</th>
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<tbody>
<tr>
<td>44Meg</td>
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<td>20ms</td>
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<td>88Meg</td>
<td>SQ5110</td>
<td>20ms</td>
<td>$419</td>
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<td>88Meg</td>
<td>SQ510C</td>
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<td>88Meg</td>
<td>20ms</td>
<td>$64</td>
<td>$315</td>
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</tbody>
</table>

### CD-ROM Drives
Includes: Trantor Driver Software with Music play software, cables, 1 year warranty. All CD Drives are Kodak multisession Photo CD Composable.

<table>
<thead>
<tr>
<th>Brand</th>
<th>Speed</th>
<th>Transfer</th>
<th>Type</th>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texel</td>
<td>265ms</td>
<td>300KB/sec</td>
<td>Single Disk</td>
<td>$459</td>
<td>$519</td>
</tr>
<tr>
<td>Toshiba</td>
<td>200ms</td>
<td>330KB/sec</td>
<td>Single Disk</td>
<td>$499</td>
<td>$579</td>
</tr>
<tr>
<td>Toshiba</td>
<td>200ms</td>
<td>330KB/sec</td>
<td>Battery Powered</td>
<td>N/A</td>
<td>$729</td>
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<tr>
<td>Pioneer*</td>
<td>380ms</td>
<td>565KB/sec</td>
<td>6 Disk Changer</td>
<td>N/A</td>
<td>$899</td>
</tr>
<tr>
<td>Pioneer</td>
<td>270ms</td>
<td>612KB/sec</td>
<td>6 Disk Changer</td>
<td>N/A</td>
<td>$1279</td>
</tr>
</tbody>
</table>

TCD's hold only with CD Drive

### Tape Drives
Includes: Retrospect Backup Software Version 2.0, 1 Tape, Cables, and a 1 year warranty

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Type</th>
<th>Brand</th>
<th>Speed</th>
<th>Internal</th>
<th>External</th>
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<tbody>
<tr>
<td>250Meg</td>
<td>QIC 150</td>
<td>Archive</td>
<td>7MB/min</td>
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<td>$499</td>
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<tr>
<td>2Gig</td>
<td>DAT</td>
<td>Archive</td>
<td>11MB/min</td>
<td>$1039</td>
<td>$1079</td>
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<tr>
<td>4-8Gig</td>
<td>DAT</td>
<td>Hewlett Packard</td>
<td>12MB/min</td>
<td>$1299</td>
<td>$1299</td>
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<tr>
<td>4-8Gig</td>
<td>DAT</td>
<td>Hewlett Packard</td>
<td>88MB/min</td>
<td>$1299</td>
<td>$1297</td>
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<tr>
<td>4-8Gig</td>
<td>DAT</td>
<td>Hewlett Packard</td>
<td>42MB/min</td>
<td>$1429</td>
<td>$1469</td>
</tr>
</tbody>
</table>

We have Hewlett Packard and Archive DAT AutoLoaders for large backup.

Tapes DC6250 $29
6250 5 pack $125
90 meter DAT $17
DAT 5 pack $75
DAT Cleaning Tape $19

### Optical Drives
Includes: SpotOn Formatting Software, 1 Media, and Cables

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Speed</th>
<th>Feature</th>
<th>Internal</th>
<th>External</th>
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<tbody>
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<td>20Meg</td>
<td>65ms</td>
<td>Floptical</td>
<td>$319</td>
<td>$359</td>
</tr>
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<td>128Meg</td>
<td>30ms</td>
<td>Fujitsu</td>
<td>$649</td>
<td>$999</td>
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<td>650Meg</td>
<td>53ms</td>
<td>Pioneer</td>
<td>$2059</td>
<td>$2099</td>
</tr>
<tr>
<td>650Meg</td>
<td>37ms</td>
<td>Hewlett Packard</td>
<td>MultiFunction</td>
<td>N/A</td>
</tr>
<tr>
<td>8Gig</td>
<td>35ms</td>
<td>Maxoptix Tahiti ILM</td>
<td>MultiFunction</td>
<td>N/A</td>
</tr>
<tr>
<td>Media</td>
<td>20Meg</td>
<td>20Meg 5 pack</td>
<td>$339</td>
<td>$359</td>
</tr>
</tbody>
</table>

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When will Apple ship its last Mac? It takes two Dvoraks to make the prediction.

This month I’m going to do what I do best: argue. But I’ll take both sides of the debate this time, so I can experience on one page both the thrill of victory and the agony of defeat. Unusual.

Bad Dvorak: A well-known newsletter writer had a contest asking his subscribers to guess when they thought the last mainframe would be unplugged. Most people suggested the year 2000. I thought the idea was just a cute gimmick until I realized that the same contest could be held with the question rephrased to ask: When will the last Mac roll off the assembly line? From the looks of it, the time is coming soon. If Apple can’t successfully make the transition to the PowerPC and if it can’t make any money from the dubious Newton devices, then the company will be no more.

Good Dvorak: This is alarmist nonsense. Apple can make the transition to the PowerPC, and the Newton will do just fine. Even if it doesn’t, so what? Apple has been continuously growing since its inception, and I see no reason for things to change. Look at the slew of new machines that Apple’s announced lately.

Bad Dvorak: Yeah, but Apple’s always had lots of great new products. Look at the company now: It’s got nothing new. Sure, Apple’s churned out a completely new lineup of machines, but the differences among them are hardly worth mentioning. Maybe the industry is going into a new phase, not unlike the automobile industry. Functionally, there is little difference between a Ford and a Mercury. Both are made by the same company. Both use the same components. The only real difference is in the design, and even that doesn’t differ radically from one machine to the next. To the outside observer, it looks like Apple’s just stirring the pot because it’s at a dead end and doesn’t want anyone to notice.

More disconcerting is that so many Mac users have moved to Windows and the PC. These are die-hard Mac users who essentially are giving up on the Mac. Of course, all the cheapskates who’ll buy whatever is cheapest have long since moved to Windows. Apple used to tout price-comparison studies that showed how the Mac was, in fact, less expensive than a PC if you crunched the numbers just right (and ignored the $999 486sx machines). Now that IBM, Compaq, and other onetime premium-price producers have turned to lowball pricing, Apple can’t make those numbers add up anymore.

Good Dvorak: Nobody bought into that crap, anyway. People know they’re buying convenience and alternative computing ideas when they buy a Mac. Mac owners pay a premium. It still turns out to be cheap. Have you ever tried hooking a SCSI device to a PC? If your time is worth anything, you’ll want a Mac.

Bad Dvorak: Then why are all the users bailing out? I can think of four former editors-in-chief of MacUser who now have Windows machines on their desks. And at least two of them are actually using Windows! The cohort on your radio show used to be a Mac fanatic—you mentioned this last month—now he’s a Windows user. And, finally, recent studies show that the majority of Macs being sold today are replacements for older Macs.

Good Dvorak: I have no idea why these guys are going to Windows. They’re nuts. As for your replacement-market theory—what? Replacing old cars with new cars hasn’t ruined the auto industry. Don’t all consumer markets eventually become replacement markets?

Bad Dvorak: Well, as far as I’m concerned, the computer market is too young to degenerate into a replacement market already. Where are the new breakthroughs? Is there nothing really cool coming out? It doesn’t look like it.

Good Dvorak: Newton.

Bad Dvorak: Same to you, pal!

Good Dvorak: No, I mean the Apple Newton. It’s a cool device. Apple will lead the transition to that technology.

Bad Dvorak: Horse-pucky. The Newton is nothing more than a Sharp BOSS with an antenna. These are devices designed for neorotics. Who needs an electronic leash? Maybe the dog, but that’s it.

Good Dvorak: I think you’re prejucizing an untested technology without giving it a chance.

Bad Dvorak: Yes, true. So? Let’s get back to the question. When does the last Mac come off the assembly line?

Good Dvorak: I don’t know. When?

Bad Dvorak: Middle of 1995. Then guess what will come along?

Good Dvorak: The PowerPC, Pink, and all that.

Bad Dvorak: You’d better hope so.
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