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**Personal Power**
by Russell Ito
Announcing the Macintosh LC II and the Personal LaserWriter NTR, pumped-up versions of last year’s best-selling models.

**QuickTime in Action**
by Russell Ito
Here’s how to get QuickTime, Apple’s hot multimedia extension for System 7, up and running — quick!

**The 1992 MacUser Color Buyer’s Guide**

- **A Mac Color Primer**
  by Paul Yi and the MacUser Labs staff
  The allure of color is matched only by its complexity. MacUser Labs shows how to coordinate your color strategy.

- **Chasing Rainbows: Accelerated-Video Cards**
  by Winn L. Roscn and the MacUser Labs staff
  The cost of color is usually paid in speed. How far can you push the speed limit? MacUser Labs evaluates the options by putting eight video accelerators through their paces.

- **New Color Printers**
  by Rik Mysiewski
  MacUser Labs tests eight new color printers that are based on four different competing technologies.

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  Just say the word.

- **Guy Kawasaki**
  Are you one of The Not-Ready-for-QuickTime Players?

- **Michael Swaine**
  You will become a scripter. Believe it.

- **John C. Dvorak**
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On a Claire Day

The woman with the magnifying glass has just found a typo, thereby winning MacUser’s monthly Eagle Eyes contest. Her reward? Thousands of dollars a year; the undying gratitude of dozens of staff editors; and, every once in a while, a picture in the magazine.

But spotting typos won’t win you any prizes unless you happen to be the assistant managing editor, a position already admirably filled by Claire Hamilton (she of the oversized monocle). For three years, Claire has been on the front lines of quality control, with the help of the copy department, checking every last detail of the magazine for consistency and accuracy.

There’s more to Claire’s job than discovering design disparities or errant commas. Claire manages that key stage in the process of producing the magazine, where all the various elements that make up a story are merged into one PageMaker file and printed out as a layout. Claire reviews the layouts to make sure all the pieces — the article itself, the illustrations, and the captions — are present and accounted for in a logical fashion.

It’s her job to ensure that the magazine is a model of, well...clarity.

The initial master layouts that Claire marks up and reviews serve as road maps for the editors in their last look at the story before it goes to press, alerting them to content or illustration oddities. Each issue of MacUser is composed of hundreds of files, including all the assorted article manuscripts, icons, illustrations, and captions. That’s why Claire also serves as the server observer, making sure not only that all the pieces are in on time and in the right place but also that everyone is working on the latest version of any given file. “We always mark corrections on a hard-copy version of the document so that we have a paper trail we can follow — like popcorn in the forest — in case we’re lost. The paper trail has proved to be our salvation in more than one case of mixed-up versions,” says the ever-sleuthful Claire.

And when the paper trail proves intractable, she turns to her own special brand of, well...clairvoyance.

This month, Claire was faced with the particularly daunting task of coordinating our special comprehensive buyer’s guide to color technology. Not only does this magazine within a magazine involve coordinating more complex story elements than usual but — because 100,000 extra copies of the buyer’s guides are printed for special distribution to computer dealers nationwide — it also introduces the added complications of an extra print run.

A perplexing proposition — unless you have someone who can make it all perfectly, well...claire.
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CIRCLE 25 ON READER SERVICE CARD.
Handsome Prints
I was surprised by your lukewarm review of the LaserWriter IIIf's FinePrint technology ( "Practically Perfect Printing: High-Resolution PostScript Printers," February '92, page 172). My new IIIf handled a job that had an oblique 9-point TrueType font that our LaserWriter INTX had made hopelessly maddeningly and that had prompted half a dozen service bureaus to sell me to get lost. The IIIf printed it superbly, with almost no stair-stepping or plugging.

The new Apple toner cartridges have a finer-grain toner, although the part number has not changed. Did you use a new Apple toner cartridge in your IIIf tests?

David Lerner
New York, NY

Yes, we did use a new cartridge, and we wouldn't call the LaserWriter IIIf's four-mouse rating (and an Eddy Award for its big sister, the IIg) lukewarm. Granted, Apple's FinePrint improves 300-dpi text output, but our lab tests found that Hewlett-Packard's RET (Resolution Enhancement Technology) produces even-more-legible text than FinePrint does, especially in small point sizes. — TB

According to your February '92 lab report on high-resolution printers, the 1989 technology in our NewGen TurboPS/480 is apparently still superior to the technology of the products you covered. The TurboPS/480 is twice as fast as our LaserWriter NTX, and it seems to have no compatibility problems with PostScript Level 1 or TrueType. However, we can't be sure how it or its recent replacement, the PS/840, compares with other products.

David Barrett
Los Angeles, CA

All the PostScript clones we've tested now support TrueType. The NewGen printer was omitted because at testing time, it didn't meet the 8-page-per-minute cutoff for that lab report, although it has been improved since then. You'll find the comparison you're looking for in an upcoming printer roundup. — TB

This and DAT
In reference to the February '92 issue, I must take issue with Steven Bobker's usually excellent Personal Best column ( "Down to Basics," page 253).

First, Thunder may be a good spelling checker but it's a nightmare of a compatibility problem for most users. It's very skittish with the majority of programs I've tried. Besides, most people would prefer an excellent spelling checker and thesaurus built right in to their word processors.

Next, Bobker misleads readers when he specifically mentions that an LC with 10 megabytes of RAM is unable to use more than 8 megabytes without 32-bit addressing turned on. All Macs will be so limited.

Last, I think there are many people who would argue that there are backup media superior to DAT tape. Removable cartridges, for instance, are portable from one machine to another, use less-expensive hardware, and can rapidly access data.

Harold Goldman
Cambridge, MA

Dear Mr. Sculley . . .

System 7 has its first birthday this month. Have you upgraded yet? Mr. Sculley wants to know.

Speak Up:
What finally got you to take the plunge to System 7, or what's holding you back?

In January '92, we asked for some better names for the new Apple/IBM companies. Robert N. Miller, of Lewis, New York, came up with the punchy yet descriptive name "Gahoots."

Albert Su, of Irvine, California, suggests "combining Big Blue and the usual color of apples" to get "Big Red. Of course, Apple might have to obtain permission from Wrightley's."

Albert Macias, Jr., of Clifton, Virginia, who calls himself a "disciple of John C. Dvorak and Dr. Jerry Pournelle," offered his perspective on what will become of Apple in its alliance with IBM. "The IBM/Apple alliance serves only one purpose — to fill out IBM's product line. One line of machines for business, and one line for education. Oh, the Macintosh plays some pretty good games. But Apple's legal department, for that matter.

When we asked readers in March what Microsoft can do to get back in the good graces of Mac users, Randy Lewis, of Palo Alto, California, sent us a list: "Microsoft has worked hard for many years to become truly user-hostile. But if it really wants to change, it could (1) charge less than $50 for upgrades and include more than mere bug fixes, (2) follow the rules for the system rather than make up its own, and (3) get Bill Gates to refund the money I spent for Windows 2.03 and give me free Microsoft upgrades for the rest of my life for being an unwitting beta tester for that product." It may be too late for that refund, Randy; we understand that Bill has already frittered away your money on a complete set of Inside Macintosh.
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LETTERS

The LC is the only current Macintosh that can run with 10 megabytes of physical RAM. However, your comment about the 8-megabyte limit is correct.

You must have an old version of Thunder, Thunder 7 and its extension have proven rock-steady for me and everyone I know. That wasn’t true of older versions (Thunder II for example).

I’ll take my DAT over your SyQuest any day. I have found cartridges to be unreliable (I’ve lost data), and at $70+ a cartridge, that hurts. Tapes are $12 to $20 here. A friend just visited and brought all his data and applications (about a gigabyte’s worth) on a tape that fit in his pocket. Can you imagine hauling 15 SyQuest or Bernoulli cartridges? — SB

DAT Does It

The article “Less Is More: Digital Audiotape” (October ’91, page 116) is for the most part accurate, but it also had some misleading information.

The results of the complete-backup test were misleading, because typical DAT data sets are much larger than the 30-megabyte folder you used in your test. What looks like a significant performance difference with the small 30-megabyte data set will disappear as the data set becomes larger. Tecmar’s software product, QTBackup, which is included with our DAT hardware, performs a unique partitioning of the DAT cartridge that stores the contents of the DAT cartridge on the beginning of the tape. DAT drive must switch partitions as the backup starts and again when it is finished, requiring 30 to 40 seconds per switch. But QTBackup’s excellent writing performance more than compensates for this time, as a larger backup set would have shown.

In addition, the complete-restore test would have been more accurate if the restore had been made to an empty disk drive to simulate the aftermath of a disk crash. Other backup programs rely on an archive file being present on the hard disk. But this file is missing in the typical complete restore from a disk crash and must be manually rebuilt. QTBackup stores the necessary archival information in the catalog partition of the DAT cartridge, so it is always available. — Paul T. Tam

Senior Macintosh Software Engineer
Tecmar
Solon, OH

We agree. Ideally, the tests would have been performed on 100- to 150-megabyte machines. In future DAT tests, we’ll use a larger data set. Your second point about backup being done after a disk crash illustrates the need for users to save on archive file. Tecmar’s QTBackup software’s approach of saving it on the front of the tape eliminates the separate step—a clear advantage of the software. — SS

Monitoring the Monitors

Why does the “Bottom Line” sidebar on page 164 of the article on color monitors (“Big Screens for Small Macs: Mac LC and IIsi Color Display Systems,” February ’92, page 156) say that the SuperMac 21” SuperMatch Spectrum/8 si was “the clear winner” when on page 170, the table shows two other monitors with higher mouse ratings?

Elisabeth H. Beller
New York, NY

The SuperMac 21” monitor clearly had the best picture of all the monitors for the si, and it should have received a four-and-a-half-mouse rating. Although the other two monitors that received four-and-a-half-mouse ratings didn’t have as good a picture, they do offer such features as low price, pivot technology, and support for 24-bit color. — MF

Your February ’92 lab report on color display systems was misleading when it said that Toshiba shadow-mask tubes are an “older design” than the “new Hitachi Invar alloys.” Toshiba was the pioneer in adopting Invar-alloy shadow masks in our color-picture- and color-display-tube products. Also, all of our FS (flat-square) color-display tubes utilize this shadow-mask technology for improved brightness and antidimming characteristics. Both of the monitors mentioned in the article that use our tubes, the E-Machines ColorPage E16 and the Radius Color Pivot, use our FS display tubes and therefore incorporate Invar shadow masks. — Steven A. M. Vrablik

Electron Tubes and Devices Division
Toshiba
Deerfield, IL

The innovative aspect of the Hitachi tube’s design that we meant to highlight was the tube’s use of newer, brighter phosphors. — MF

Database Debates

I’m dismayed by the vengeance with which Sharon Zardetto Aker criticizes RecordHolder Plus in the February ’92
CANVAS 3.
EVERYTHING ELSE THIS GOOD IS BAD FOR YOU.

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LETTERS

issue ("Everyday Databases," page 110), not conceding that the program has a single good trait.

RecordHolder best suits the needs of those who work more with words than with numbers. The interface with the index window available at all times, the ability of one field to contain 32K of data, and the easy and versatile report generator — to mention just a few — are superb features. Speed is by no means the only criterion by which to judge the efficiency of a database program.

Ms. Aker never asks what RecordHolder can do but starts with benchmarks that a priori favor FileMaker Pro. That's like blaming a poodle for not being a beagle.

George Krotkoff
Baltimore, MD

We agree that speed is not the only criterion for testing a database program (in fact, FileMaker Pro has some significant speed problems). Interface was the biggest consideration in our testing, and RecordHolder's failed abysmally. I won't comment on your choice of comparing RecordHolder Plus to a dog. — SA

I'm confused about your summary of RecordHolder Plus. Your February review portrays it as the worst flat-file-database program a person could want, with a meager one-mouse rating. But in MiniFinder's in your August '91 issue, you state that it's an average flat-file-database program that "has the best editing functions available." Back in 1989, you gave it three mice, and in 1987, you gave it an Eddy Award.

Did the program get worse? Did the competition pass it up? Doesn't a classic remain a classic for eternity?

David Kieven
Albuquerque, NM

Hey, "Stayin' Alive" was considered a classic when it came out. Do you still listen to disco? Nuff said. — RI

For Ms. Aker to say that FileMaker Pro "provides at least as much as Panorama, in a more elegant environment" indicates that she gave Panorama considerably less than a fair trial.

Panorama gives you more macro commands than FileMaker; imports much faster from a text file; and offers buttons and cross tabs, complete layout flexibility, sounds as well as pictures, and lookups from several files in the same equation. It allows search on punctuation or spaces and can search and replace individual characters, spacing, or punctuation in any field.

And isn't it better to be able to use simple or complex equations in all the ways you can use them in Panorama than to be restricted to using them only in field definitions, as you are in FileMaker?

Brooks Leffler
Pacific Grove, CA

As a Panorama user, I found the review on flat-file-database programs biased toward FileMaker. I hardly recognized the description of Panorama as the same program I use.

The review reminded me of a comparison between soccer and football. Football must be better, because I've watched it longer, it has more points scored, and it has cheerleaders.

Peter G. Guerrini
Santa Rosa, CA

I've been a fan of Panorama since its early days as OverVUE; I wasn't a fan of FileMaker until its last incarnation. They each offer a similar core of functionality and specialized extras. The program you choose depends on which extras you want and need and the price you're willing to pay in terms of money and interface. There are many things in Panorama that put FileMaker to shame, but the reverse is also true. And finally, the presence of cheerleaders is hardly one of my criteria for enjoying a sport — unless, perhaps, they are of the male persuasion. — SA

EGA Maniac
Soft PC, from Insignia Solutions, doesn't support the VGA DOS graphics standard, contrary to the reply to Christopher Gordon (Letters, January '92, page 18). With the AT module, you get 16-color EGA compatibility, not VGA — a difference of 240 colors. That's considered a big difference in the IBM world. So until Insignia gets its act together, I'll just have to use my Mac IIci and swim in its 16.7 million colors.

Eric Claypool
San Juan Capistrano, CA

Actually, Insignia itself was the first to alert us to that error, but not the last. Who ever said that one letter can't make a difference? — IR

Paint It Black

After the excitement over my new PowerBook 170 started to wear thin, I noticed that one of the pixels on the screen wasn't black when it should have been.
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notice. Finally, CheckFree users enjoy
benefits far beyond the ease of handling
recurring payments.
Michael M. Sapinanza
Vice President, Marketing
CheckFree Corp.
Westerville, OH

Gaffe Track
Which will be greater: (1) the number of
readers who write to point out that the
Classic II doesn’t display color (as por­
trayed on the January ‘92 cover) or (2) the
number of customers who attempt to lo­
cate and purchase a color Classic II?
Bob Nichols
Kauai, HI

I vote for number 3: the number of
readers who caught the upside-down
Quadra in the December ‘91 issue (page
115). — JZ

Checks and Balances
I eagerly anticipated the recent release
of Intuit’s Quicken 3.0 (February ‘92,
page 89). I was particularly intrigued by
the CheckFree service, which lets users
perform transactions electronically without
ever writing a check. I thought we had
finally reached another great level of per­
cisional-computing potential. However, I
was dismayed to read that this feature
costs about $120 per year to use. Sure the
service bureau has operational costs, but
electronic checking should reduce the
banks’ costs, because there are fewer pa­
er checks to process. Shouldn’t they be
subsidiizing this service?
Evan S. Smith
Provo, UT

Your statements about CheckFree in
the Quicken 3.0 review are inaccurate.
Only five days are required for payment
lead time, not two weeks. Also, stop pay­
ments can be made easily with five days’
notice. Finally, CheckFree users enjoy

Clarifications
In the article “Magnetic-Cartridge
Drives: The Next Generation” (January
‘92), Table 3 on page 148 should have
indicated that the Third Wave 88 SR
drive uses a push-button SCSI-ID se­
lector. Also the correct price for Third
Wave’s data-recovery service (Table 2,
page 138) is $865 per hour, with a one­
hour minimum.

In the description of the graphic in
“When Lightning Strikes: Power Pro­
tection” (February ‘92, page 193), the
correct phone number for MacTutor (“Making
Checks and Balances” (February ‘92, page 193), the
correct price for Third
Wave’s data-recovery service (Table 2,
page 138) is $865 per hour, with a one­
hour minimum.

The correct phone number for TeleTypesetting, makers of Digital
Gourmet (Personal Macintosh, March
‘92), Table 3 on page 148 should have
indicated that the Third Wave 88 SR
drive uses a push-button SCSI-ID se­
lector. Also the correct price for Third
Wave’s data-recovery service (Table 2,
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Wave’s data-recovery service (Table 2,
page 138) is $65 per hour, with a one­
hour minimum.

In the description of the graphic in
“When Lightning Strikes: Power Pro­
tection” (February ‘92, page 193), the
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Connections,” page 203) is (310) 575­
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Jay Nathanson wears a lot of hats. His company — Target Marketing of Richmond, Virginia — is one of the fastest growing small businesses on the East Coast. Ask Jay to explain his success and he'll give you an uncharacteristically succinct response: FileMaker® Pro.

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FileMaker Pro even closes Jay's books every month, in 45 minutes. As you might expect, those books look pretty good.

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A Conversation with Casper

Apple-watchers have been deluged with a downpour of new hardware for the last two years. Low-cost Macs. PowerBooks to go. High-powered Quadras. Easy-to-use printers and scanners.

But over the next few years, the big story from Apple is going to shift from hardware to system software. The software enhancements we’ve seen from Apple in the last year or two have been significant but subtle. Most of the benefits of System 7, for example, have been transparent to most users, applicable to a small number of users, or dormant while users wait for developers to release new applications that take advantage of them.

But Apple is gearing up to open the floodgates on a torrent of new system extensions. And the new capabilities they will bring will be as immediate and obvious as the profound prowess of QuickTime. Some of the big stories you’ll be reading in MacUser in the next few months will be about:

• AppleScript, a powerful language based on Apple events, which will automate and customize your applications to do precisely what you want.

• Open Collaboration Environment, a clearinghouse of tools for consolidating, simplifying, and extending all your communications services.

• Customizable interface options for the Finder (and elsewhere) that’ll make things as simple or as intricate as you want them to be.

• A new imaging model that will combine elements from the worlds of typography, printing, graphics, 3-D modeling, and animation—all compatible with QuickDraw and PostScript but fundamentally different from both.

You will also be seeing some changes in the way system software is distributed and marketed:

• System extensions will be released often, thanks to a modular architecture that doesn’t require Apple to hold pieces of the system because one component is behind schedule.

• Apple will adopt an à la carte strategy, letting you buy just the specialized system extensions you need.

• Certain familiar Mac functions will follow the lead of QuickTime to other platforms.

But of all the software marvels coming soon, there’s one that will really make your ears perk up: speech-based input.

“Mr. Watson, come here . . . I want you.” Alexander Graham Bell’s urgent but polite request marked one of the most important turning points in the evolution of spoken communications, the very first practical telephone transmission.

A few months ago, another spoken statement marked what may prove to be an equally significant turning point. The phrase was: “Casper ... 36-point bold.”

Earlier this year, Apple CEO John Sculley spoke these words to Casper, a software “agent” living inside a Mac Quadra. Casper responded instantly to Sculley’s spoken commands, changing the type on-screen as directed. Like his ghostly namesake, Casper is friendly, swift, and nearly invisible, but this Casper is more than mere ectoplasm and should be materializing on desktops within a year.

The man who gave Casper the ability to hear and respond to his master’s voice is Dr. Kai-Fu Lee, the manager of Apple’s Speech & Language Technologies group. At a recent preview of Casper, after Sculley had knocked the socks off the crowd up by asking Casper to change fonts, Dr. Lee continued to wow the suddenly sockless audience when he instructed Casper to make a phone call, pay a bill, and—perhaps most impressively—program his VCR.

Can We Talk?

Speech recognition on the Mac is not science fiction; it’s not even new. The Voice Navigator, from Articulate Systems, brought speech recognition to the Mac years ago, with its ability to translate spoken commands into actions.

What’s new is three things: the accuracy and speed with which Casper performs, the kinds of tasks Casper was designed to handle, and the interface design for making users feel comfortable talking to a machine.

Apple set out to develop technology that anybody could use without having to train the system with examples of a user’s particular speech idiosyncrasies—regardless of whether the speaker is male or female, speaks quickly, or has an accent.

Apple wanted Casper to understand sentences spoken naturally and fluidly, not as artificially articulated separate words. Apple needed speech recognition that doesn’t force you to reroute your train of thought to think about the fact that you’re using speech input or to worry about fluctuating levels of ambient noise and background sounds.

Apple also gave Casper the intelligence to understand what you’re really asking for. For
example, when you tell Casper to “Call John Sculley,” Casper knows that “Call” means to “look up the telephone number for the name I’m about to say, and establish a voice connection to that number.” The catch is that the speaker must also know the rules. You need to know that the correct phrase to make Casper do your bidding is "Call John Sculley," not "I need to talk to the old Scullmeister."

There’s a trade-off between building more flexibility in to the syntax you can use and the speed and certainty with which the agent responds. Without sufficient constraints, Casper’s performance wouldn’t be good enough to earn your trust.

Although Apple does plan to incorporate speech technology into the Macintosh, it really needs this technology for its forthcoming line of personal electronics, what John Sculley calls PDAs (personal digital assistants)—low-cost, vest-pocket-sized tools for accessing and organizing information and communicating with other electronic devices (everything from Macs to telephones to VCRs).

In the world of PDAs, there’s no room for keyboards or mice. They’re too big and too heavy and make you think too much. You need something more intimate, more off-the-cuff. Speech recognition fits the bill nicely but only if it works seamlessly and doesn’t require exorbitant additional hardware beyond the power of a 68030 processor. In other words, Apple wants speech technology that will appeal to the least common denominator.

Lease Comedy Nominator

The fundamental reason computers have problems understanding free-form speech is that language is filled with ambiguities. Even a human listener hearing an isolated snippet of speech may not be able to understand it out of context.

Try this simple test: Ask a few people to read only one of these sentences aloud to you but not tell you which one they’re reading:

1. The least common denominator puts man in control.
2. The lease comedy nominator puts mannequin troll.

If you could tell which sentence they were reading, it had little to do with the actual sounds they were making. It had more to do with their facial expression. If their expression was one of mild confusion, they were reading the first sentence. If they looked utterly baffled, they were reading the second.

Recognizing the actual sounds of speech is not enough for free-form speech recognition. You also need to collect and understand clues about the context of a sentence or phrase. But at the rate speech-recognition technology is progressing, the only remaining bottleneck will soon be the awkwardness of talking to a machine. Start practicing now. Holler at your VCR, and make sure to tell your Macintosh to “Have a nice day.”
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Let the QuickTimes Roll

Someday help me. Companies are pouring a lot of money, time, and effort into multimedia, and many people are dedicating their careers to it. I'm not sure why. So far multimedia is a fad — a solution in search of a problem, and an end without a need. Washed-up entrepreneurs have used multimedia to get a shot of venture capital, and publishers have used it to create magazines to capture advertising dollars.

Apple’s love affair with multimedia doesn’t help. (Apple figures that if it puts *desktop* in front of enough nouns, it’s bound to find another *desktop publishing*.) Kaleida, the multimedia company Apple created with IBM, is proof. The company’s headhunter called me for suggestions for a CEO after it was formed. Am I missing something? Don’t most entrepreneurial companies start with at least a product or a CEO?

Multimedia is good for schools, kiosks, and training stations. I don’t believe, however, that it will find its way into mainstream computer use for another ten years, if ever. This column explains why and some things we can do to shorten the time.

Multimedia Is Impractical. Using multimedia in presentations requires hardware that is too expensive for most people. For example, I speak frequently — five to ten times a month — at cost-almost-no-object industry conferences and company meetings as well as at user-group meetings and not-for-profit organizations that can barely afford to rent a room.

I thank my lucky stars if the Kodak carousel slide projector I requested is there. I get down on my hands and knees and thank the Lord when a remote control is there and the bulb isn’t burned out. Yet the multimedia demogods would have you believe that all speakers can use multimedia products to enhance their speeches with video, animation, and special effects.

Wake up and smell the coach-class ticket. No one travels with three engineers to set up a 16-megabyte Quadra and $1,000-per-day color projector as John Sculley does. (I don’t even have a color monitor or a CD-ROM drive.) Until speakers can depend on having the necessary equipment at the Podunk Elementary PTA meeting, multimedia is no more than an interesting trade-show diversion.

Multimedia Is Boring. Once, in a discourse about the shortcomings of multimedia, Jean-Louis Gassée asked me — as only Jean-Louis can — if I ever watched a videotape more than once. His point is well taken. My answer was, “Very seldom, if ever.” I don’t even watch such fascinating ones (to me) as the Wings series about fighter aircraft. Let’s face it: We generally *replay* videotapes instead of buying them and the ones we watch, we watch only once or twice.

Multimedia is boring because it lacks soul. It’s difficult to define soul without using examples. Breitling watches have soul; Seiko watches do not. Button-fly 501 jeans have soul; Guess? jeans do not. Porsche 911s have soul; 928s do not. Mac Classics have soul; LCs do not.

So far multimedia doesn’t have soul because product development usually means forcing existing data into a new medium. For example, most multimedia involves taking books, video clips, and large databases and adding a thin layer of navigation buttons and icons. This is the equivalent of broadcasting black-and-white photographs on color television. Thus, multimedia is eye candy that produces an initial rush but lacks long-term nutritional value. It’s the difference between the latest Michael Jackson video and *Citizen Kane*.

Multimedia Is Overhyped. Multimedia is being positioned as the next paradigm-shifting, wealth-creating, earth-shattering technology. Expectations are so high that disappointment is inevitable. When I look at CD-ROMs and animation clips, all I can think is, “This is what all the hype is about? But what can I do with this?” (I dare not say this out loud, for fear of offending people.)

In the same meeting in which Jean-Louis pointed out that people don’t watch videotapes over and over, he also explained the difference between a tool and a solution: A drill is a tool; a hole is a solution. Because a drill (like a personal computer) is a tool, it is used over and over to create more solutions. Because a hole is a solution, you stick a dowel through it once and go on with your life.

For multimedia to succeed, it must be a tool, not a solution. It will be a tool when mere mortals can use it the way they use word processors, desktop-publishing programs, and spreadsheet applications. This day is not far off — take a look at products such as MacroMind-Paracomp’s Magic. To be a tool, however, multimedia must produce solutions that are practical — that is, solutions that users can use for sales presentations, speeches, and meetings in any small town. That’s still a long way off.
A Bitter Bill to Swallow

As you can see, I had multimedia all figured out. Then I heard that Bill Gates, demi-god of Microsoft, had funded a multimedia company and that he was buying the rights to electronic images of artwork. Had Billion-Dollar Bill burst a blood vessel in his brain? Had I missed multimedia’s magnificent market potential? Holy cow, where had I gone wrong?

Then I remembered that I was one of the many people at Apple who thought that the LaserWriter would never fly. (Believe me, I wasn’t alone.) I’ve concluded that I’d better jump on the multimedia bandwagon in order to save face (this is a big deal to Japanese people) and not be left behind in the ’80s.

I’m an upbeat kind of guy. I may not believe in multimedia right now, but I know what has to happen to improve the situation. Here are three guiding principles to help make multimedia into something real, useful, and profitable:

More Is Not Better. The availability and ease of integrating video, photographs, and special effects seduces many people into creating God-awful, contentless multimedia presentations. The point of presentations is to communicate, not to impress. Most of the time, multimedia defeats communication: If it’s dazzling, the medium overpowers the message; if it’s lousy, people won’t pay any attention.

As the old Italian saying goes, “Just because you own a red Ferrari doesn’t mean you have to drive it every day.” People using multimedia should start from the intended message and work backward instead of starting with the technology and making the message take advantage of it. Frankly, the best speakers don’t need any media; they paint pictures with their words. A good rule of thumb is, “The more speakers use multimedia, the less they have to say.”

Data Is Not an End. Accumulating data and enabling people to click on buttons to see it doth not a product make. (Maybe it can make an educational product, because anything is better for kids than shoot-em-up video games or crack.) The development algorithm of many CD-ROM companies is, “Let’s collect a lot of images, press them onto the disc, and let people click around.”

I’d like to see someone “author” a CD-ROM disc—to take data and forge it into something with structure, style, and personality. I want to feel the way I do when I read a good book— that someone went

through a great deal of trouble to come up with a concept, develop a framework to communicate it, and sweated the details. I don’t want random access to data; I want to feel the passion of an author’s vision.

This is the test: Can you recognize the author of a CD-ROM the way you recognize a book by John McPhee? Or is the CD-ROM data slapped onto a disk? Products from Voyager, such as its CD Companion Series and Expanded Books, are a nice start down this path of truly authored multimedia.

Never Expect People to Use What You Don’t Use. I know an executive of a company that’s owned by General Motors. He was forced to sell his BMW and get a General Motors car. He bought a Lexus for his wife, however. When he took me to dinner, guess which car he drove? I’ll give you a hint: It was built by a company that is relentlessly pursuing perfection, not flying to Japan with George Bush to beg for business. He doesn’t expect me to buy a General Motors car.

I saw a presentation about QuickTime by an Apple employee. To my amazement, the first 75 percent of his presentation was a series of static Presentation screens containing bulleted text items. No video. No motion. No integration among applications. And God knows, no demo. He didn’t even use “builds” for his bullets. If multimedia is so great for speakers, why was he using monomedia?

What’s the Use?

I hope this column helps companies and people involved in the multimedia market. I’ll be attacked by multimedia gurus and entrepreneurs who’ll label me an ignoramus. But I don’t think I’m wrong. Just because they (and some venture capitalists) think something is neat doesn’t make it useful.

In a rare moment of humility, however, I admit that I thought desktop publishing was a fad for a niche market. I acknowledge the usefulness of multimedia for education, but now the challenge is to make multimedia even greater and let the QuickTimes roll. ☛
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Introducing the Personal ColorPoint printer.
What did it take to get the editors at MacWeek and MacUser to agree on the best Macintosh utility product? Unprecedented performance, compatibility, and value. In this case, a collection of 10 utilities that does for System 7 what products like SUM and Norton do for hard disks — only more so. As MacUser put it, “Now Utilities will make your Macintosh faster, easier, and more fun to use.” For example:

- **StartUp Manager™** provides complete extension management
- **Super Boomerang™** finds files and folders instantly
- **WYSIWYG Menus™** groups fonts in their own typefaces
- **NowMenus™** makes the Apple Menu hierarchical
- **AlarmsClock™** displays the time & reminders in the menubar
- **NowSave™** automatically saves files to prevent data loss
- **Screen Locker™** keeps confidential information confidential
- **MultiMaster™** launches applications and files
- **Profiler™** analyzes system configurations
- **DeskPicture™** puts color and B&W pictures on the Desktop

In fact, every utility in the collection is the best of its kind. All of the utilities in the collection are also designed, tested, and guaranteed to work together — and with anything else your customers may have — even System 6. No wonder MacUser gave it a perfect five mouse rating and called it “a must-have for experienced users and novices alike.”

What will it take to get the editors at MacWeek and MacUser to agree on the best Macintosh network product? Perhaps Now Up-to-Date™: the only Macintosh application that keeps your appointments and your associates up-to-date — whether you’re in the office, at home, or on the road.

**Organize Your Appointments** Now Up-to-Date can schedule a meeting to occur at 9:00AM on the first Tuesday of every month and have it automatically appear on your associates’ calendars. Scheduled events can be private, shared, or restricted (i.e., only available to people with the correct password.)

**Remember Your Meetings** Now Up-to-Date keeps track of all of your meetings and appointments, so you don’t have to. It can also provide advance warning of upcoming events to ensure everyone shows up on time.

**Mobilize Your Office** Now Up-to-Date’s versatile printing options include support for all major appointment books, so you can take your calendar on the road. If you own a PowerBook you’ll appreciate the fact that Now Up-to-Date doesn’t require you to be connected to a network to see your schedule. For that matter, you don’t even need to own a network: Now Up-to-Date makes a great single user product, too.

Isn’t it time you got up-to-date?
Control Freaks

Sarath Elizabeth Wadsworth (not her real name) just doesn’t get it.

Sarah’s the Macintosh guru for a large pharmaceutical company. When people in the company have questions about their Macs, they go to her.

When David (his real name) visited the company recently to campaign for user scripting among the employees, people pointed Sarah out to him. Yes, Sarah admitted, she supposed that she was the most advanced Mac user in the place. People expected her to solve their Macintosh problems and to evaluate new technologies for the Mac. But Sarah wasn’t about to provide the endorsement that David was looking for. Scripting, she pronounced, was something she would just never do.

I don’t know Sarah, but I know enough about her, and about Macintosh gurus in large companies generally, to be pretty sure that she’s wrong about scripting. So do you. Let’s see.

We know that she’s been using a Mac for at most eight years, because the Mac is only eight years old. She’s probably been using it for considerably less time than that—six years of experience is probably a generous guess. On the one hand, if she’s the company’s Macintosh guru, she can hardly be a new user; on the other, there weren’t a lot of Macs in big companies before the Mac II was released five years ago.

A Mac guru in a large company is likely to be a relatively early adopter, and early adopters of new technology tend overwhelmingly to be young. Sarah is probably a little shy of 40 today. Say 39.

Even if there is still Social Security when Sarah turns 62 in 2015, do we think that this computer-savvy woman is going to be content to sit and knit in the 21st century? No, like many 21st century people, Sarah will be using a personal computer several hours a week. Being a very experienced computer user, she’ll always sit a good arm’s length from the screen, so she’ll no doubt live out her allotted three-score-and-change years.

And she claims that never in the next 30-some years will she use a scripting system? Hogwash. Her 6 years of experience with this pimply adolescent technology is no basis for projecting so dogmatically into the next three decades of technological development. Not only will Sarah be scripting but so too will a lot of other people who don’t think they will.

Scripting is the wave of the future.

Scripters Rule the World

User scripting is not a new application niche as is desktop publishing or multimedia authoring. Instead, it’s a completely new approach to controlling a computer. Someday, everyone will be scripting. Script writers will rule the world. How’s it going to happen?

When Apple started marketing the Mac, it made a distinction between the techno-weenie computer users of the pre-Macintosh age and “the rest of us.” It was a good marketing strategy for its time and one that seemed to keep with the slightly different distinction between programmers and users. But that “computer for the rest of us” slogan ought to be retired now, because it imposes a division where there ought to be a continuum or at least a lot of options. Programming and what the rest of us do are just two of many ways to direct a computer.

One reason I championed HyperCard when it first came out was that I believed that we needed more than these two ways (using and programming) to direct the machine. Scripting is one more way, and as such, it represents the beginning of the end of the user/programmer dichotomy.

I’ve written here before about UserLand Frontier, David Winer’s system-level user scripting language. Frontier is still the only game in town, although Apple is again talking openly about its long-delayed scripting language, AppleScript. And existing tools such as HyperCard and QuickKeys can do some of the things a scripting language can.

But QuickKeys is still an extension of the existing language of clicks and drags rather than a language unto itself, and HyperCard restricts its scripters to the program’s own environment rather than the whole Macintosh desktop.

With Frontier, a scripter can type in a command such as clock.now() to check the time and date or key in a few more lines to create a script that deletes all Word backup files, backs up a hard disk, collects icons from applications, counts files, finds locked folders, or creates aliases for all applications on a system and collects them in one place.

That’s Frontier as a system-scripting language. It also serves to drive applications. For example, version 4.2 of PageMaker is Frontier-friendly, and Aldus and UserLand have released an install file for Frontier that adds verbs to its language for more than 200 PageMaker operations. This means that a scripter
GDT’s printer drivers reveal the hidden capabilities of virtually any printer and make it fully compatible with your Mac.

GDT drivers have the most features; here are some of them:

- Text and graphics support along with access to multiple bins, color, internal fonts, custom paper sizes, etc. for most printers.
- Reduction and enlargement from 20% to 400% in 1% increments.
- Smooth 90° rotated text.
- Print on both sides of a page with Even/Odd pages feature.
- Smoother grayscale patterns.
- Fastest QuickDraw™ drivers you can select in the Chooser.
- Smarter and faster label and forms printing without jamming.
- Compatible with System 6 and 7, TrueType®, Adobe Type Manager™, SuperLaserSpool™, NetSerial™, etc.

**PowerPrint™**

Enables Macs to print to over 850 non-Apple printers. Great for users who already have or want to use less expensive, better dot matrix, inkjet, and laser printers. Also ideal for PowerBook users who want access to high quality portable printers or just the ability to walk into any office and print to virtually any printer. PowerPrint comes complete with a high speed, easy to use cable.

**BetterWriters™**

Dramatically improves printing speed and provides LaserWriter-like features for serial Apple ImageWriter® I, II, and LQ. Also provides powerful enhancements for StyleWriter® and DeskWriter® users.

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**Someday, everyone will be scripting. Script writers will rule the world.**

...the “real world,” or the user layer, is more abstract, and from the user’s point of view, it’s more focused. But we have by no means exhausted the possible levels of abstraction or focus with these two traditional methods of directing the machine. As hinted at in the mention of wiring applications together to do something specialized, there are levels of abstraction or organization beyond what users deal with today. A scripter wiring together various applications to manage all aspects of a task is working at a higher level than the user who plugs away at the applications one at a time, and the superuser who uses the wired-up tool is working at a higher level yet.

These higher levels of abstraction get you working closer to your real task. Another way of saying this is that they represent a step in the direction of specialization, which means narrow markets, which means that commercial software companies can’t afford to build such specialized applications. What’s necessary is the empowerment of the people who perform the tasks; the ones who will have to construct the tools of the future. People such as Sarah who now think of themselves as users will need to customize their tools for their purposes, and the ability to do this is currently called scripting.

What I’m saying is that scripting and a new class of people called scripters are going to be necessary for the development of the next level of software.

But I expect the look of scripting to change radically in the coming years. I expect to see more tools that bring a programmer-like degree of control to a world very far from the one programmers work in, as far beyond applications and desktop icons as applications and desktop icons are beyond the bits and bytes of programming. I expect object-oriented operating systems to make it easier to represent within the computer the real components of a job and to build on such representations new tools for doing the jobs. And I expect to see users become more sophisticated, not in their understanding of the computer but in their understanding of their work.

And I expect Sarah to become a scripter. Like the rest of us.
The only thing missing from our new spreadsheet is the learning curve.

Get a Billion for only $249.
A billion cells, that is. Plus 145 advanced business functions. And it's all readily accessible.

Chart Your Success.
Charts and graphs are unbelievably easy with Claris Resolve. Especially with 25 different styles to choose from.

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Finally, you don't have to be a rocket scientist to use a spreadsheet. All you need is new Claris® Resolve™ 1.1. It's the only spreadsheet you already know how to use. Because its tools and commands are familiar to anyone who's ever used a Macintosh.


Still, Claris Resolve 1.1 has more than enough features to inspire any power user. For example, there are 145 built-in functions for solving any business problem; 25 charts and graphs for making any audience sit up and take notice; and the kind of performance that makes Resolve among the fastest spreadsheets anywhere.

Resolve also takes full advantage of System 7. So you can effortlessly combine its power with other applications.

Given all this, it's not surprising Claris Resolve earned 4½ mice from MacUser. What is surprising, though, is that it's available for only $249 through June 30, 1992.

Go straight to your phone and call 1-800-3CLARIS for your nearest authorized Claris dealer.

And get the only spreadsheet that won't make your head spin. Because we left out the learning curve.
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Aldus Persuasion V.2.1

$324

Need to develop presentation graphics? Let Aldus Persuasion 2.1 do all the work. Just select one of the predefined templates (or create your own), and type your ideas into the outliner. Persuasion automatically prepares your slides from the outline. Aldus #6346

MultiSync 4FGx 15" Monitor

$794

Completely redesigned from the inside out, the new MultiSync FG monitors give your Mac brighter, sharper, more accurate images. The 4FG, 5FG and 6FG monitors feature AccuColor Control System which provides unprecedented color accuracy, nothing short of dazzling. Packed with state-of-art extras like FullScan capabilities for 36% more screen display. NEC Technologies #7143

Mac24 MacFG 24bit Interface Card

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Wacom SD 510-C 6"x9" Tablet

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Increase your graphics quality and productivity with the SD 510C 6x9 Tablet. Its cordless and batteryless cursors and stylus add a new dimension to computer graphics. Use the feather-light stylus to paint, draw, trace, point, open and close—all at a natural speed without the limitations of conventional input devices. Wacom #3498

Aldus FreeHand V.3.1

$399

Aldus FreeHand combines an elegant user interface with exceptional depth of function. The result: an easy-to-use tool for creating professional-quality graphics. Aldus #0333

DO-IT-YOURSELF COLOR!

Color. It turns dull into dazzling. It turns prospects into customers. It turns heads.

Not long ago, if you wanted color you had to send it for outside processing. It took days. It cost a fortune. And you never knew what it would look like until you got it back. Now it's easy to do ultra-professional, low-cost color layouts and transparencies in house—all you need are the right tools. On this page you'll find a selection of the finest color production tools available. At the Mac Zone we carry everything you need to start turning heads with your own in-house color.
DPI Drives: Don’t Settle For Less!
A Top-Quality Drive At An Amazing Price

The Mac Zone proudly presents a new line of high-quality, low-priced hard drives, the DPI series. Our DPI removable was given top honors by BMUG (Berkeley Macintosh User’s Group). All DPI drives are built using only the finest components and drive mechanisms. Each drive is carefully tested for over 24 hours to assure your complete satisfaction. You will not find a better drive for the money.

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52 Mb Quantum
External
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With removable SyQuest cartridges your storage capacity is virtually limitless. Lifetime warranty. Syquest #2183.

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MacTurbo 2400
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Our MacTurbo 24/96 Group III Fax Modem gives you both fax and modem for the price of most data-only modems. It features 9600 bps send rate, full-featured 2400 bps data modem, full Hayes compatibility and compact design. MacTurbo #0977.

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Feel the power! Take your 4Mb Quadra into the next dimension with 8Mb. Order 8Mb SIMMs (must be installed in sets of 4).
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#0849 16Mb SIMM ...... call for latest low price

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DesignCAD provides the speed and accuracy necessary to manipulate complex two- and three-dimensional designs. File support for DXF, IGES, XYZ, PICT, RIB. Designed for engineering (mechanical, architectural & electrical), animation, desktop publishing and multimedia. DesignCAD, Inc. #4180 ✔

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MiniCAD+ is the original award-winning 2D/3D professional CAD package. You cannot find a more fully featured 2D/3D CAD program at this price. The program includes an integrated worksheet, spreadsheet and database—all linked to your drawings. Graphsoft #3540 ✔

Design Your Own Home:

Architecture #3809
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$64 each

Whether you are a professional or a do-it-yourselfer, Design Your Own Home can make your planning time more productive. Each program includes sample plans and a try-out section to get you started, plus command cards to keep by your side as you work. There are 3 programs: Architecture (floor plans to structural details), Interiors (furnishings to color schemes), and Landscapes (trees to fences). Includes dozens of sample plans. Abracadatat ✔
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Fractal Design Painter™ lets your Macintosh create original art or embellish scanned images with realistic natural media effects by duplicating traditional tools and textures in 24-bit color. Fractal Design #0655.

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With Print Central never wait for a printer, make the most use of your printer. Print Central publishes itself as one or several Chooser-level printer(s) over your AppleTalk network. It quickly receives documents from any application (including PageMaker) and spools them to one or several PostScript printers. Compumation #00621.
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With a simple shift-click of the close box you can create completely locked folders, read-only folders or drop folders. Once a FolderBolt file is locked it can’t be opened, duplicated, deleted or moved without the password. Kent Marsh #0258

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This high-quality screen saver has over 30 different displays and sound—now you can hear those whoozing meteors, and screen-munching worms. Exciting new displays feature Flying Toasters, Down the Drain, and the Bogs Software classic, Fish! Berkeley Systems #2785

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Are you tired of staring day after day at the same old desktop? Redecorate with Wallpaper, the software that allows you to display, create, edit and save any number of large desktop patterns using artwork made in Wallpaper or artwork imported from your favorite paint or draw program. Thought I Could, Inc. #4762

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**Microphone II v4.0**

$209

MicroPhone II V.4.0 delivers communications without the hassle. Praised for ease of use and advanced scripting language, Microphone II 4.0 now contains faster script execution, screen speed, file transfers and new interface design tools. Software Ventures #4893 ✨

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**Hayes Ultra 96 Bundle**

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The Hayes Ultra 96 is the modem for those who appreciate quality engineering and demand the best in data transfer hardware. This rock-solid, feature-filled modem comes bundled with widely celebrated Smartcom II software and a modem cable. Hayes #4796 ✨

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**White Knight 11**

$84

Written by programming prodigy Scott Watson, White Knight 11 gives you technical sophistication, flexibility and user-friendliness... at a great price. Its features include: a full-featured BBS package, a text log, security and access restriction and more. Freesoft #2881 ✨

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  - 4754 Solectek Small Fax Modem ....... 199 ✨

- **Supra**
  - 0424 Fax Modem V.32 w/o SW/Cable .... 259 ✨
  - 0426 Fax Modem V.32 Mac Fax Modem ... 199 ✨

- **Telebit**
  - 2554 T-2500 V.42 10.8K Fax Modem ... 999 ✨

- **U.S. Robotics**
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**Xeba 9600 V.42 S/R Fax**

$199

You will not find a better price for a 9600 send/receive Fax Modem. The V.42bis offers multiple positions and is available in black or gray. Includes Mac cable. Logicode Technology, Inc. #4644 Black #4674 Platinum ✨

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**Hard Drives**

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**Everex Systems**

- 2161 Emac 150 Tape Backup Drive: $715
- FWB, Inc.
  - 0506 100 MB PocketHammer Drive: $768
  - 04882 DPI 200MB QExt. Quantum: $849
- 04884 DPI 415MB QExt. Quantum: $1799
- 04451 DPI 45MB Removable Syquest: $549
- 04880 DPI 88 MB Q Ext. Quantum: $359
- 04886 DPI 88 MB Removable Syquest: $699

**CDR M36**

NEC's CDR-36M offers low cost entry to CD-ROM with the key benefit of fast, smooth data access. It's new features include: 450ms average access time, MPC compliance, user selectable SCSI ID extra buffering, 2-year manufacturers warranty. NEC #0573

$429

**CDR 73M**

NEC's CDR-36M offers low cost entry to CD-ROM with the key benefit of fast, smooth data access. It's new features include: 450ms average access time, MPC compliance, user selectable SCSI ID extra buffering, 2-year manufacturers warranty. NEC #0573

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**Infinite Optical 128Mb 3.5" Optical Drive**

The next phase of optical technology has arrived. The PLI Infinite Optical read/write disk drive redefines high-capacity data storage. Backed by the manufacturer's 1-year warranty. PLI #4698

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- 4467 Monarch Notes: $54
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**Quantum Leap Technologies**

- 0668 CD7 2 disc set: $74
- 0666 Giga-ROM 2.0: $98
- 0151 Macademic Vol 1: $73

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**Tactic Software**

- 4219 Tactic Multimedia CD-ROM: $149

**Software Toolworks**

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- 0516 Timetable Of History: $54

**Wayzata Technology Inc.**

- 0551 Front Page News 10/90-9/91: $94
- 4565 GAIA Environmental Resources: $149
- 4043 EPS Professional: $169
- 0243 U.S. Presidents: $79
- 0244 Down to Earth: $155
- 3511 Vietnam Remembered CD ROM: $78
- 0025 Middle East Diary: $65

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Sherlock Holmes Consulting Detective CD-ROM game features over 90 minutes of full-motion color video. Live actors, original sets, and costumes provide an interactive-movie gaming experience. ICOM Simulations

$38

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**Networking**

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**Get Connected! Keep In Touch With Quality Network Tools**

**10T Hub/8**

$264

With the Asante 10T Hub 8, network managers can connect local area networks with inexpensive twisted-pair telephone wire instead of expensive coaxial cable. Supports the IEEE specifications for 10Base-T Ethernet. Asante #0404

**NEW EtherNET Cards from Farallon**

**Mac II Ethernet Card**

$179

The 10BASE-T-compliant PhoneNET Card allows owners of Mac SE/30 through Mac II machines to use the increased speed and bandwidth of Ethernet running over ordinary telephone wire. No external connector or transceiver is needed. Farallon #4894

**NetModem/E**

$1749

NetModem/E is a stand-alone EtherNET communications device designed to meet three LAN communication needs: 1) It allows remote workstations to dial in and have full access to network services; 2) It allows LAN workstations to dial out to remote information services or hosts; 3) It joins geographically separated networks via a routing connection over ordinary phone lines. Shiva #4129

**Call Me!**

$32

Call Me!, the network intercom, lets you talk, record, play and forward messages. The program requires System 7, AppleTalk and Microphone. compatible with MacMike, MacRecorder and EtherTalk. PeCox #1036
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The most comfortable seat in document publishing.
Marketing, marketing... Nest ([800] 524-3315 or [408] 441-1944) may have devised the ultimate gimmick. Through May, users who buy Nest's MacQuill ($149), a combination word-processing/page-layout program, will receive a certificate for four days' free accommodations at a first-class hotel in Palm Springs, Las Vegas, Fort Lauderdale, Orlando, or Hilton Head Island. In exchange, users need only send Nest a returned MacQuill registration card and a floppy disk with a file created in MacQuill.

By Russell Ito

A few words less: Not so long ago, RAM was expensive and word processors were small. Then, RAM got cheap and word processors got big. Now, RAM is still cheap (OK, depending on the type) and word processors are... getting small — again? Seems so. Last month, we told you about Paragon Concepts' Nisus Compact, and now there are two more entrants in the arena.

The people at T/Maker ([415] 962-0195) didn't shrink WriteNow 3.0 ($249); instead, they bulked it up, but the package is still tiny (only 275K) compared with behemoths such as Word 5.0. The biggest change to WriteNow is the addition of style sheets — for both paragraphs and characters. WriteNow's style sheet implementation may be the most comprehensible yet. For example, a style's definition is displayed in a scrollable list that clearly spells out each of the formatting options involved. The pop-up style list also displays the styles in a hierarchical order, so it's easy to trace which styles are based on which. The character styles are equally sophisticated. For example, character styles can be defined either to override or to combine with the paragraph's character styles.

WriteNow 3.0 also includes a print-preview option and support for color text and graphics. However, it treats placed graphics as characters and it has no text wraparound. LetterPerfect ($199), from WordPerfect ([800] 225-5000), is a scaled-down version of WordPerfect 2.1 that produces fully compatible WordPerfect files. LetterPerfect includes most of its parent's features, including a spelling checker, thesaurus, full System 7 support, and text wrap around graphics, but it doesn't include user-definable styles, a drawing environment, macros, or QuickTime support. Designed to run even on a 2-megabyte System 7 machine, LetterPerfect may be the mobile word processor of choice for WordPerfect offices.

Up to Date...

Excel 4.0 Blazes Ahead

 Barely a year after the April 1991 release of Excel 3.0, Microsoft has announced the imminent release of Excel 4.0. The new version includes significant improvements in ease of use, formatting and presentation capabilities, and data-analysis tools.

 The most notable ease-of-use addition is AutoFill. With this feature, Excel uses intelligent guesswork to fill in a range of cells based on the contents of cells you’ve selected. For example, if you enter January and February in adjoining cells, Excel will fill the remaining cells with the names of the subsequent months. Or if you select a series of numbers such as 5, 10, and 15, Excel will follow with 20, 25, 30, and so on.

 Other ease-of-use improvements parallel the drag-and-drop capability and the increased tool-bar emphasis of Word 5.0. The Excel drag-and-drop feature lets you select and drag cells to move or copy them without cutting and pasting. In the tool-bar area, Excel 4.0 offers a redesign of the standard icon toolbar, new tool bars for activities such as charting, and the ability to customize and float tool bars. A spelling checker is another Word-like addition.

 Excel 4.0 also lets you bind several workbooks, charts, and documents into a Workbook, which you can open from one icon on the desktop. Workbooks provide a destination for Lotus 3-2 spreadsheets (you can now import them). You can unbind Workbooks if you need to — to share one of the workbooks with someone else, for example.

 In formatting and presentation, Excel 4.0 includes such improvements as automatic range formatting and text centering over columns and the ability to create on-screen slide-show presentations. A slide show can include Excel graphics, work-sheets, and charts as well as graphics imported from other applications. Charts are now easier to create, because the new ChartWizard tool leads you through Excel’s otherwise quirky and unpredictable process step by step.

 For power users, Excel 4.0 includes several new analysis features. The Analysis ToolPak includes general-purpose statistical-analysis tools as well as tools for financial, engineering, and scientific applications. For what-if analyses, the Scenario Manager lets you vary input values and view the output changes in a table.

 The closest thing yet to one-touch scanning: HP’s ScanJet IIp can communicate with some graphics applications and all text-based applications (once you’ve installed Caere’s OmniPage Direct). You can scan words and images directly into applications with just a few mouse clicks.

 Easy Scanning from HP and Caere

 The ideal scanning process, some might say, would be to click on a button in your application and instantly have the text or graphic show up in the application. With Hewlett-Packard’s new ScanJet IIp scanner and Caere’s OmniPage Direct OCR software, the process is almost that simple.

 The ScanJet IIp, a 300-dpi, 8-bit (256 grays), monochrome flatbed scanner, is the first scanner to support the TWAIN imaging standard. If your scanner and application support TWAIN, you can select an option within your application such as Scan Text or Acquire Image, click on the Scan button, and sit back. Within moments your text or image appears at the cursor location in your document. So far, the only TWAIN-compatible graphics applications on the Mac are PageMaker, from Aldus; Desktop, from Zedcor; and PhotoFinish, from ZSoft. All your text-based applications become TWAIN-compatible when you install OmniPage Direct, though.

 DeskScan IIp software, which comes with the scanner, is designed to make scanning as automatic as possible, although it also includes manual options. It can automatically find the image to be scanned, set the exposure for optimized brightness and contrast, and discern whether an image is gray scale or line art. When you’re scanning in text, OmniPage Direct uses HP AccuPage technology to set the optimal brightness level for OCR on every region of a page, so it can read text against tinted background areas. OmniPage Direct also automatically interprets the document orientation and character type, and it recognizes nearly all nonstylized fonts, from 6 to 72 points, at speeds of up to 2,000 words per minute.

 The low price of the ScanJet IIp and OmniPage Direct — and the option of a 20-page automatic document feeder (ADF) for the IIp — make this combination well suited for small businesses and offices new to scanning. OmniPage Direct for the Mac should ship in the second quarter of 1992.

 Hewlett-Packard Co., 19310 Prunemont Drive, Cupertino, CA 95014; (800) 752-0900. ScanJet IIp, $1,095; ADF, $395.

 Caere Corp., 100 Cooper Court, Los Gatos, CA 95030; (408) 395-7000. OmniPage Direct, $595 ($300 with the ScanJet IIp).
LaserJet Language Leap

Cartridge wars have long been a drawback in sharing HP LaserJet printers over a mixed network—those PC users keep removing the PostScript cartridge so they can use the printer-resident HP PCL 5 language. However, help is at hand. The new HP LaserJet PostScript Cartridge Plus for the LaserJet III, IIIID, and IIP printers lets the PC users switch between PostScript and HP PCL 5 from their computers without holding you up. It also gives you a way to access the speed and power of PostScript Level 2 printing—once the driver for Level 2 becomes available.

The price for all this power? You'll need to add at least 1 megabyte of printer memory (the board costs about $230 from HP), for a total of 2 megabytes. If you want the duplexing capability the new cartridge supports for your IIIID, you'll need an additional 2 megabytes ($390), for a 4-megabyte total.

As we mentioned, you'll also need a PostScript Level 2 driver (from Adobe) to access the Level 2 features. HP plans to include that driver with the cartridge, but Adobe may not have it ready by the time you read this.

Hewlett-Packard Co., 19310 Prune-ridge Avenue, Cupertino, CA 95014; (800) 752-0900. S695; upgrade, $195 (call [503] 750-5856 before May 31).

Virtual Networks from Radius

Now that distributed processing over networked Macs is becoming a reality, many of us dream of having a network of 68040 processors at our disposal. While we've been dreaming, Radius has been working on RocketShare, an innovative software extension to System 7. Together with one or more Radius Rocket 68040 accelerators, RocketShare provides a true multiprocessing environment for the Macintosh. And with Apple licensing part of its operating system to Radius (see the "NewsLine" sidebar), future System 7 compatibility for RocketShare is assured.

RocketShare makes each Rocket installed in your Mac II or Quadra operate as if it were another Mac connected to your host Mac by a network. You can open a desktop window for each Rocket and access the host Mac's disk drives in that window as AppleShare volumes. When you run processor-intensive functions on a Rocket, your host Mac's CPU remains free for other tasks. Distributed processing among the Rockets and your Mac works essentially as it would among networked Macs, only faster, because the CPUs communicate over NuBus. And other Macs connected to yours on a network can also access your Rockets as though they were networked Macs.

Of course, with each Rocket being a separate Mac with its own System Folder, we have to wonder: Do you need a site license for any application you want to put onto your new "network"?

Radius, Inc., 1710 Fortune Drive, San Jose, CA 95131; (408) 434-1010. Price not set at press time.
Atlas Pro

Atlas Pro links data files with geographical features to create a sophisticated mapping tool.

With its innovative feature set, System 7 support, and street-level-mapping capabilities, Atlas Pro takes the lead in the burgeoning desktop-mapping field. Combining the power of database and spreadsheet programs with the graphic strengths of the Mac, Atlas Pro goes far beyond presenting eye-catching maps. By linking data with geographic features, it excels at analyzing as well as presenting geographical data.

Caught Mapping

Atlas Pro is a hybrid of basic data-manipulation tools and an extensive collection of cartographic files. Based on data you enter or import, Atlas Pro can create maps of two basic types — locational point maps and area maps that use color to indicate data values — to present that data geographically. Street-level maps are also available, but they're optional and cost extra. By creating hot links between the data and the program's cartographic files, Atlas Pro can serve as a powerful analytical tool.

Using a spreadsheet format to enter and edit the data that's linked to Atlas Pro map files, users have a fine degree of control over the map-creation process. However, Atlas Pro's spreadsheet module doesn't provide the same abilities as a stand-alone spreadsheet program does. It's clear that, rather than reinvent the spreadsheet program, Strategic Mapping concentrated on what it knows best — mapping tools. As a result, Atlas Pro's spreadsheet tools are limited — you can enter data, add new columns and rows, and do basic sorts and searches, but that's it. This is not a major weakness, though. Atlas Pro comes with an excellent implementation of System 7's publish-and-subscribe, making it easy for you to do your number crunching in Microsoft Excel, for example, and subscribe to the results in Atlas Pro. Nonetheless, some enhancement of the program's native analytical capabilities would be a welcome addition in future versions.

Atlas Pro's power stems from its ability to link two different file types — cartographic data and attribute data — for each map you create. Cartographic data, which consists of x,y-coordinate information as well as a Primary ID for each geographic feature, determines map geography, including points for cities, curves for highways, and polygons for geographic regions such as states. Attribute data, which can consist of information such as demographics or sales figures, determines how geographic regions are to be shaded or how points are to be distributed on a map.

Atlas Pro's cartographic-file collection comprises countries and their capital cities, state and provincial boundaries for the U.S. and Canada, U.S. counties, U.S. interstate highways, U.S. cities with a population of more than 25,000, and major Canadian cities. Also included is basic demographic data for each geographic entity, so users can create maps before they've even entered any data.

Attribute data is stored in spreadsheet format, and you can view and edit it separately from the maps. Column headings in the spreadsheet signify each attribute-data class (population, for example), and rows signify each geographic feature (counties or states, for example). Attributes are linked to map features in the associated cartographic file through the feature's Primary ID, which appears as a column in the spreadsheet.

If, for example, you want to create a county-level map of Vermont that's shaded by population, you can import Atlas Pro's file of Vermont-county geography and then bring up the attributes spreadsheet, which in this case consists of a two-column spreadsheet containing a Primary ID column and a population column with 14 rows, one for each county.

At this point, you can begin entering data and adding new columns manually. Atlas Pro also provides several options for bringing data into the spreadsheet from other programs. You can import data directly from text, FoxBASE+/Mac, or dBASE files. If you work with mainframe databases supported by Fairfield...
Software’s ClearAccess and your Macintosh has a physical connection with the remote computers that store those databases, you can query them directly by executing a ClearAccess script from within Atlas Pro. You can also paste data from another application or bring it in by using System 7’s publish-and-subscribe feature.

Once all your data is in the spreadsheet, you select the thematic data category (population by county, in this example) and opt for either a point map or an area map. Atlas Pro can create standard shaded thematic maps, dot-density maps (which do a better job of displaying broad distributions), graduated-symbol maps (which scale a symbol in proportion to a given data element for each point), locational point maps, and area cartograms (an infrequently used map type that scales an entire polygon to a data element). You can also generate summary data reports by selecting geographic areas.

One of Atlas Pro’s most innovative features is the ability to link PICT files to cells in spreadsheets. For example, a real-estate agent could create a street map of Boston with dots located at each listed property costing less than $250,000 and within ten miles of a client’s work address and then configure Atlas Pro to display floor plans of the houses when clients clicked on specific listings. You can take advantage of even-more-powerful capabilities by linking QuickTime movies to map features.

Atlas Pro’s optional street files cost $200 to $500 per county (you can also purchase street maps of the entire U.S. on CD-ROM for $25,000). This option is impressive, but Atlas Pro’s street-level mapping can’t compete with the speed and additional features (the ability to locate addresses on the right and left sides of the street, for example) of more costly, high-end packages such as Tactician, from Tactics International. In addition, Atlas Pro suffers from an annoying bug that prevents users from correctly labeling points on a street map by using spreadsheet-column names.

But compared with chief rival MapInfo, from MapInfo Corp., which sports a similar feature set and price tag, Atlas Pro is a better all-around mapping tool. Its map annotation is more sophisticated, it sports a cleaner and less cumbersome interface, it can plot maps in any of nine projections, and it provides remote-mainframe SQL querying. In addition to publish-and-subscribe, the System 7-savvy program supports Apple events, TrueType, and Balloon Help.

Atlas Pro runs on any Mac, from the Classic to the Quadras. Because of its data-intensive operations, however, we recommend a 68030-based machine for optimal performance. The documentation, which includes a user manual, a getting-started tutorial, and a section on improving mapmaking skills, is excellent. Strategic Mapping’s technical-support department responded quickly and accurately to our phone calls.

The Bottom Line

With its ability to create hot links between data files and geographic features on a map, Atlas Pro is an excellent and affordable tool for performing geographic analysis. The program supplies an extensive collection of cartographic files, optionally with street-level files, making it ideal for presenting your results once you’ve completed your analysis.

Although Atlas Pro’s built-in data-manipulation tools are limited, the program’s support for publish-and-subscribe makes it easy to bring in data from stand-alone programs such as Microsoft Excel and ACIUS’ 4th Dimension. For those looking for a way to do sales-territory analysis, demographic studies, or land-use planning, Atlas Pro is a powerful and accessible tool.

— Jeffrey A. Steinberg

Get Info

Atlas Pro

Published by: Strategic Mapping, Inc., 4030 Moorpark Avenue, Suite 250, San Jose, CA 95117; (408) 985-7400.

Version: 1.0.5.

List Price: $795; optional street maps, $200 to $500 per county.
**DataPivot**

Brio's Eddy Award-winning click-and-drag reporting tool simplifies data analysis.

If you've ever longed for a way to create a variety of cross-tabular reports from the same worksheet or data record — without the arduous task of writing complex spreadsheet formulas and macros — DataPivot is for you. A powerful and flexible reporting tool, it lets you create multiple views of a single data set by rearranging the data on the fly.

**Pivoting Reports**

Anyone who has ever struggled with Microsoft Excel's clumsy transposition procedure will take to DataPivot instantly. The program lets you pivot a report, interchanging columns and rows, simply by clicking and dragging row and column headings to a new location. It not only sees to it that all the interchanged data falls under the appropriate headings in the new format but it also recalculates new totals, subtotals, and cross tabulations.

By letting users view n-dimensional data in a variety of formats quickly and easily, DataPivot succeeds wonderfully as a data-analysis tool. But it has its limitations — it lacks charting tools and its report-formatting options are minimal for presentations. Moreover, you can't create ad hoc data entries directly within DataPivot. In its first iteration, the program is designed to collect tabular data from a spreadsheet or database, massage it, and send it to a charting application or presentation tool for refinement.

You work with DataPivot by using two main windows: the Source window, for accepting tabular data, and the Report window, for manipulating it. The Report window comprises a central data area and a horizontal bar (top labels) and a vertical bar (side labels) for labeling the data. In a report, top labels become column headings and side labels become row headings.

You have three options for bringing data into the Source window: subscribing through System 7, pasting data from the Clipboard, or importing data from a text file. Once DataPivot has the data, you build reports by clicking on columns of data in the Source window and assigning them to areas in the Report window.

To begin, you must decide which data classes in the Source window are to become top labels and which will be side labels in the Report window. That done, when you first assign a column of data to either a top label or a side label, DataPivot reads the data class (Sales Regions, for example) of the source column and automatically creates a label. A floating icon bar makes this process a snap.

Once you've created labels, DataPivot is smart enough not only to organize selected columns of data under the appropriate labels (Sales Quarters across the top and Sales Regions down the side, for example) as you transfer them from the Source window to the Report window but also to calculate the data values.

When you have assigned all your data to labeled rows and columns in a report, DataPivot allows you to switch the row-and-column orientation by clicking and dragging the labels. You can, for example, switch your view from comparing yearly sales within each region to comparing regions within each year. As you pivot the report, DataPivot recalculates the values to reflect the new report structure.

Rows and columns are readily interchangeable, so from here on we'll refer to report columns and rows as vectors. The only differences among vectors in a report, as far as DataPivot is concerned, are the underlying data values and whether the vectors have a horizontal or a vertical orientation.

A key DataPivot concept is that vectors and labels in a report are interconnected, so you never work with individual cells or even individual labels, as in a spreadsheet program; instead, you work with related groups of vectors and labels, some of which aren't always visible on-screen. As a result, a complex substructure of a particular selection may not always be readily apparent.

**Gadgets**

You can further refine DataPivot reports by applying the program's gadgets, or tools. One of the most powerful is the Limit gadget, which lets you specify a range of source values for a report as well as exclude specific values. This process requires just a few mouse clicks in DataPivot; accomplishing the same task in a spreadsheet program or a database program would require tedious and time-consuming manipulation.

The Formula gadget lets you define and modify vector formulas. We were confused by its Increase formula, which computes the difference between two adjacent vectors. Its usefulness seems limited, and you're probably better off performing such calculations in a spreadsheet program. Luckily, transferring a report to a spreadsheet program is a non-brainer. You can export reports in a variety of formats, including Excel's BIFF format.

DataPivot lets you create blank columns in the Source window and apply DataPivot is a reporting tool that lets you create multiple views of the same data set by clicking and dragging columns and rows. Here, we've entered source data (bottom) into the main Report window, and we're about to pivot the report.
Here's the same data set after rearrangement of the columns and rows. DataPivot has recalculated the totals according to the new arrangement. By default, the program sums the values, but the Formula gadget lets you opt for other formulas.

and collapse them again to show sales on a semianual or annual basis. Unfortunately, however, the program provides no tools for automating this process. The ability to create and save views within a DataPivot document would be extremely useful.

Depending on the cursor's position within a cell, the cursor points upward or sideways to indicate that a click will select data in either a column or a row orientation. However, DataPivot's supersensitive cursor sometimes behaves erratically if you don't elect to display grid lines in the data area of the report while you're setting the report up.

You can adjust row height and column width by selecting parts of a data area, moving the cursor to the edge of a row or a column, and dragging when the cursor changes into a double-ended arrow. Several important options are missing, however: Among them are a menu item for adjusting column width and row height in a dialog box and an option for snapping vectors to appropriate heights or widths based on the data they contain.

DataPivot works entirely in RAM, so the more memory you have, the larger the data set you can manipulate. The program is most comfortable working with data sets consisting of 20 or so columns and about 2,000 rows; performance suffers with larger data sets. Other factors that affect performance are CPU horsepower and the number of gadgets and formulas you use.

If you're going to make the most of DataPivot, you'll likely spend a few dimes on phone support. Overall, we found the technical-support people knowledgeable and open to suggestions for future enhancements to the program. DataPivot is System 7-savvy and supports publish-and-subscribe as well as Apple events.

The Bottom Line

DataPivot is an extremely useful tool for creating sophisticated cross-tabular reports. Its simple click-and-drag interface lets you build a variety of numerical summaries with the same data set quickly and easily, thereby simplifying the process of data analysis. In this regard, it beats the time-consuming process of writing complex formulas in Excel, and it's far easier to use and understand than many of the statistical packages available for the Mac.

However, as is often the case with first versions of innovative programs, DataPivot is at times quirky and frustrating. Moreover, its documentation needs considerable work — it's obvious that Brio added and/or changed features after it made the documentation final. And although DataPivot's capabilities are impressive, the program has its limitations. It can't substitute for the specialized analytical tools of statistical packages, its formatting and printing options are adequate only for the most-basic report formats, and it lacks charting features altogether. For presentation-quality output, you have to export DataPivot reports to your favorite spreadsheet or page-layout application.

Overall, DataPivot's strength lies in condensing and organizing data in a uniquely fluid manner. With its data-import and -export abilities, and its support for publish-and-subscribe, DataPivot is best for use as an analytical "pre-digester." If it sorted out some confusing features and added tools for creating more-attractive report formats, Brio could make a valuable gem out of a diamond in the rough.

— Louis Benjamin, Jr.

DataPivot

Published by: Brio Technology, Inc., 444 Castro Street, Suite 810, Mountain View, CA 94041; (415) 961-4110.

Version: 1.03.

List Price: $299.

Get Info

MacUser May 1992 47
Six Trackballs

Fast and precise, trackballs put an ergonomic spin on pointing devices.

Trackballs offer several advantages over the common mouse. They take up less space; don't get tangled up in their own cords; and when used with a large monitor, can save users from making numerous swipes across a mouse pad to get from one corner of the screen to another — a simple roll does the trick. Moreover, many users claim that trackballs give them a finer degree of cursor control. For those of you who are tired of swiping and want to get on a roll, the six trackballs reviewed here offer attractive, ergonomically designed alternatives to the mouse.

MacTRAC

The MicroSpeed MacTRAC is a sturdy, unassuming trackball that comes with powerful software. Its base forms a comfortable curved surface on which you can easily rest your wrist. The accompanying software offers more options than any other trackball does for customizing the buttons — in this case, the three that surround the billiard-ball-sized ball. The preassigned buttons perform click, Shift-click, and click-lock operations, respectively. You can use the software to customize MacTRAC for either left- or right-handed use. The real power of the software, however, lies in Key Events. Key Events allows you to set the device to perform a variety of functions — such as Save, Undo, and Delete — that use different click sequences. For example, while you hold down the MacTRAC's right button, one click on the left button can execute a Cut operation and two clicks can execute a Paste. What's more, you can set the third button (it's between the two side buttons, and you can reach it by extending your fingers over the ball) to execute as many as eight Command-key shortcuts or Fkey operations. In concert with a macro program such as QuickKeys or Tempo II, the number of combinations becomes virtually endless. The only drawback to the MacTRAC is the middle button, which is awkward to reach.

MVP Mouse

Despite its confusing moniker, the Curtis MVP Mouse is a trackball, and it comes with a most unusual option, a foot switch. The switch serves as a fourth button you can use for clicking or as a key assignment. The three-button layout on the trackball itself will suit both left- and right-handed users.

In addition to letting you set the tracking speed, the MVP Mouse's software lets you assign a variety of operations to its buttons, including click, click-lock, Delete, Return, Undo, and Command plus any character. We found the bumpy surface of the base and the button action uncomfortable, but if you like the idea of a foot switch (organists and sewing-machine operators, perhaps?), then check out the MVP Mouse.

Silhouette

The EMAC Silhouette is a somewhat odd-looking, oblong trackball with the ball nestled at one end of the base. The primary button falls naturally where your thumb rests, but the second and third buttons are inconveniently placed — too far up for you to use your thumb and an
awkward reach for your index finger. The trackball is designed for right-handed users only.

You can choose one of four colored balls for use with the Silhouette, each of a different weight. When you take a ball out of the base, the circuit board inside is exposed. Because balls collect dirt easily, this absence of shielding between the ball and the circuit board can cut down on the life of the trackball.

The Silhouette’s software offers standard controls for setting the device’s tracking and double-click speed. You can also assign Command-key shortcuts to the Silhouette’s third button.

Stingray
The CoStar Stingray is a trackball for the ham-fisted — the device’s two buttons take up more than half the base (one on each side of the ball) and demand no dexterity whatsoever. The device features the lowest profile of any of the full-sized trackballs reviewed here, and it is shaped much like the marine creature whose name it bears.

The Stingray’s symmetry makes it ideal for right- or left-handed users. A switch underneath the base lets you set the buttons for click and click-lock (you can also set both as a click). The accompanying software is basic — because the keys aren’t meant to double as macros, you use the software only to set acceleration and double-click speed. To the Stingray’s credit, you can customize both settings to an incredibly precise degree. The Stingray’s cord is too short to connect the device to the ADB port on the back of your computer, so you have to use the keyboard port, which is not always the most convenient setup.

Thumblina Mac
Whereas the Stingray is well suited to the ham-fisted, the Appoint Thumblina Mac is best used by the nimble-fingered. It’s one of the smallest trackballs made and requires a fair amount of dexterity and practice to use effectively.

The ball is the size of a marble, and the base is small enough to fit in the palm of your hand. Three buttons dot the surface: One performs a click, another does a click-lock, and the third controls the tracking speed (no software is required). The Thumblina Mac has none of the usual scrolling advantages of a trackball. It takes several swipes of the tiny ball just to get the cursor across a 9-inch Classic screen, for example. A hinged bracket lets you mount the device on the upper right corner of your keyboard, but the documentation does a poor job of explaining how to do so. However, unlike with stationary trackballs, you can hold the Thumblina Mac in your hand and use it effectively while you’re standing, making it an attractive option for presentations or other situations in which a stationary trackball is too limiting.

TrackMan
As you might expect of the 1991 Eddy Award Winner for Best Input Device, the Logitech TrackMan is a cut above the rest of the trackballs. The rectangular device sports three buttons in the upper right corner of the base and a golf-ball-sized ball in the lower left corner. Unlike with most trackballs, you operate the TrackMan with your thumb on the ball and your fingers on the buttons. It’s an unusual design that may not suit everyone, but it worked well for us.

The TrackMan’s MouseKey software is outstanding. It provides the standard settings for tracking and double-click speed, but it really shines when used with the device’s programmable buttons. As with some other trackballs, each of the device’s three buttons can be defined as a number of clicks (one, two, three), a click-lock, a Command-key shortcut, or an Fkey. But what really sets the TrackMan’s software apart from that of all the other trackballs is its ability to let you assign buttons to execute commands specific to certain applications. As you switch applications, the settings change according to your assignments.

The Trackman is not only rich in features but also sturdy in construction, and its flexibility and ergonomic design let it outshine the competition.

The Bottom Line
Each of the devices reviewed here offers unique ergonomic and customizable features. The Trackman stands out from the pack with its excellent design and versatile software. Next in line in terms of excellence is the MacTRAC, a comfortable, well-built device that provides a host of options for customizing its buttons. The Silhouette gives you your choice of ball color and weight, and the Stingray is the most forgiving in terms of operator dexterity. If you require freedom of movement for presentations, the Thumblina Mac may be what you need.

But ultimately, choosing your trackball is as personal as selecting your office chair. Comfort is the most important characteristic, followed by the flexibility to meet specific needs.

— Ben Templin

Get Info

MacTRAC
Manufactured by: MicroSpeed, Inc., 4400 Old Warm Springs Blvd., Fremont, CA 94538; (800) 232-7886 or (510) 490-1403.
List Price: $119.

MVP Mouse
Manufactured by: Curtis Manufacturing Co., Inc., 30 Fitzgerald Drive, Jaffrey, NH 03452; (800) 548-4900 or (603) 532-4123.
List Price: $149.95; optional foot switch, $29.95.

Silhouette
Manufactured by: EMAC, 48431 Milmont Drive, Fremont, CA 94538; (800) 628-3837 or (510) 490-1111.
List Price: $99.95.

Stingray
Manufactured by: CoStar Corp., 22 Bridge Street, Greenwich, CT 06830; (800) 426-7827 or (203) 661-9700.
List Price: $129.

Thumblina Mac
Manufactured by: Appoint, 7026 Koll Center Parkway, Suite 230, Pleasanton, CA 94566; (510) 417-0611.
List Price: $99.

TrackMan
Manufactured by: Logitech, 6506 Kaiser Drive, Fremont, CA 94555; (510) 795-8500.
List Price: $149.
The 33MHz **Performance/040™** accelerator from Impulse Technology provides your Macintosh with the number-crunching power you need for today's sophisticated applications.

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<thead>
<tr>
<th>Accelerator</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadra 900</td>
<td>10:15</td>
</tr>
<tr>
<td>50MHz '030 accelerator</td>
<td>5:44</td>
</tr>
<tr>
<td>Mac Ici w/32k cache</td>
<td>6:24</td>
</tr>
<tr>
<td>Mac Ici</td>
<td>6:24</td>
</tr>
</tbody>
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**SECURITY**

**ultraSECURE and Empower II**

**ultraSECURE** provides more security options but less privacy than Empower II does.

For those whose security needs extend beyond simple volume and drive protection, two packages offer a variety of sophisticated access-control, data-encryption, and audit options. Both Empower II and ultraSECURE are easy to set up and use, although they differ in their security implementation as well as in the overall number of features they provide.

**ultraSECURE**

ultraSECURE offers more features than Empower II does, but its implementation is more structured and rigid. Most noteworthy among the ultraSECURE features that Empower II lacks are virus protection and data-eradication tools.

To begin using ultraSECURE, you must first create an AutoInstall script with the Administrator program. The most crucial step involves creating a hierarchical user chart, which controls access privileges. You design the chart to reflect the security structure for your particular organization — at the top is the system administrator, followed by group supervisors, followed by users. Access privileges move from the top down: Users can access their own files as well.

ultraSECURE provides sophisticated access-control options (top) as well as virus protection and data eradication. The program takes a hierarchical approach to security with user charts that assign access privileges from the top down (bottom).
as those of all users who fall below them in the hierarchy.

The administrator can permit or restrict a variety of activities — including floppy-drive access, floppy initialization, SCSI initialization, file- and folder-related operations (creation, deletion, renaming), rearrangement of the Finder desktop, and use of the programmer's switch — for each level in the chart.

Next, the administrator assigns options for log-ons, log-on failures, passwords, audit trails, and DA access. The administrator can restrict access to DAs according to level in the hierarchy (administrator, supervisor, user).

Once setup has been completed, administrators can install the finished Autolinstall script file on those machines they want to protect. If a single multiuser machine with more than one hard drive is involved, you can install a separate script for each hard drive. The ultraSECURE INIT is installed automatically, and you have the option of loading ultraSECURE's Access Controller and appSECURE DAs as well as the virus-protection INIT and a copy of the Administrator program. After installation is finished, the Macintosh automatically restarts and presents you with a dialog box for entering the user name and password.

You can also use the Administrator program to add or delete users and to completely erase disks according to National Security Administration standards.

The process of setting up folder protection is identical to using System 7's File Sharing or AppleShare. In fact, if you're using System 7 but haven't activated File Sharing, you can use System 7's Sharing item, on the File menu, to set up access privileges. If you've activated File Sharing, however, you must use ultraSECURE's Access Controller DA. You can set Owner, Group, and User access privileges to designate who can view and/or change files and folders.

When you use the Access Controller DA to restrict file access, you can also opt for one of three file-encryption methods: DES (the U.S. government data-encryption standard), Double DES, or ultraSECURE's own ultraCRYPT.

To create an audit trail of users' activities, ultraAUDIT compiles reports on unsuccessful log-on attempts; who has logged on and off a system and when; and what applications, documents, and DAs were used. You can export the reports as text files to your favorite word processor.

The appSECURE DA lets you password- and/or copy-protect applications. The virusCIDE INIT provides a modicum of virus protection — it's able to detect, isolate, and remove WDEF and other viruses.

ultraSECURE also supports ultraKEY, which allows administrators to access a Mac by using a key disk they've created instead of using a password.

Unfortunately for its users, ultraSECURE's manual is only fair, so it's easy to get confused if you've never used security software before. Moreover, technical-support calls go through an answering service, which results in frustrating rounds of phone tag. ultraSECURE's maker assured us that this problem would be remedied with a direct toll-free number in the near future.

What bothers us most about ultra-
SECURE, however, is its inflexible implementation. The software doesn’t allow individual users to protect their personal files. Once the hierarchy has been set up, administrators and supervisors can access everything on a user’s machine if the user is beneath them in the hierarchy.

Empower II
Empower II’s features can’t match ultraSECURE’s long list: The package can’t protect applications, prevent the deleting and renaming of accessible files and folders, or provide automatic shutdown and data eradication. But it does offer a flexible, easy way to set up access privileges that extends well beyond the capabilities of System 7’s File Sharing, and it provides data encryption.

Unlike with ultraSECURE, you don’t have to create a special script to begin using Empower II. You simply install the Empower II control panel and restart. The first person to log in after restart is the de facto security administrator. The administrator uses the control panel to create users and groups as well as to set passwords, registration, lock-out, volume-lock, access-log, and encryption preferences. If you’re using a SafeWord MultiSync card (a hardware device that accepts credit-card access), you can set card-authentication preferences as well.

Like ultraSECURE administrators, Empower II administrators can grant or prevent access to DAs, but they must do so on a person-by-person basis rather than by hierarchical levels. This allows for a finer degree of access control but entails a bit more work to set up.

Empower II’s control panel uses a dialog box similar to ultraSECURE’s. However, encryption (with DES or Magna’s own Automatic) is not automatic. If you want to encrypt a file, you must select it individually and assign it a password.

Unlike ultraSECURE, Empower II doesn’t use a multilevel hierarchical structure, so you can’t set intermediate-level access privileges. However, by default, all users’ individual files remain under their control. The administrator has the power to provide any user with access to all security levels and all users’ files, but unless the administrator chooses to do so, users can maintain privacy.

Empower II creates an activity log that you can view via the control panel or export as a text file to a word processor. In addition, the administrator can prohibit the use of floppy drives as startup disks or block their use altogether after startup, to prevent unauthorized access or stop the spread of viruses. A screen-locking screen saver is also included.

Empower II’s manual is better organized and less confusing than is ultraSECURE’s, and technical support is both helpful and easy to reach.

In addition to Empower II, Magna markets Empower I ($169), a subset of II that offers basic volume protection. A third product, Empower Remote ($396), may be available by the time this review appears. The package will provide all the features of Empower II, with the added ability to administer Empower II functions over a network.

Both Empower II and ultraSECURE are System 7-compatible and 32-bit clean. Empower II is not yet Quadra-friendly, but a fix should be available by the time you read this.

The Bottom Line
On a feature-by-feature basis, ultraSECURE outshines Empower II by offering more access and encryption options as well as virus protection and data-eradication tools. However, its Big Brother approach to security doesn’t allow for individual privacy and its mediocre manual and questionable technical support may reduce its appeal to some users.

Empower II, although not as feature-rich as ultraSECURE, provides straightforward security that lets users maintain the privacy of their personal files.

— Tom Petaccia

Get Info

Empower II
Published by: Magna, 332 Commercial Street, San Jose, CA 95112; (408) 282-0900.
Version: 4.0.7.
List Price: $296.

ultraSECURE
Published by: usrEZ Software, Inc., 1202 E. Pike Street, Suite 383, Seattle, WA 98122; (206) 672-5387.
Version: 1.2.
List Price: $290.
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PC/Computing Most Valuable Product, Nov. 1990
BYTE Editor's Product Merit Award, Jan. 1991
PC/Computing MVP Award, April 1991
MacUser, Editor's Choice Award (Eddy), Jan. 9, 1991
1990 Outstanding Achievement Award

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Enhance

For powerful gray-scale image processing at an affordable price, nothing equals Enhance.

Despite the appeal of color images, when you get right down to it, most DTP image processing deals with gray scale. If you don't need the color image-processing capabilities of a high-end program such as Photoshop or ColorStudio, you'd do well to take a look at Enhance, an affordable gray-scale image-processing program that delivers more powerful features than any other program in its class.

Enhance is a sophisticated image processor that can open files in TIFF, PICT, MacPaint, or EPS formats. It processes 1-, 4-, and 8-bit graphic files and uses a virtual-memory scheme that can accommodate large images. In fact, the image size is limited only by your available disk space (or your patience for dealing with slow screen redraws and lengthy filter processing of large files).

Enhance's tools are predictable for a gray-scale image processor: pointer, hand (grabber), magnifying glass, dropper (for picking up specific grays from an image), selection tools (rectangle, oval, lasso, and magic wand), and paint tools (brush, eraser, pencil, airbrush, line, filled rectangles and circles, and paint bucket) as well as blur, smudge, sharpen, gradient (linear only), and font tools. Most of these tools have associated icons that appear at the bottom of the Tool palette and provide options for the selected tool.

What sets Enhance’s Tool palette apart from other programs', however, is its customizability. If you know you're not going to use the filled-object tools, for example, you can simply replace them with other tools you use frequently.

Enhance features a full set of image controls, including filters, masks, and anti-aliasing. The program’s own suite of filters (which it calls kernels — apparently a misspelling of kernels) might initially seem anemic if you’ve used other image-processing programs. Gone are novelty filters such as Zigzag and Twirl. However, Enhance does supply all the important professional-level filters. You can also create your own custom filters and save them to disk.

In addition, Enhance accepts Photoshop-compatible plug-in filters. But be forewarned — the current version works only with Photoshop 1.0 plug-ins. Photoshop 2.0 plug-ins don’t work with Enhance, which means that you can’t use the striking Aldus Gallery Effects package with any success.

Enhance’s mask control can match that of any high-end program. You can feather or blur masks to create softer, more natural transitions, and you can create and save your own masks. The program supports 1-, 4-, and 8-bit masks.

The anti-aliasing controls are impressive. You can apply anti-aliasing to selections and can configure several tools

Enhance outperforms all other gray-scale image-processing programs in its class. A unique feature is the customizable Tool palette (upper left corner of the screen) — you can swap tools you don't need for those you use frequently.

Get Wet!
Other nice touches include multiple levels of undo, real-time image editing without the need for previews, and a font tool that’s an absolute joy to use. Unlike Photoshop’s font tool, it doesn’t spirit you off to another window that’s separate from the original image. You can see the image as you type the text, making placement a snap. You can also append notes to images in a file-information box.

Although Enhance has plenty to recommend it, it’s not always the most intuitive program to use. Its main weakness is the fuzzy terminology it uses for command names and menu items. The program sometime refers to filters as convolution kernels and at other times as plug-in filters. It would be less confusing simply to settle on the name filters and group them under a common menu item.

The program’s documentation, however, provides valuable instruction on the sophisticated art of image processing. The manual’s appendix on the fundamentals of filtering is especially helpful.

Minimum system requirements for using Enhance are a Macintosh SE/30, LC, or member of the Mac II series; at least 2 megabytes of RAM; System 6.0.3 or later; 32-bit Color QuickDraw (either as an INIT or hard-wired into ROM); and a hard-disk drive. The program is System 7-compatible but not -savvy.

The Bottom Line

Because of its confusing terminology, Enhance comes across as less polished than similar gray-scale image-processing programs such as Digital Darkroom and ImageStudio. Nonetheless, we prefer Enhance. Overall, the program’s masking and anti-aliasing tools, customizable Tool palette, and informative documentation work together to make it a winning package.

— Gregory Wasson
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REVIEWS

Fonts & Typography

FontStudio 2.0

FontStudio 2.0's powerful new type-design features make the program the best in its class.

With version 2.0 of FontStudio, Letraset has significantly beefed up its type-design program by adding support for TrueType fonts, automatic and manual hinting, screen previews that use three different rasterizers, and interpolation for creating new fonts with intermediate weights. However, FontStudio exacts a price for its power, with an interface that makes it difficult at times to access its professional-level tools.

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With version 2.0 of FontStudio, Letraset has significantly beefed up its type-design program by adding support for TrueType fonts, automatic and manual hinting, screen previews that use three different rasterizers, and interpolation for creating new fonts with intermediate weights. However, FontStudio exacts a price for its power, with an interface that makes it difficult at times to access its professional-level tools.

Compared with rival Fontographer's straightforward, bare-bones interface, FontStudio's interface is densely packed and sometimes confusing. With Fontographer, you can simply open or create an outline-font file and immediately begin tweaking characters. FontStudio, on the other hand, requires that you open or create a separate font-family window before you can begin working with a font. The window displays icons that represent all the elements that make up a font family, including outline and bit-mapped fonts, style names, character encoding, and so on. Interface issues aside, however, FontStudio's ability to tweak characters, fine-tune metrics, and edit bit maps is unsurpassed.

Fortunately, FontStudio supplies some neat tricks for speeding up the creation of font families. For example, if you set out to modify existing PostScript typefaces, FontStudio can quickly create family files for some or all of the font families contained in even the most enormous font suitcase. FontStudio forces users always to think in terms of entire font families rather than in terms of single typefaces.

Once you've created a font family, you're ready to begin designing with FontStudio's powerful outline editor. The editor sports two floating palettes: one for tools, another for measurements. Here too the interface is somewhat cluttered and confusing, but the tools it provides are impressive. The character-parts library, for example, lets you store serifs and strokes and quickly apply them to characters. When you change a serif in the library, the change is reflected in all the characters that use that serif.

At first glance, FontStudio outlines, with their familiar Bezier control and anchor points, seem much like Illustrator's and FreeHand's. But subtle differences in FontStudio's approach to control points cancel out any experience you may have gained by using illustration programs.

New to version 2.0 is a split-screen window that displays a rasterized image of the outline character you're designing as well as a rasterized image of the
character. You can select one of three rasterizer options: Adobe Type Manager, TrueType, or FontStudio's own.

If you want to import characters to modify in FontStudio, rather than start from scratch, you can import existing Adobe, Bitstream, Fontographer, or Letraset typefaces. You can also paste artwork directly from Illustrator 1.1 into the outline-editor window. You can use PICT and TIFF files as templates to trace by hand or put the program's auto-trace tool to work to do the job for you.

FontStudio 2.0 also offers a unique new feature for creating a new font weight by interpolating between two existing weights. For example, by interpolating between a "light" and a "bold" font, you can create a new medium-weight font.

The program also features a powerful automatic hinting algorithm as well as the ability to let users manually adjust the hinting for each character. When you open an existing outline, FontStudio preserves the hints in Adobe as well as TrueType fonts. You can observe and edit hinting for individual characters as well as for an entire typeface, using FontStudio's histogram view.

Once you've hinted an outline, you can use it to generate bit-mapped fonts at any size and then edit them with FontStudio's excellent bit-map editor. You can also create gray-scale anti-aliased or color bit-mapped fonts for presentations or for use in high-resolution color applications such as Photoshop.

In addition to its new features, FontStudio continues to provide outstanding management tools for character metrics. The automatic and manual kerning capabilities of the program are especially impressive, including sophisticated spreadsheetlike formulas for precise control and the ability to automatically generate kerning pairs.

The Bottom Line
FontStudio's interface can sometimes make simple jobs more complicated than they should be. Moreover, the program's outline editing is a bit unconventional, and it can generate only Macintosh fonts. Rival Fontographer's ability to generate Windows and NeXT fonts may turn out to be an advantage for mixed-platform environments.

On the other hand, FontStudio is impressive as a powerful, full-featured font editor. When it comes to hinting tools, font metrics and kerning, and unique features such as the ability to generate intermediate-weight fonts, FontStudio steals the show.

— Eric Taub

Get Info
FontStudio 2.0

Published by: Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07653; (201) 845-6100.
Version: 2.0.
List Price: $595.

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**Hard Disk ToolKit**

FWB’s formatting and partitioning software will help you get the most out of your hard drive, but you’d better know what you’re doing.

FWB’s Hard Disk ToolKit stretches the envelope of traditional formatting and partitioning software. In the hands of novices, its powerful features can easily wreak hard-disk havoc, but for those who know what they’re doing, Hard Disk ToolKit provides unprecedented control for optimizing hard-drive capacity and performance.

**The Primer Advantage**

HDT Primer is the focal point of the package. Primer lets you format and partition a disk, perform diagnostic tests, and configure the HDT driver. It also lets you set several hard-disk-specific parameters, something you can’t do with other Mac formatters. For example, if your drive allows it, you can redefine the disk’s block size (the smallest storage unit it uses) before formatting. Until recently, 512 bytes per block was the standard for the Mac. However, most of the current crop of large-capacity drives support larger block sizes, and therein lies the Primer advantage. By defining a larger block size, you can boost both the performance and the usable capacity of a drive.

Once you’ve formatted your disk, you must make it accessible to the Mac operating system by partitioning it. HDT provides numerous standard partitioning options, including A/VUX. You can also define custom partitions, but the process can be frustrating. Once you’ve defined a partition and its attributes, such as password protection and encryption, you must wait for Primer to initialize and mount the partition before continuing on to the next partition. If you’re setting up a large disk with custom partitions, waiting for HDT to initialize each partition can be a trying experience.

HDT’s competitor, La Cie’s Silverlining, has more than its share of user interface problems, but partitioning hassle is not one of them. With Silverlining, users can define all partitions at once and then leave the Mac unattended while the software initializes and mounts all of them. No muss, no fuss.

After formatting and partitioning a disk with HDT, you can choose to configure several driver attributes, including the drive’s Finder icon and automatic drive-level bad-block reallocation.

Once your disk is set up, you’re ready to use the HDT World Control module to fine-tune it. World Control is the first utility that lets you edit a hard-drive controller’s SCSI mode pages, using the Mac interface. A drive’s mode pages contain such preference settings as the controller’s caching options and controller-level automatic bad-block reallocation. However, be forewarned that editing mode pages is not for casual users. If
done incorrectly, changing a controller's settings may result in lost data, or—even worse—it may make the drive inaccessible to the Mac. Unless you know precisely what you're doing, steer clear of World Control.

Testy Program
HDT also supplies a benchmarking program called BenchTest. Ostensibly, BenchTest is designed to let you see whether the changes you've made with Primer and World Control benefit the drive's performance. BenchTest lets you weight the tests based on the applications you use. That's because different applications use disks in different ways: Graphics applications, for example, read and write to the disk far less frequently than do software-development tools.

HDT also gets high marks for its manual. It's the first comprehensive Macintosh-specific SCSI reference that goes out of its way to explain, in detail, exactly how the Mac interacts with SCSI devices. For example, the manual discusses each of the SCSI mode pages and the effects of their various settings.

The HDT package also supplies several less impressive, but nonetheless handy, utilities. HDT Prober is a control panel that's similar in function to the Freeware SCSI Probe control panel. HDT Extension is designed primarily to mount removable SCSI drives that can be somewhat recalcitrant at startup. It also allows removable media inserted after startup to mount immediately. HDT Util is a mixed bag of features: Worthy of mention are a utility that lets you set the size of the system heap and another that lets you control how long a disk spins up before your Mac tries to boot from it.

The Bottom Line
FWB's Hard Disk ToolKit redefines the state of the art for Mac formatting, partitioning, and hard-disk utility software. Highlights are HDT Primer—the only Mac utility that allows users to set hard-disk-specific parameters—and the World Control utility, which provides a way to edit hard-drive-controller SCSI mode pages, using the Mac interface. HDT is not for the faint of heart, however—it's powerful enough to make your hard drive inaccessible from your Mac if you don't use it correctly. But if you're an experienced user or if you're looking to standardize on a single powerful driver and utility package that supports most of the drives you're likely to encounter for the Mac, you'll find that HDT and its comprehensive manual fill the bill.

—Stephan Somogyi

Get Info

Hard Disk ToolKit

Published by: FWB, Inc., 2040 Polk Street, Suite 215, San Francisco, CA 94109; (415) 474-8055.
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Mystermor's Revenge ... ea. 32.

Nordic Software ... 30 day MBG
Turo Turbo Math Facts ... ea. 34.
Word Quest ... ea. 34.

LEARNING COMPANY
Science Disk 1-4 ... ea. 25.
MECC ... 30 day MBG
Oregon Trail ... ea. 28.
WordMuncher 1.2 ... ea. 28.
Super Munchers ... ea. 28.

MicroMaps ... 30 day MBG
Kid Maps ... 16.

Microsoft ... 30 day MBG
Flight Simulator 4.0 (CP) ... 42.

Mystereum ... 30 day MBG
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Oracle Software ... 30 day MBG
Reunion ... 32.

After Hours Software
New Math Blaster ... 34.
TALKING SPELL II PLUS ... 29.

PENTAGON OVERSEAS
Voculabune, Levels 1 & II (SPAN. FRAN., GER., ITAL., JAP.) ... ea. 35.
Voculabune, Level III (SPAN., FRAN., GER., ITAL., JAP.) ... ea. 35.
Picturing It! (SPAN., FREN., GER., ITAL., JAP.) ... ea. 35.

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King's Quest V ... 38.
Police Quest III ... 39.
Leisure Suit Larry V ... 39.

Siri Tech Software
Bane of Cosmic Forge ... 35.

Software Toolworks
Brainwave Typing 3.0 (CP) ... ea. 32.
World Atlas 1.0 ... 52.

Spectruman Software
Excelerator ... ea. 14.
Tetris 1.3 or 6112 ... ea. 22.
WordWhiz ... ea. 27.

Spectrum Holobyte ... 30 day MBG
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Documents & Forms ... ea. 31.

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THUNDERBASE ... 2.0 ... ea. 31.

Touch Base ... 2.0 ... ea. 31.

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Word Muncher ... ea. 31.

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<td><strong>CE Software</strong></td>
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<td><strong>Insignia Solutions</strong></td>
<td>Access PC 1.1</td>
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<td><strong>Microcom</strong></td>
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<td><strong>ORACLE</strong></td>
<td>30 day MBG</td>
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<td><strong>PSI Integration</strong></td>
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<tr>
<td><strong>Zoom Telephonics</strong></td>
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<td>**ProModem Ultima Home Office</td>
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<tr>
<td>**V.32 Turbo Modem (with Pack)</td>
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<td>**V.32 Turbo Modem (MacPack)</td>
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<td>**V.32 Turbo Modem (MaxPack)</td>
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<td>$2.99</td>
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@Silhouette Trackball 1.0 (ADB Macs).
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@BetterWriters 1.0 (software drivers) . . 39.
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Koala
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259.
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2467
7789
2466


**Applied Engineering ... 30 day MBG**
5250 Plus Drive—100% FDHD compatible drive for the Plus and SE. The Plus Drive installs through the floppy connector and requires no SWIM chip upgrade...
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**ACCESSORIES**

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<tr>
<td>7050 Avery 5669 (1&quot; x 2&quot;) Clear Adrs.-Laser</td>
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**SIMMs ... 2 year warranty**

| 8316 1 MB SIMMs (80 ns, set of 2) | $75. |
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| 7457 4 MB SIMMs (80 ns) | 139. |
| 7600 4 MB SIMMs (80 ns, set of 4) | 549. |
| PowerBook memory | call |

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<td>Apple Security Kit</td>
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<td>Moustrak Pad Low Friction (9&quot; x 11&quot;)</td>
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**Hayes**

1345 OPTIMA 24 Modem—An affordable high-speed V.42bis modem with the reliability and quality that made Hayes famous. Supports throughput up to 9600 bps...
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- Our order lines are open continuously from 8:00 a.m. Monday until noon Sunday Eastern Time. You can call our business offices at 603/446-7711 Monday through Friday 9:00 a.m. to 6:30 p.m. Eastern Time.
Here’s our favorite scoop.

Have you noticed that sometimes things just don’t work out? Great expectations turn into puzzled expressions. Unfortunately, when you buy a Mac product from most places, you’re stuck with it. You open it, you own it—whether you like it or not. Maybe you can give it away. Or use it as a lawn ornament. But you can’t return it for a refund.

If, however, you buy a product covered by our 30/60-day Money-Back Guarantee, you can send it back for any reason at all. Just call for an authorization and return it with all the original packaging. We’ll send you a prompt refund or credit your card. We were the first Mac mail order company to offer real money-back guarantees. And it’s still our favorite scoop of all.
NewLife Accelerator!

For those looking to improve sluggish Mac Classic performance, NewLife Computer has come up with a product that’s less expensive and faster than Apple’s Classic II Logic Board Upgrade kit.

At $721, Apple’s upgrade kit costs almost as much as the original Mac Classic itself. The NewLife Accelerator!, on the other hand, costs more than $100 less than Apple’s offering and provides almost twice the performance as well as a better mix of features.

The 68030-based NewLife Accelerator! clips to the Classic motherboard’s 68000 processor, and a small power supply mounts onto the Classic’s internal metal chassis. The accompanying software sports a single control panel that supports the board and provides a user-selectable SANE (Standard Apple Numeric Environment) patch that improves performance for mathematics-intensive operations.

The NewLife board is equipped with a single bank of four SIMM slots. Each slot can accommodate a 4-megabyte SIMM, so you can load your Classic with as much as 16 megabytes of RAM. Because the board uses a 68030 chip and a 32-bit data bus, its performance is on a par with that of a Mac SE/30. There is a catch, however. You must fill all four slots with SIMMs of the same size. You can use 80-nanosecond or faster 1- or 4-megabyte SIMMs.

The Accelerator! unit we tested came with an optional 68882 FPU (floating-point unit). The board is priced at $599 with the FPU and costs $529 without it. NewLife also provides a socket for a video port ($266) that supports several monochrome monitors.

We performed our tests with the FPU installed and the SANE patch enabled. Using System 7 and version 1.05 of NewLife’s software, we ran the same suite of benchmark tests used in “Shopping for the Right Mac” (March ’92, page 128). 

Our tests showed the average performance of a Classic equipped with a NewLife Accelerator! to be nearly double that of the Classic II, almost four times that of the original Classic, and equivalent to that of the Mac SE/30.

We encountered only minor compatibility problems with the Accelerator!.

The sound output is distorted, but NewLife claims that it will fix the problem with a software upgrade by the time this review appears. Excel 3.0 didn’t run under System 7.0.1, but it ran just fine under System 7.0. As a compatibility safeguard, you can disable the Accelerator! by holding down the interrupt key when booting or restarting the Classic. NewLife also says that Micron SIMMs are not compatible with the Accelerator!.

With its speedier performance and color support, Apple’s Mac Classic II is in many respects what the original Classic should have been. But owners of the original Classic, don’t despair. Both Apple and NewLife offer a solution that can enhance your Classic considerably. Neither Apple’s Classic II Logic Board Upgrade kit nor the NewLife Accelerator! is without drawbacks, though. Apple’s upgrade includes 32-bit-clean ROMs and can accommodate color but lacks an expansion port and FPU and supports only 10 megabytes of RAM. The Accelerator! relies on the Classic’s ROMs, which aren’t 1.32-bit clean and don’t support color, and it has its share of compatibility problems. However, with its faster speed, coupled with support for 16 megabytes of RAM and the inclusion of an expansion port for video cards, the Accelerator! can save you more than money over Apple’s offering.

NewLife Computer Corp., 603 March Road, Kanata, Ontario K2K 2M5, Canada; (613) 592-5080. $529; with FPU chip, $599.

— Jeff Pittelkau

DayMaker

DayMaker is a personal scheduling and information-management program you’ll love to hate. It’s check-full of almost all the powerful, useful features you want in a PIM. However, figuring out how the damming works may well drive you crazy. DayMaker is crammed with so many features that it demands a superbly crafted interface for quick and easy access to its power. Unfortunately for users, the program’s interface is its Achilles’ heel.

DayMaker’s flexibility for customizing, which lets you configure it to fit your preferred PIM style, is as impressive as its list of features. The program lets you categorize new entries as calendar, note, or to-do items. You can also choose to set alarms for items (with or without advance warning) as well as assign priority levels and any number of descriptive tags. To assist— or confuse, depending on your point of view — pop-up menus proliferate on-screen.

DayMaker lets you choose one of five modifiable views of your information: monthly, weekly, or daily for calendar items and single or list for to-do items. In the Daily and List views, the program displays information in columns. You can get a selective view of your columns by using the program’s tags or priority levels.

For example, you can opt to view all uncompleted tasks in the List view or to view only personal items in the Calendar view. To further customize DayMaker, you can create custom menu commands for any layout, view, or sort order you use repeatedly.

DayMaker can also serve as a simple address book and phone directory — it even dials for you. In addition, because it allows lengthy text entries, you can use it as a free-form database. It also lets you print data in calendar form or in a variety of other layouts, including predefined label templates.

It takes more than an endless feature set to make a usable PIM. DayMaker’s features ought to be more convenient to access and use. For example, the alarm function provides no direct way to change an item’s listing to “done” or to delete an item after a reminder has appeared.

Another annoyance is that DayMaker can’t automatically schedule recurring events. You also can’t delete items when you’re in the Single Item view. You must use another view, so frequent shifts between views are necessary. Moreover, once you’ve created a customized view or item, you can’t modify it without deleting the original and creating an entirely new view with the same name.

Despite DayMaker’s handicaps, Pastel Development deserves credit for the sheer amount of power it packs into a single package as well as for its flexibility. If you’re looking for one program that has scheduling, alarms, and free-form text entry with tags and priority-level settings, DayMaker is a good choice. You may grumble about its clumsy interface, but it’s the only program versatile enough to handle all those tasks.

Pastel Development Corp., 91 Franklin Street, New York, NY 10013; (212) 431-3421. Version 1.01. $99.

— Ted Landau
Now there are two ways to make an 11" x 17" sheet of paper fly.

The new LZR 1560 from Dataproducts is a complete departure from ordinary laser printers. At 15 ppm it's not only faster than most laser printers, it can also deliver output up to 11" x 17". Which means it can print spreadsheets, illustrations—any two-page layout—in the time it normally takes to process a letter-size page.

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QUICK CLICKS

Kiwi POWER WINDOWS

Kiwi POWER WINDOWS does a great job of managing window clutters under System 7. If you typically work with numerous open windows belonging to several applications or spend more time than you care to admit fussing with window size and alignment, this system extension can save you a good deal of time, effort, and aggravation.

You access KPW (Kiwi POWER WINDOWS) through a special menu that resides at the far right of your menu bar. Work Sets, Window Layouts, and Window Selection form the heart of the KPW menu. Although all three are useful and convenient, Work Sets is the most powerful. A work set can consist of documents from one or more applications, a collection of Finder windows, or a combination of both.

When you launch a work set, all the appropriate applications launch. Then KPW goes about the task of opening, moving, and resizing windows to recreate the desktop as it existed when you saved the work set. Work sets are especially handy with programs that insist on opening document windows in the upper left corner, regardless of where they were when you last issued a Save or a Quit command.

KPW’s Window Layouts are predefined window arrangements. If you like windows stacked and offset, for example, choose one of the Stack layouts. You can choose to apply layouts to the current application only (a local layout) or to all open applications (a global layout). KPW includes dozens of predefined layouts, and you can create your own with the easy-to-use KPW Manager application.

Another slick feature is KPW’s Window Selection submenu. Many programs have Window menus that allow you to select any open window in the application, but the menus apply only to that specific application. The Window Selection submenu makes this function global, so you can select any open window in any open application. The submenus allow you not only to switch applications but also to activate the windows. This feature is a godsend if you keep three or four applications open at once.

KPW also includes four additional commands — Maximize, Minimize, Rotate Order, and Send to Back — for managing windows. All have keyboard command shortcuts.

Unfortunately, KPW has a few blemishes. It’s slow — windows grow, shrink, and move sluggishly. We also experienced several nonfatal errors, and the program occasionally moved the wrong window. Kiwi promises an update that will not only fix these idiosyncrasies but will also include a utility that allows users to access their work sets directly from the Apple menu.

KPW is a unique and powerful utility that gives you the ultimate in control over your application and Finder windows. If you’re a System 7 user looking for a utility that can launch multiple programs and documents, restore your windows to preferred positions, and align windows to suit the most finicky of desktop housekeepers, Kiwi POWER WINDOWS will be just your cup of tea.

Kiwi Software, Inc., 6546 Pardall Road, Santa Barbara, CA 93117; (805) 685-4031. Version 1.0. $79.95.

— Bob LeVitus

Spectre

Spectre is a supremely designed arcade game that pits tank against tank in a high-tech version of capture the flag. Similar to the classic game Battlezone, Spectre lets you play in single-user or multiplayer mode over a network.

Spectre’s visually impressive virtual landscape, populated by shaded polygons in a variety of shapes, enhances the game’s appeal. Animated 3-D windmills and flags move and rotate in perfect perspective. You can switch to wire-frame mode, in which objects are outlined but not filled, making the game almost as fast on a Mac Classic as it is on a IIci.

As you battle your way across the terrain, indicators show when your tank is low on ammo or when you’re one hit away from total destruction. Ammo dumps placed randomly across the playing field offer refills and repairs.

You can view Spectre’s terrain from a variety of perspectives. The game begins in cockpit view, in which you face forward. With a keystroke, you can switch to either an elevated view that’s positioned slightly above your tank, which offers a wider field of vision, or a bird’s-eye view that displays most of the battlefield.
Where is it written that a great word processor has to be an expensive word processor? MacWrite® II, in fact, has just rewritten that story. Now it costs only $129.

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including your tank’s position.

All the views — except the bird’s-eye — include a tactical display in the upper right corner of the screen. Blips mark the location of flags, tanks, and ammo dumps relative to the position of your vehicle. Thankfully, Spectre bucks the current game trend toward accurate simulation of dangerous military hardware. You won’t find yourself forced to engage in tedious clearance, takeoff, and tactical procedures. With Spectre, you can get right down to the business at hand — namely, blowing up enemy tanks. The controls you use to maneuver your tank are mercifully sparse: You can fire the cannon; roll in one of eight directions; and teleport, which zaps the tank to a random spot on the playing field. Teleport comes in handy when your tank is pinned by enemy fire and you find yourself trying to remember the words to “Nearer My God to Thee.”

Speaking of the enemy, enemy tanks on the first few levels of the game are about as clever as oxygen-deprived goldfish. You usually find them hanging around flags, occasionally peppering each other with crossfire as they wait to chase your tanks when you engage them. As you progress to higher levels, however, the enemy gets smarter and more aggressive. Opposing tanks begin to employ actual tactics: One tank distracts you from the front, for example, while another suckerizes you from the rear.

Windmills and other terrain objects are not there only to provide visual appeal; they’re also strategic. Evidently made of titanium or some other indestructible material, they offer protection from enemy fire.

Spectre’s multiplayer mode, which works across any AppleTalk network, lets multiple players terrorize the same battlefield. Players can work in teams or let complete anarchy reign, blowing up anything that moves, including each other. A few glitches in Spectre’s networking scheme, however, slightly mar an otherwise excellent network game. The program’s copy-protection scheme is a serious inconvenience, and you can’t play games across network zones.

These quibbles aside, Spectre is one of the best arcade games we’ve seen in a long time. But watch out — it’s addictive and may pose a serious threat to corporate productivity.

Velocity Development, Box 875, Palatine, IL 60078; (708) 991-0594, $59.95.

— Andy Ihnatko

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What ClarisWorks software does is combine word processing, graphics, spreadsheet, charting, database, and communications in one convenient package.

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Price and performance are the watchwords for Apple's newest CPU and printer. Although each offers good value, one of them sets a new standard for speed at an affordable price.

BY RUSSELL ITO

If the '80s can be summed up in a single five-letter word — greed — then the five-letter word for the '90s may be value. Getting more for your money has become the guiding principle of the decade, and Apple has certainly endorsed the concept, with two new value-oriented upgrades. The Macintosh LC II has a 16-megahertz 68030 instead of a 68020, as in the original LC, and the Personal LaserWriter NTR is a fast RISC-based upgrade of the Personal LaserWriter NT. What's most impressive, however, is that Apple has done all this without raising prices. More power for the same cost — what could be more '90s?
New Apple Products

According to Apple, the LC currently outsells the Classic and the Personal LaserWriter NT was the best-selling PostScript printer in the world last year, so these upgrades are being made to two of Apple’s most successful personal products. The enhancements are almost all internal. Apart from an additional port on the printer (see Figure 1), the exteriors of the new LC and printer remain basically the same. Both the LC II and the NTR replace their predecessors, and Apple is providing upgrade paths for current owners.

Macintosh LC II: A New LC

The Macintosh LC II is basically the same machine as the Mac LC but with a more powerful processor at its core. Instead of a 68020, the chip that drove the original Mac II, the LC II uses a 16-megahertz 68030, the chip that drives the Classic II. The change generally doesn’t boost the LC II’s performance beyond that of the LC, but the LC II does give you access to System 7’s virtual-memory scheme, which wasn’t available with the earlier chip.

The only other significant physical change to the LC is the amount of RAM it has. Apple has equipped the LC II with 4 megabytes of RAM on the motherboard, leaving the two SIMM sockets empty. As with the original LC, the maximum amount of RAM is 10 megabytes.

Like the original LC, the LC II comes in two configurations: 4/40 (4 megabytes of RAM and a 40-megabyte hard drive), for $1,699, or 4/80 (4 megabytes of RAM and an 80-megabyte hard drive), for $2,049. In addition to the hard drive, the most important difference between the configurations is the amount of VRAM they include. The 4/40 configuration includes 256K of VRAM, enough to drive Apple’s 12-inch RGB display at 8 bits (256 colors) or a 13-inch display at 4 bits (16 colors), each using the internal video circuitry. The 4/80 configuration includes 512K of VRAM, meaning that it can display 16 bits (32,000 colors) on a 12-inch monitor or 8 bits (256 colors) on a 13-inch unit.

Even with the newer CPU, however, you won’t see a huge performance boost. Our tests on a preproduction unit showed the LC II’s performance to be pretty much the same as that of the original LC. Although the LC II was faster in the Illustrator test, it was only marginally faster in the MacWrite II find/replace test and was even slightly slower than the LC in the Excel recalculation and Finder duplication tests (see Figure 2). In other words, for most users, the LC II’s performance will be virtually indistinguishable from that of its predecessor—not better, not worse, just the same.

At just about $2,000, however, a bare-bones LC II system is a good value. If what you’re looking for is a relatively inexpensive way to buy into Apple’s modular Macs, the LC II is a reasonable choice.

If you already own an LC and are wondering if it’s worth upgrading it to an LC II, that’s a different question. At press time, Apple hadn’t decided on the price of an upgrade. The only real advantages the LC II offers are virtual-memory support and the anxiety relief that comes from knowing you’re up-to-date with Apple’s current CPUs. Because you aren’t going to get much of a performance improvement, if any, the upgrade is probably advisable only if you’re neurotic enough to be losing sleep over not having a 68030-based Mac.

Personal LaserWriter NTR: Fast

The Personal LaserWriter NTR retains the same look as the Personal LaserWriter NT, which it’s replacing, but it introduces two important firsts for Apple printers and points in a new direction for Apple’s subsequent models.

The biggest change from the NT is the NTR’s processor, which makes it Apple’s first RISC-based printer. Using a 16-megahertz Am29005 RISC processor, the NTR can actually drive its 4-ppm Canon LBP-LX engine at close to the engine’s rated speed. As readers of our frequent printer lab reports know, most printer engines aren’t driven at their full rated speed, because their processors aren’t fast enough to keep up.

And in a nod to the world of mixed computing environments, the Personal LaserWriter NTR is also the first Apple printer to sport a parallel port. So equipped with a parallel cable, you’ll be able to use the NTR in a PC as well as in a Macintosh environment. Apple won’t be supplying a parallel cable with the printer, however; for that, you’ll need a parallel cable for the printer.
need to pay a visit to your local computer store.

The NTR includes Adobe’s PostScript Level 2 and Hewlett-Packard’s HP PCL 4+ page-description languages, with all ports (parallel, LocalTalk, and serial) active. However, because the printer doesn’t buffer its jobs, it runs on a strictly first-in-, first-out basis: Whichever document reaches the printer first “owns” the printer until the print run has finished; other jobs don’t automatically queue up. The NTR ships with 35 fonts, 3 megabytes of RAM (expandable to 4 megabytes), and Type I and TrueType support in ROM. The NTR’s list price — $2,199 — is identical to that of the printer it’s replacing, the Personal LaserWriter NT. (A $1,249 upgrade is available for the LaserWriter NT or SC.)

In our testing of a preproduction model, the NTR’s performance was exceptional. The new printer consistently outperformed its predecessor and did so by as much as a third in the text-intensive tests (Excel and Word) and by nearly one and a half times in the graphics (Persuasion) test (see Figure 3). Much to our surprise, the NTR even beat the LaserWriter II in the Persuasion test — and by a substantial margin. If you’re thinking of buying a IIIf, we wouldn’t suggest that you forget about the IIIf and switch to the NTR, however. Our test involved only five pages; larger print jobs might not show as substantial an advantage, if any.

Considering its flexibility and performance, the Personal LaserWriter NTR has become the standout value in Apple’s printer line. It costs about $1,400 less than the LaserWriter IIIf, but depending on the job, it can hold its own against the IIIf in terms of speed. The NTR isn’t going to knock off the IIIf, however. For all its speed, the NTR is still a personal or small-workgroup printer: It’s not intended for heavy use in an office environment, and its paper tray holds a maximum of only 70 sheets. In addition, it doesn’t have the resolution-enhancement capabilities that the IIIf does. Compared with other 4-ppm printers, however, the NTR comes out an easy winner, in both speed and flexibility. For example, competing printers took nearly three times as long as the NTR, on average, to complete our graphics test.

**Personal Power**

The LC II and the NTR are definitely ’90s machines. Although the LC II doesn’t break new ground, it does level the field for the modular Macs, providing its users with virtual-memory support and the confidence that comes with being current with the technology.

The NTR, on the other hand, offers a substantial performance increase over the Personal LaserWriter NT plus the versatility of having a parallel port. Depending on the job, the NTR can perform nearly as well as the LaserWriter IIIf — even better, in some situations. For a personal printer, it’s a simply outstanding value.

But the really good part of Apple’s latest announcement is that the LC II and the Personal LaserWriter NTR cost exactly the same as their predecessors. In this value-conscious decade, that may be the best news of all.

Russell Ito is a senior editor who wishes that the NTR had been around when he was about to dump his ImageWriter II.
7 REASONS WHY YOU NEED A NEW WORD PROCESSOR.

1. Because you're ready to see what System 7 can do.

Apple calls System 7 the biggest improvement in Macintosh since Macintosh. And WordPerfect® is now System 7 savvy.

So now (among lots of other new things), WordPerfect will automatically keep track of changes that you (or someone else) might make to imported files (charts, graphics, whatever), and update your WP documents accordingly. Now, a change made in one place can be a change made in many places. Apple calls it “Publish and Subscribe,” and it works between programs on your hard drive, as well as among people on your network. Publish and Subscribe assures you that your documents will always reflect the latest information available.

And it’s just one of the new System 7 tricks that WordPerfect 2.1 has mastered.

2. Because WordPerfect does columns better than the Greeks.

Pick a starting point, click on the ruler, and see your text in two columns. Or in three columns. Or five columns. With vertical rules beside or between them, if you like. Drag a guide on the ruler and try unequal columns. Highlight text in a box that jumps across columns.

Go crazy with the design, or stick with the tried-and-true. The point is, WordPerfect gives you formatting options that other word processors don’t. And exploring them couldn’t be much easier.

3. Because you'd use more graphics if using them were easy.

WordPerfect not only gives you full control over the placement of graphics in your text, it also gives you a color drawing program for modifying imported artwork (or starting over from scratch) without ever leaving the program.

You can print graphics under your text (as “watermarks”) or on top (as overlays). You can use the drawing tools to rotate text to any angle that strikes your fancy (something many page-layout programs still can’t do).

And WordPerfect gives you 36 border styles and 64 fill patterns — which you can use in any of 256 colors — for highlighting graphics, paragraphs, columns, pages, even blocks of text.

4. Because a movie is worth who-knows-how-many words.

If a picture is worth a thousand words, what's a movie worth? With WordPerfect and QuickTime, you can calculate it for yourself.
Apple's QuickTime is a new technology that lets you work with digital video and sound as easily as you now work with text and graphics files.

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We have a feeling that words can't begin to describe all the ways you'll think of to use it.

Language, WordPerfect's macro editor intimidates some people at first. It shouldn't.

It's no more complicated than a tape recorder. Click "record" and it memorizes your keystrokes. Click "play" and it repeats them.

With no more knowledge than that, you can create a WordPerfect macro. And can spare yourself the effort of formatting M-E-M-O-R-A-N-D-O (and so on) across the top of the page every time you want to fire off a memo, for example.

But simple as recording your own macros can be, we also ship a number of them with the program. For formatting addresses to print on envelopes. Placing "drop caps" at the start of paragraphs. And other jobs you'd rather not do twice.

WordPerfect's compatibility can save you a lot of aggravation. Not to mention a lot of reformatting.

Because some people work on DOS computers.

You want the word processor that's right for you. If your choice happens also to be the choice of millions of others — with other computers — so much the better.

That's why WordPerfect is such a good choice. Lots of DOS users use WordPerfect. As well as UNIX, VMS and other users. If you ever find your Mac on a network with other computers,

5
MACROS
Because you get tired of repeating yourself, yourself, yourself.

Perhaps because they've heard it's a powerful programming language, WordPerfect's macro editor intimidates some people at first. It shouldn't.

It's no more complicated than a tape recorder. Click "record" and it memorizes your keystrokes. Click "play" and it repeats them.

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WordPerfect's compatibility can save you a lot of aggravation. Not to mention a lot of reformatting.

Because even if you never call us, it's nice to know we're here.

Like any good Mac program, WordPerfect 2.1 is easy to use. But unlike many Mac programs, you're not on your own with it. You get toll-free help from one of the largest support staffs in the industry.

For more reasons to try WordPerfect, call for our free video. 1-800-526-2296
Apple’s QuickTime is here, and if you use a spreadsheet, word processor, or presentation package, the way you work may never be the same. Here’s how to get things moving.

BY RUSSELL ITO

QuickTime in Action

How many times have you sat in front of your Mac and thought, “Now I’m going to do some computing!”? The fact is that computing has very little to do with how people use personal computers. Personal computing has always been more about personal communicating. It started with words alone. Then came words and pictures. Now, with QuickTime, we can finally communicate by using dynamic data.

Dynamic, or time-based, data includes video, sound, animation, or any other type of information that changes over time. Because the type of data in a dynamic data file can vary from file to file, Apple has created a new file format, Movie, specifically for dynamic data. For the average user, the Movie file format will be just like PICT or Paint. With QuickTime you can cut, copy, and paste moving images in the same way you do most text or graphic objects and then play those movies back without any additional hardware or software.
QuickTime

Figure 1: New Human Interface Guidelines are part of QuickTime. The two immediate additions to the interface are the Standard Movie Controller (top) and the Standard File Dialog with Preview (middle). The Movie Controller lets you play and control clips. When you click on the speaker, a fader for volume control pops up. The horizontal slider lets you move through the movie, and Shift-dragging on the slider selects part of the movie for cutting and pasting. QuickTime also comes with a new Scrapbook (bottom) that lets you paste in movies and play them back within the Scrapbook. Because the Scrapbook retains only aliases for the movies it contains, you can paste in many movies without significantly increasing the Scrapbook's size.

Even if you don't have a need for moving images such as video clips, on-screen demonstrations, or computer animations, QuickTime has something else to offer: a still-image-compression algorithm that lets you work with graphics that otherwise would be impractically large and that causes virtually no detectable degradation of the image. (For more on the anatomy of QuickTime, see the "How QuickTime Works" sidebar.)

In addition to defining a new data type, QuickTime also defines two new classes of Mac users: passengers and pilots (to borrow Apple's terms). Most users will be QuickTime passengers. They'll play back and use QuickTime clips just in the same way they use clip art and they'll also use compressed images, but they generally won't spend much time creating new QuickTime material. The pilots, on the other hand, will provide the material the passengers will use. Because QuickTime should be equally useful to both groups, we'll give you an idea of how users in each class can take advantage of QuickTime's components.

Of course, whether you're a passenger or a pilot, you'll need the right hardware and system software before you can use QuickTime. QuickTime runs on any color-capable Mac running System 6.0.7 or later — including System 7. This means that anyone using a Mac LC, a Classic II or a PowerBook 140 or 170, for instance, can use QuickTime. The only caveat is to make sure you have enough memory. If you expect to use QuickTime without raising your blood pressure, we recommend a minimum of 5 megabytes of RAM, and realistically, you'll be happier with 8 megabytes or more. The more you intend to do with QuickTime, the more RAM you should have.

Word Jockeys

Most users spend the majority of their computing time doing word processing, and the printer is the final destination for their documents. For these people, QuickTime offers a change in the nature of documents and in their final form. Going beyond the static word and the printed page is what QuickTime in word processing is all about.

Because you can't create a movie in a word processor, word processing is the ultimate passenger application: Users will incorporate preexisting movies into on-screen documents instead of creating new material. WordPerfect 2.1 is the first word processor to support QuickTime internally, and an installable module should make Word 5.0 a member of the QuickTime club by the time you read this. Incorporating a movie into a document with either application is as simple as cutting and pasting or performing a graphic import (see Figure 2). The applications treat the movie as they do any still image such as a PICT, so you can crop, position, and wrap text around movies too.

Unlike conventional graphics, however, movies aren't actually placed in a file. Instead, you paste in a still image from the movie, called a poster, and the file retains a pointer to the appropriate movie or movie segment. This
lets you add a several-megabyte movie to a file while increasing the file’s size by only about 10K or so. As long as the QuickTime file remains accessible on a local disk drive, a shared volume, or a server, the word-processing file will find it.

QuickTime in a text document may seem like a contradiction in terms, but using a dynamic file in a text document can make sense. For example, reading employee-training and orientation manuals is usually about as interesting as watching paint dry, but incorporating live-action demonstrations into an on-screen document can spice things up. QuickTime movies can also liven up proposals that would otherwise rely strictly on static images or words. For example, each frame of a QuickTime storyboard proposal can itself be a movie and an architectural proposal can contain a movie that flies readers through a building instead of forcing them to see it from a single perspective.

**Number Crunchers**

Spreadsheet programs are useful analysis tools, but they’re not particularly good for analyzing data that changes over time, such as interest rates, stock prices, currency exchange rates, or a company’s profitability. Tracking a trend is easy if you can study an animated chart, and such a chart is also much more memorable.

Unfortunately, at this writing, none of the major spreadsheet programs supported the creation of QuickTime movies. However, Microsoft is planning a QuickTime module for both Excel 3.0 and 4.0 that will let you create animated-chart movies.

With the QuickTime add-in installed, you see an additional command, Create a Movie, on the Chart menu. When you select this option, a dialog box appears that offers a variety of options that let you specify such things as the frame rate and whether the resulting animation should be saved as a file or to the Clipboard. This last option is especially useful, because it lets you paste the movie into the Scrapbook and then later paste it from there into any other QuickTime application. With the QuickTime add-in installed, you’ll find that creating an animated Excel chart is no harder than creating a static chart (unfortunately, it’s also no easier).

Spreadsheet users probably won’t have as much use for digital video in their work as users of other applications will, but they will still be able to act as both passengers and pilots, creating and using QuickTime movies in their own work and providing dynamic charts for presentations and reports.

**Presentation Performers**

The one type of software that probably stands to benefit the most from QuickTime is presentation software. When these software slide shows first appeared, presenters everywhere jumped on the bandwagon. Since then, those static slides have started looking pretty dull. From that standpoint, QuickTime has come along not a moment too soon.

With the addition of QuickTime, presentation packages have now become quasi-authoring environments. Users who want to create interactive programs can do so without having to learn a complex scripting language such as HyperCard’s HyperTalk or MacroMind Director’s Lingo. In that sense, presentation packages are the melting pot of QuickTime users, because passengers as well as pilots will find a use for the new data format. Passengers will be able to incorporate QuickTime elements into their presentations as easily as if the movies were clip art, and pilots will be able to generate new movies quickly, supplying the passengers with a ready supply of digital material.

Of the three traditional presentation packages (Symantec’s MORE, Aldus’ Persuasion, and Microsoft’s PowerPoint), Persuasion is the first to incorporate QuickTime. Because QuickTime works at the operating-system level, movies can be imported, sized, and placed as if they were any other graphic, so experienced Persuasion users won’t have to learn anything new to jazz up their slide shows with movies (see Figure 3). As with word processors, inserting a movie is just like using clip art.

Animation/presentation packages such as Cinemation, from Vividus, and Magic, from MacroMind Paracomp, let you add QuickTime movies to your animations, accenting your points with dynamic data (see Figure 4). For example, you could create a series of animated charts in Excel and slide those chart movies into your presentation for emphasis. Cinemation and Magic are path-based programs, so creating animated

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**QuickTalk**

- **badge**: A small icon (it looks like a strip of film) that identifies an image as a movie; it appears in the lower left corner of a movie’s poster.
- **codec**: Quick-speak for compressor/decompressor.
- **compression ratio**: A file’s original size divided by its compressed size. The higher the ratio, the better the compression.
- **JPEG**: Lossless/lossy: the two basic forms of compression. In a lossless scheme, no data is lost during compression. In a lossy scheme, some data is irretrievably lost during compression.
- **movies**: Apple’s generic term for all dynamic data. The Movie file format can contain any type of dynamic data, including animation, video, and sound.
- **poster**: A still frame from a movie that represents the movie. It’s also the frame the user sees when a movie is pasted into a document. Often, but not always, it’s the first frame of a movie.
The chart at left indicates just how successful CUC organization has been over the past year. You will note, however, that even though we have experienced exceptional growth over the last fiscal year, things aren't perfect. You can clearly see how badly the Eastern region lags behind our Southern and Western operations.

Figure 2: WordPerfect 2.1 is the first word processor to incorporate QuickTime support. This animated chart was created in Excel 3.0 and then imported into WordPerfect. The badge at the lower left identifies it as a movie.

Figure 3: Persuasion 2.1 treats QuickTime movies just as it does any other graphic. You can paste and position them onto slides and then pop the controller down to play them back.

Figure 4: Cinemation was the first presentation package to support QuickTime, and it goes beyond such packages as Persuasion in that it’s designed for creating animated interactive presentations. The video movie and chart movie shown here can be animated just as any other graphic can.

Presentations with them isn’t as difficult as using a more sophisticated package such as MacroMind Director.

QuickTime also benefits users of these presentation packages even if they don’t import any movies at all. That’s because you can now save the output from your presentation package in the generic Movie file format rather than in the proprietary format of an individual program, so you can create animations in Cinemation or Magic, save them as Movie files, and then import them directly into other applications. Even if users don’t have the originating application, they can still run the animation by importing it into any QuickTime-compatible application such as a word processor.

The point of every presentation is to communicate a message effectively. With QuickTime, presenters can further expand their range of communication tools beyond the static slide into animation and video.

Authors and Animators

QuickTime provides multimedia producers, the true pilots of QuickTime, with the one thing they’ve been missing for so long, a common file format. Now that producers are armed with it, they can exchange files from different applications and, even more, incorporate live video, animated charts, or audio into a single project just by using the Clipboard.

For serious pilots,MacroMind Director will probably continue to be the authoring system of choice, and the next version, which should be out by the time you read this, will support QuickTime. Because the QuickTime-ready version of Director will treat movies just like any other graphic, multimedia producers will be able to continue working with it as they always have.

HyperCard developers will also be able to incorporate QuickTime interactively. Claris is providing a developers’ kit, the QuickTime Tools stack. It will let developers install the necessary resources to incorporate QuickTime into their stacks and set playback options for their movies by just clicking on a few buttons.

Somewhat surprisingly, traditional animation packages, with the exception of Director, haven’t jumped on the QuickTime bandwagon. In fact, at this writing, only the next release of Director and Motion Works’ upcoming PROmotion were slated to support QuickTime. Nonetheless, you can expect all animation programs to support QuickTime in the near future.

Video Stars

QuickTime is going to make video production on the Mac more accessible to more people than ever before. In fact, many passengers may find that for QuickTime to be really useful, they have to become pilots. Unlike clip art, which can be generic, dynamic data should be specific to a particular situation, and a canned collection of video clips can’t always provide this level of specificity. Therefore,
users will often need to create their own dynamic data.

A simple way to get your own videotaped images onto your hard disk is to use SuperMac Technology’s Video Spigot, a $600 budget digitizer card. All you have to do is plug in your video source, whether it’s a video camera, a VCR, or a laserdisc player; start and stop your capture; and save the file as a QuickTime movie.

However, the Spigot doesn’t provide any support for audio, leaving that task to a MacRecorder, and setting up to record digital video and audio is a major hassle. SuperMac has announced plans for a bundle called Spigot & Sound, which will combine a Spigot card and audio capabilities. Although the specifics hadn’t been worked out at press time, the plans call for either a bundle of a Spigot with a MacRecorder box or a two-NuBus-card bundle with the MacRecorder implemented as a card.

Once you’ve collected your video clips on your hard disk (your large hard disk), you can edit and arrange them with a digital-editing package such as Adobe Premiere or DiVA’s upcoming VideoShop. In effect, editing packages will become to digitizers such as the Spigot what page-layout packages now are to word processors.

Because it’s the first editor to be released, Premiere will probably set some standards for future editing interfaces (see Figure 5). Its basic click-and-drag approach greatly simplifies the process of compiling an edited movie, but even so, editing still takes time — lots of time. Don’t be surprised if you glance at your watch and find that you’ve spent two hours working on a clip that lasts barely half a minute.

Although the video will be far from broadcast-quality, QuickTime may make the creation and distribution of simple video programming such as press releases, training tutorials, and video messages a simple in-house activity that won’t require hiring an outside production group.

Not So Quick

So now that you’re excited about what QuickTime can do, you should become aware of a few of its limitations. Let’s start with image size. Although nothing inherent in QuickTime restricts a movie’s image size, most movies appear on-screen at 160 x 120 pixels, or just a little larger than four standard postage stamps. You can enlarge the image, but if you do, the image quality (not one of the current QuickTime’s strong suits in any case) quickly degrades, and you can forget about sound synchronization. Another reason you’ll probably want to settle for 160 x 120 pixels is that that’s about the biggest image you can get while decompressing a compressed video image from a hard disk or CD-ROM without additional hardware and while still maintaining an adequate frame rate. What constitutes an adequate frame rate depends on your perspective. For video professionals, that means 30 fps (frames per second); for QuickTime users, that means 10 to 15 fps. Even on an 8-megabyte iIci, you can’t expect a frame rate

A QuickTime Checklist

Before you plunge into the wilds of dynamic data, here are a few items to consider for your shopping list:

1. CPU speed/power. Don’t even think about QuickTime production on anything less powerful than an LC II. You need all the power you can get. Also, forget about working with internal video on any Mac other than the Quadra. For any other Mac, get a video card.

2. Big memory. Passengers and pilots need memory. You should plan on at least 8 megabytes of RAM, especially if you’re working in color.

3. Big storage. Whether you’re a passenger or a pilot, you should have at least one 200-megabyte hard drive. Movies are compressed, but they still take up a lot of room. If you’re a pilot, you drive requirements start at 350 megabytes, and a single drive won’t be enough.

4. Video equipment. You’ll want to record your own material eventually, so you’ll need at least a camcorder and probably a VCR too. Although you can play back from a camera, you’ll find that plugging the camera in to your digitizer and then unplugging it to shoot more material is more of a hassle than it’s worth.

5. Sound equipment. What would video be without sound? Right. Silent. If you want audio in your movies, you’ll need an audio digitizer, such as a MacRecorder, from MacroMind+Paracom. Serious pilots may want to consider a high-end 16-bit digitizer such as Digidesign’s AudioMedia card.

6. The right cables. There’s nothing more frustrating than being delayed because you don’t have the right cable for plugging something in. Check all your connectors to make sure you have the right plugs for the job. RCA plugs are the most common, but you may need miniplugs (stereo and mono), BNC connectors or converters, or S-video plugs (they look like ADB connectors). Always make sure you have more cables than you think you need, because even that won’t be enough.

7. Digitizer cards. The quality of your image captures can vary from card to card, so try out several before making a decision. At the same time, however, remember that if you intend to turn your captures into QuickTime movies, you aren’t going to get a high-resolution image anyway, so you can scale your ambitions to your output.

8. CD-ROM speed. CD-ROMs are sure to be a popular way to distribute QuickTime movies, so make sure your CD-ROM drive is fast enough to play them. According to Apple, the minimum throughput is 90K per second.

9. Removable media. Although you’ll need a large-capacity hard drive to hold your raw material, you’ll want to keep your finished QuickTime projects on removable media. You won’t be able to fit most of your movies on a floppy, so make sure you have a reliable removable-media system for storage and easy file transport.

10. PowerBook video. If you’re going to use a SCSI video device, you should test it for performance first. SCSI video isn’t as fast as normal video, and if you have an action-packed presentation, that slight speed degradation can spell disaster.
QuickTime

How QuickTime Works

Even though the QuickTime extension is represented by only a single icon on your desktop, it actually comprises several tightly integrated components, each of which performs a specific task. In the broadest sense, QuickTime includes four components: system software, Apple Compressors, file formats (PICT extensions for image compression and previews and the Movie format), and human interface elements (the Standard Movie Controller and the Standard File Dialog with Preview).

System Software

The system software component consists of three major elements: the Movie Toolbox, the Image Compression Manager (ICM), and the Component Manager. The Movie Toolbox is a set of high-level system software services that lets developers easily write applications that can both create and incorporate movies. In such applications, inserting a movie will be as easy as cutting and pasting and playing a movie back will be just a matter of clicking the mouse.

The ICM is QuickTime’s compression traffic cop. Without QuickTime and the ICM, developers who want to include a compression/decompression scheme in their applications have to write their own scheme, but with the ICM, they just have to make a call to the ICM for the desired type of compression. The actual compression/decompression work is handled at the system level, so developers can focus on creating an application with the assurance that any compression issues will be handled automatically by the ICM. All that passengers need to know about this is that QuickTime applications will always have access to the best compression schemes available for the task at hand.

The Component Manager is QuickTime’s hardware traffic cop or, perhaps more precisely, vehicle registration bureau. The Component Manager lets external resources such as digitizer cards, VCRs, system extensions, and peripheral devices register their capabilities with the system software. Because this is QuickTime’s first release, Apple has defined only a single class of devices, digitizer cards, at this point.

At application launch, an external device registers its capabilities with the Component Manager. So, for example, a digitizer card might register its maximum frame capture rate, its maximum frame size for capture, its highest pixel depth, and so on. Then when an application needs a digitizer card, it only has to request a digitizer card with a specific set of capabilities instead of looking for a specific model from a specific manufacturer, which is what happens without the Component Manager. The Component Manager then checks its registry, finds an available card that matches the given set of criteria, and handles all the necessary communications with that device.

For users, whether they be passengers or pilots, this means that they no longer have to be as concerned with the specifics of their workstation’s configuration. For software developers, the Component Manager is a boon, because it lets them create applications that take advantage of devices and extensions without forcing them to create custom software for each product.

Apple Compressors

The Apple Compressor component has four parts: the Photo Compressor, the Animation Compressor, the Video Compressor, and the Graphics Compressor. The Photo Compressor, for still
More Apple and third-party compressors to be added.

Premiere

Selects the best compressor for the job.

Apple-supplied compressors

Other compressors

More Apple and third-party compressors to be added.

Premiere

Selects the best compressor for the job.

Apple-supplied compressors

Other compressors

Provides support for the creation, editing, and playback of QuickTime movies.

Lets external resources (such as digitizers, VCRs, and videodisc players) register their capabilities at application runtime. Lets applications access an external device based on a generic set of capabilities (for example, frame rate or image size) rather than through custom software.

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QuickTime

of more than 15 fps, but if you're using a Quadra, its faster processor will let you achieve 30 fps. And if you're wondering how you can maintain tight sync with your soundtrack, the simple answer is, you can't.

Even at its best, QuickTime's video-image quality won't win any awards. If you're expecting photographic quality, forget it. Even if you only expect the same quality as that of a television image, you'll be disappointed. Until we get faster, more powerful computers and better compression schemes, QuickTime isn't going to rival the image quality of your TV.

QuickTime's First Steps

Still, QuickTime's achievements more than outweigh its limitations. Even at this early stage, QuickTime is more than good, and it's only going to get better. Remember how just a few years ago, 8-bit, 256-color QuickDraw was the greatest thing anyone had ever seen, and look where we are now. As faster, more powerful Macs and better compression schemes appear, QuickTime will improve too. Better image resolutions, larger frame sizes, and faster frame rates are coming, and some have already arrived. New Video, of Venice, California, for example, has already demonstrated full-screen, full-motion, QuickTime-compatible DVI (digital video interactive) hardware for the Mac.

For multimedia pilots, QuickTime is a godsend. Without a system-software-level multimedia standard, these users were facing the potential chaos of a field without standards — a situation not unlike that of the printer market on the PC side. Now Apple has saved application developers and third-party manufacturers from having to develop and evangelize separate standards, so they can turn their attention to the creation of innovative products.

Multimedia passengers will find that QuickTime extends their work beyond the two dimensions of a printed page. Now a document doesn't have to terminate at the laser printer down the hall. It's just as likely that that file need never leave its original electronic form. With QuickTime, it won't be too long before you see many applications offering the option of printing to videotape as well as to paper.

Ironically, the beauty of QuickTime is its very invisibility. Once users have become accustomed to the concept of dynamic data, using QuickTime will require as much thought as using the Clipboard — or QuickDraw, for that matter. When was the last time you heard anyone talk about either of those subjects? Once the novelty has worn off, users will be able to concentrate on using QuickTime to communicate more clearly and with more impact. And in the long run, that's what QuickTime in action is all about.

Russell No is a MacUser senior editor and former film student who thinks that editing QuickTime movies is a lot more fun than doing desktop publishing.
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Color is a powerful tool you can use for desktop publishing; for graphic-arts presentations; and even for getting more mileage out of business applications such as word-processing, spreadsheet, and database programs. But it can be a mystifying puzzle to put together all the pieces of hardware and software in a color Mac system. Here's a guide to help you figure out three of the most challenging components of your color system. We look at video accelerators, the most cost-effective upgrade for boosting color productivity; take a snapshot of three emerging categories of color printers that challenge the widely used thermal-wax-transfer technology; and, to start things off, present a primer on how to integrate the diverse input, output, and image-processing techniques required for today's full-color Macintosh.
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A Mac Color Primer

If you aren’t using color, you’re missing 16.8 million golden opportunities. MacUser Labs takes you on a guided spin around the Mac color wheel.

BY PAUL YI
AND THE MACUSER LABS STAFF

Getting into the desktop-publishing game is relatively easy these days: Just buy a Mac, a page-layout program, and a laser printer, and you’re in business. But when color is part of the picture, the desktop-publishing model becomes more complex. And it can get downright convoluted as you dip deeper into color-production issues — color models, printing methods, and the like.

But let’s face it: Color on the Mac is well worth the hike up the learning curve. Using the Mac for many color business applications doesn’t require anything more technical of you than locating your color inkjet printer’s power switch. For this report, MacUser Labs takes a look at color desktop publishing. We follow a real-world project through the production cycle and discuss some of the tools you’ll use each step of the way, from capturing the original color image and getting it into your Mac to manipulating the image on-screen and printing it.
Traditional Versus Desktop Color Printing

Traditional method

Print shop

Manual stripping
Photograph separations

Cyan
Magenta
Yellow
Black

Layout separations

Cyan
Magenta
Yellow
Black

Desktop method

Slide

Slide scanner

Macintosh

Imagesetter

Cyan
Magenta
Yellow
Black

The desktop method offers the option of using a high-resolution imagesetter or a low-resolution color printer.
Any business can make good use of color to enhance its image in presentations, annual reports, financial graphics, and the like. Let’s say you operate a small wholesale nursery and you decide to branch out into the mail-order market. You’d like to launch a direct-mail campaign with a professional-looking catalog of your offerings, lush plants and flowers. Your catalog should be of the highest quality; you want people to plant your catalog on their coffee table, not at the bottom of the bird cage.

Although many steps in the production process for printed materials of any quality are the same, the low and the high ends part company at several points. We’ll clue you in as we go along. So while the professional photographer you’ve hired is shooting all the gorgeous photos for your catalog — preferably slides, for the best color quality from the very beginning — let’s talk about color on the Macintosh.

**WYSIWYG?**

Many of the color photographic images you see in print — in books, magazines, and so on — are the result of the four-color-printing process, which tricks the eye into perceiving a series of cyan, magenta, yellow, and black (CMYK) dots of ink on the printed page as the original photograph. Hold an extra-high-powered magnifying glass or a printer’s loupe up to one of the plant photographs in this article, and you’ll see the dots. The original color photograph or slide is separated, either photographically or electronically, into each of its component colors, resulting in a separate sheet of graphic-arts film for each color. A separate printing plate is then made from each of these sheets of film (see the “Traditional Versus Desktop Color Printing” sidebar).

Nowadays, you can do much of this work on the Macintosh. You can scan photographs into your Macintosh and manipulate and correct the color balance with image-enhancement software. You can print to desktop color printers, which are also based on the four-color process, or you can print color separations as film to a high-resolution imagesetter at your service bureau.

But don’t underestimate the complexity of working with color. First-time Mac color users who print to a desktop color printer or generate separations from their files are often surprised when their output barely matches the colors they saw on the screen. The reason is that monitors display colors as a combination of red, green, and blue (RGB) light and a printer deposits cyan, magenta, yellow, and black ink on paper. These two color systems are significantly different, and translating between them isn’t easy. Monitor-calibration software is designed to make your on-screen image match your original photo, but when you print — either complete output from a desktop color printer or separations from an imagesetter — the color generated is dependent on the printing device’s color system, not on the color you see on your monitor.

One recent innovation, Electronic for Imaging’s Cachet, is a unique solution to the problem of the device-dependence of color on scanners, monitors, and printers. Cachet lets you adjust the on-screen colors of your image to match the colors of a reference image that has already been color-corrected and printed. Cachet comes with a database of various reference images for a wide variety of printers, including the Dupont 4Cast and the QMS ColorScript, as well as imagesetters.

Adobe’s PostScript Level 2 can also address the problem of the device-dependence of Mac color printing. Level 1 of the PostScript page-description language provides a common device-independent language for outputting text and graphics on any printer. PostScript Level 2 achieves such device-independence in the area of color graphics.

Before you can get started, you need a color-capable Mac — a 68020-based Mac II, SE, or Macintosh Classic — and a color monitor. Finally, you’ll need a color printer, which is available from a variety of vendors, including Canon, Epson, and Apple. Once you have these components, you can begin to experiment with color on the Macintosh.
The trouble with most 24-bit color products is that they do the job exactly as their name implies, bit by bit by bit by bit.

Fortunately for all those long suffering graphic designers who are terminally bored with color changes taking minutes or hours to complete, Radius introduces the PrecisionColor 24x™ and the Rocket 25i™ combination. Together they blow away all existing performance standards.

Individually, they stand on their own as well. For instance, the Rocket 25i eliminates your system's performance bottleneck and allows your Mac to deliver the fastest response possible. In fact, the Rocket's 68040 chip allows it to whip along at speeds up to 6 times

Now available with the Rocket.
faster than your current Mac II*. Which means you really increase the overall performance on all your applications, like Microsoft Word and Excel, not just graphics applications.

But when the job does call for graphics performance, the PrecisionColor 24x card delivers. A radiant 16.7 million colors. On-board QuickDraw acceleration that functions like a built-in turbo. Multiple resolutions including WYSIWYG and 2 page mode. As well as compatibility with virtually any multi-frequency monitor for the Macintosh.

When you put the Rocket 25i and PrecisionColor 24x together you'll be flying through QuarkXPress, Aldus PageMaker, Adobe Photoshop and all graphics applications. Giving you lightning fast page composition, image rotations, filters, and RGB to CMYK conversions.

Therefore, it stands to reason our PrecisionColor 24x/Rocket 25i combination will beat the pants off the $3,499 SuperMac Thunder/24. And quickly humble the $3,499 RasterOps 24Xli.**

When you consider the Radius combination starts at a special bundled price of $2,999, the others seem to be asking an awful lot for very little.

Just call 1-800-227-2795. Or 1-800-966-7360 for immediate faxed information. We'll tell you how to get the performance capabilities of your color system up to speed.

At prices that are down to earth.

*CIRCLE 195 ON READER SERVICE CARD.

DO EXTRAORDINARY THINGS
Figure 1: Input (The Hewlett-Packard ScanJet IIc)

Original Image  | Hewlett-Packard ScanJet IIc  | Calibrated print  | Uncalibrated print

Figure 2: Image-Editing Software (Adobe Photoshop)

Monitor Setup...

Monitor Setup

Adobe Photoshop

Figure 3: Output (The Tektronix Phaser III PXi)

Screen image  | Tektronix Phaser III PXi  | Simulate Display print  | Normal print
model such as the LC or a 68030-based model such as a Mac II-series machine. If you’re still limping along with an old Mac Plus or SE, it’s time to upgrade. The ROMs of these relics of the original Mac family don’t have Color QuickDraw, which allows you to manipulate color images. No amount of system-software upgrading can help.

The original color Macs required a separate video card, but the IIci, LC, IIIsi, and Quadras ship with color video built in, so you don’t have to buy a separate card. Depending on its video circuitry, each of these Macs can support a different monitor size and number of colors (see “Shopping for the Right Mac,” March ’92, page 128). As shipped, for example, the LC can support the Apple 12-inch RGB monitor at 16 bits, for 32,768 colors. With additional VRAM (video random-access memory), the Quadra 700 and 900 can support a 16-inch color monitor at 24 bits, for a full 16,772,216 colors.

The 256 colors of 8-bit color are plenty for most business projects, but for the type of color control necessary for your plant catalog — the use of image-retouching and graphics applications — you’ll want the broad range of hues and tones of 24-bit color. You’ll probably also find it convenient to work with a monitor larger than 16 inches, such as a 19- or 21-inch monitor, which lets you work with two pages simultaneously.

Unfortunately, working with 24-bit images at large screen sizes taxes the Mac’s processing power — and your patience. The Mac’s main processor bears the burden of manipulating all that image data, and the result is an annoying time lag between when you move the mouse and when the shifted object finally drops anchor. An accelerated-video card speeds up the processing of QuickDraw commands, so if you’re planning to produce a catalog regularly, you might consider getting one (see “Chasing Rainbows: Accelerated-Video Cards,” in this Buyer’s Guide).

Capturing Color
How you choose to get color into your Mac depends on the quality you want for the final product. One of the most common ways is to use a flatbed scanner; with such a scanner, you can get your photo on its glass in the same way as you place a single page on the platen of a photocopier. When we last looked at flatbed scanners, we found that the quality of 300-dpi flatbed color scanners was better than ever and that the prices had dropped to an all-time low: Some street prices were less than $1,500 (see “Capturing Color: 24-Bit Scanners,” December ’91, page 152).

For a high-quality catalog, you want to start with slide film, which records a greater range of colors than print film does, and you want to use a slide scanner, such as one offered by Agfa, Array, Barneyscan, Howtek, or Leaf Systems. Slide scanners offer higher resolution and better quality, albeit at a higher cost, than flatbed scanners do — for example, the Barneyscan 4520 costs $27,995; the Leafscan 35, at $9,995, is a surprisingly low-priced product in this category.

You’ll get still higher quality, at a much higher price, by using a desktop drum scanner. Products in this class are targeted at service bureaus and in-house production departments that can bear the high cost — the Pre-Press Technologies SpectreLink costs $29,995, for example.

To skip the scanning step entirely and eliminate photography costs, you can use a camcorder or a digital camera to grab still-frame shots and get them directly into your Mac. But if the point of doing so is to save money, keep in mind that you’ll need to outfit your Macintosh with a video-frame-grabber board, such as the Computer Friends ColorSnap+ or the RasterOps XLTV. And the still-video-image quality isn’t very good. Although you might consider walking through your plant nursery with a camcorder to grab images for an in-house accounting database, chances are that you won’t want this image quality for any part of

MacUser May 1992 Buyer’s Guide 11
Color Primer

your direct-mail marketing effort.

Scanning is an art. Don't think that you can just eye a photo and figure out the best settings for your scanner software. Fortunately, with some recent developments in color-scanning software, you don't have to become an overnight expert. The Hewlett-Packard ScanJet IIC, for example, includes software that automatically sets the contrast and the brightness for the images you scan (see Figure 1). If you choose a scanner other than the ScanJet IIC, you can use a product such as Savitar's ScanMatch software to calibrate your scanner to the image you'll be scanning. If you place the ScanMatch color target on the scanner, the software can determine the scanner's characteristics and ensure that the images you scan are accurately reflected on your display.

The color you see on-screen, however, can vary from one display to another. Even on a single display, colors can change as electron tubes and phosphors age. A device called a display calibrator can help maintain colors by measuring and then adjusting a display's color characteristics — its tonal range and the color of its white. Radius, RasterOps, and SuperMac all offer calibrators that can measure and adjust these color characteristics for a variety of display systems. The RasterOps CorrectColor Calibrator also functions as a colorimeter, a device that can measure the absolute color on the screen and on a print or a slide. Combined with the right software, the CorrectColor Calibrator can accurately maintain color from the original to the screen and finally to the print.

If you still don't like what you see on your monitor after scanning — or if you want to digitally airbrush your image, for example — you can do so by using image-enhancement software. Programs such as Adobe Photoshop (see Figure 2) and Fractal Design's ColorStudio let you manipulate the color layers of an image for best output, and they provide special-effects tools that let you alter the appearance of the scanned image. You can crop and resize the image, and you can alter the scanned image's resolution if, for example, you decide to use a low-resolution version of the image for position only (FPO).

In Full Bloom

With the catalog completely laid out, you're ready to print. Desktop color printers have come a long way

### Table 1: Color-Input Methods

<table>
<thead>
<tr>
<th>Input method</th>
<th>Cost</th>
<th>Pros</th>
<th>Cons</th>
<th>Ideal Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camcorder/VCR</td>
<td>$500 to $2,000</td>
<td><em>Fast and convenient.</em></td>
<td><em>Poor quality.</em></td>
<td><em>Artists and multimedia enthusiasts.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Easy to use.</em></td>
<td><em>Need video-capture hardware.</em></td>
<td><em>Visual-database users.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Inexpensive media.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>No processing required.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic camera</td>
<td>$500 to $4,000</td>
<td><em>Fast and convenient.</em></td>
<td><em>Low-end products match only the quality of camcorders and VCRs.</em></td>
<td><em>Producers of informal in-house projects.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Easy to use.</em></td>
<td><em>High-end products require users to have photographic skills.</em></td>
<td><em>Visual-database users.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Inexpensive media.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>No processing required.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flatbed scanner</td>
<td>$1,500 to $5,000</td>
<td><em>Easiest way to get color images into the Mac.</em></td>
<td><em>Midrange quality.</em></td>
<td><em>Beginning color users.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Can't meet the demands of prepress.</em></td>
<td><em>Graphics professionals who need FPOs.</em></td>
</tr>
<tr>
<td>Slide scanner</td>
<td>$2,000 to $30,000</td>
<td><em>High quality.</em></td>
<td><em>Expensive for casual users.</em></td>
<td><em>High-end-graphics artists doing prepress work or high-quality desktop publishing.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Best way to get slide images into the Mac.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drum scanner</td>
<td>$30,000 to $100,000</td>
<td><em>Highest quality available.</em></td>
<td><em>Large footprint.</em></td>
<td><em>Professional color separators.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><em>Expensive.</em></td>
<td></td>
</tr>
</tbody>
</table>
Mac or PC. Design studio, advertising agency, service bureau or print shop.

Let's face it: you’re not completely satisfied with the traditional 300 dpi scanner standard, but you don’t want to spend a fortune on higher quality. That’s what we call the gap between DTP and DTP.

Arcus closes that gap. A superbly designed 10 bit flatbed CCD scanner with a 1200 dpi resolution, a fast one pass and over 1 billion colors. Plus software, a fully integrated transparency module and of course the Agfa service.

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AGFA

The complete picture

Circle 43 on reader service card.
**Color Primer**

**Steps to Better Color**

The key to successful color offset printing is good communication with your printer shop's staff at the planning stage. If you want to get your Mac color project commercially printed, don't begin work until you've had a good heart-to-heart with your printer about paper stock, type of press, plates, and inks. Such factors will influence decisions you make as you create your publication. For example, halftone dots enlarge during the course of making plates as well as during the printing process itself, when the ink hits the paper. Dot gain, as this effect is called, can cause colors to change or images to plug up.

The amount of dot gain varies among printing presses and also depends on the type of paper you use. Your print shop will be able to give you a dot-gain-percentage figure. You can use this information to compensate for the problem before it becomes one, prior to the film-separation stage. Different applications handle dot-gain compensation differently. Aldus PrePrint, for example, lets you select the type of press and paper with dialog-box option buttons. Other applications such as Adobe Separator have a transfer function, or curve, to which you can make midpoint adjustments based on the percentage of dot gain. Adobe Photoshopt compensates for dot gain, depending on the printer you select when you change the format of an image from RGB to CMYK.

Another good reason to have a conversation with your printer is to save yourself some money. Offset lithography encompasses a variety of platemakers and other photomechanical equipment, much of which has been in use for decades. Depending on the type of press and the specific plates or process it uses, your print shop may need negative or positive film or have other film specifications. Find out what's required before making a trip to your service bureau, to ensure that you get the right thing.

— Laura Brown and Brian Blackwelder

*from the original ImageWriter with a multicolored ribbon, bringing a variety of ink and engine technologies to the desktop (see the lab updates in this Buyer's Guide). In-house on-demand color printing is fast and convenient and can be cost-effective for many applications: press releases, order forms, presentations, overhead transparencies. For a project such as a catalog, one of the many plain-paper printers on the market — such as the Tektronix Phaser III PXi (see Figure 3) — is just fine as a rough proofing device.*

To print the catalog, however, you take your file to a service bureau to have it produce imagesetter-film output, which you give to the people who do your printing. Before going to the service bureau, however, have a talk with the staff at your commercial print shop to discuss the particulars of your job (see the "Steps to Better Color" sidebar).

Working with color on the Mac can require nothing more of you than using your imagination, or it can be an incredibly complex pursuit. The tools required depend on your output needs. Consider the level at which you want to jump in, figure out the quality you want, and buy hardware and software that can fulfill your expectations.

Paul Yi is a former MacUser associate editor currently pursuing a career as a consultant and technical writer.

**A Colorful Past**

For more information about many of the products and color-technology issues covered here, have a look into *MacUser*’s colorful past:

- "Big Screens for Small Macs: Mac LC and Illis Color Display Systems," February '92, page 156 — Lab report on 11 large-screen (15-to 21-inch) color displays. Includes a discussion of ergonomic issues, how 8-bit video works, and test results.


- "Living with Living Color," July '91, page 217 — Power Tools tutorial on using 24-bit color. Includes advice on when not to use it and a discussion of disk-space and speed issues.


These articles can be downloaded from ZiffNet/Mac, *MacUser*'s on-line service. Look for the filename COLPAS.CPT in Library 1 (Special Reports) of the MacUser Forum (GO MACUSER).
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Chasing Rainbows:
Accelerated-Video Cards

Full color on the Mac is beautiful but slow, thanks to not-so-QuickDraw. MacUser Labs tests eight video accelerators that promise to improve display performance.

BY WINN L. ROSCH AND THE MACUSER LABS STAFF

Waiting has turned into an art form: Think of the frustration of the concertgoer still standing in line when the music begins or of the Macintosh user watching as line after line of a true-color image is slowly drawn on the screen. The concertgoer, with the help of a scalper, can shortcut the ticket line — for a price. The Macintosh user, with the help of an accelerated-video card, can put more zip into true-color image displays — also for a price. But with accelerated-video cards costing as much as $4,000, the speedup had better be substantial. Is it? Or can some other technology provide more cost-effective Mac-celeration?

MacUser Labs set out to answer these questions by testing eight accelerated-video cards that plug into a NuBus slot in your Mac — the CalComp ChromaVision QuickPlus, E-Machines Futura MX, Radius PrecisionColor 24X, RasterOps 24XLi, RasterOps 24XLTv, SuperMac Spectrum/24 PDQ Plus, SuperMac Spectrum/24 Series III, and SuperMac Thunder/24. We ran each through a series of tests based on everyday operations and then ran the tests again, using a CPU accelerator instead of the video accelerators, to see if overall CPU acceleration was a better solution. As a control, we also performed the same tests with a Generation Systems Designer 24 unaccelerated-video card in both 8- and 24-bit modes.
Video Accelerators

How It Works: Video Acceleration

Unaccelerated-video card
An unaccelerated-video card receives video data over NuBus and stores that data in video memory, or VRAM. When you move the mouse, scroll through or zoom in on or out of a document, or position a graphic for placement, every pixel that's changed must be generated by your Mac's CPU with the help of QuickDraw commands. The resulting video data travels across NuBus into the VRAM on your video card. Performance is limited by your Mac's CPU speed and its ability to generate the new video data as well as the speed at which this data can travel over NuBus.

NuBus
NuBus is your Mac's data highway to expansion cards. The performance of unaccelerated-video cards and stand-alone QuickDraw accelerators (without video circuitry) is limited by the bandwidth of NuBus. Accelerated-video cards can run much faster, because QuickDraw commands don't take up as much of the NuBus bandwidth as the video data of unaccelerated-video cards does. Video data travels directly from the accelerator's QuickDraw co-processor into on-board VRAM, avoiding NuBus altogether.
Accelerated-video card

Accelerated-video cards receive QuickDraw commands over NuBus. An on-board QuickDraw processor converts the commands into video data, which is stored in VRAM before being sent to the monitor. Because less data travels over NuBus and the on-board processor can execute QuickDraw commands much faster than your Mac's processor can, screen updates such as scrolls and zooms are much faster with an accelerated-video card than they are with an unaccelerated-video card.

Some accelerated-video cards now contain GWorld memory, which stores off-screen video data. The use of GWorld memory can, among other things, speed scrolling and animation in software that takes advantage of this feature.

Our findings were surprising. Certainly, accelerated-video cards speed up your display's response time, but the degree of acceleration depends on the type of work you do. A CPU accelerator speeds up your entire Mac: Applications run faster and input and output requests are handled more quickly, for example. An accelerated-video card, on the other hand, is designed specifically to speed up the display on your monitor. For example, with a CPU accelerator, you'll notice a speed improvement when you apply a Photoshop filter to an image, but for faster screen updating when you place that finished Photoshop image into your PageMaker document, you'll probably want an accelerated-video card.

Full Color Isn't Fast

On a monochrome screen, image updates appear almost instantaneously. When you put some color into the picture, however, things start slowing down. Eight-bit-color images take noticeably longer to move around the screen, and with 24-bit-color, there's enough of a lag between the time you move an image and the time it ultimately drops anchor to frustrate most users.

The reason is simple. The Mac has to process only 1 bit of data per pixel for a monochrome image but must process 32 bits per pixel for 24-bit-color images. (Although their purpose is as yet undefined by Apple, the extra 8 bits — the alpha channel — are used by many applications for special effects.) As you move up from a 13-inch monitor to a 19-inch one (more suitable for color applications and desktop publishing), the amount of data your Mac must process to put a color image on-screen more than doubles, to more than 3 megabytes' worth per screen. As all this image data moves through your Mac, it faces two bottlenecks: your Mac's CPU, which must build the pile of pixels to put onto the screen, and the throughput of NuBus, over which image data must travel between the Mac's CPU and the video card. If you've ever watched a full-color graphic image slowly ratchet its way down a screen, you know how frustrating working in 24-bit mode can be.

Accelerated-video cards get around both bottlenecks. Such a card has a separate on-board microprocessor as well as RAM for storing video data. As you're working on an image, the microprocessor intercepts and processes calls made by your application to QuickDraw, which manages the drawing of all on-screen text and graphics on your Mac. The Mac's CPU is free to continue with the application as soon as the QuickDraw command has been issued, rather than doing the work itself. And because the video data is stored in RAM on the accelerator card, only the QuickDraw commands pass across NuBus, further reducing the amount of data passing through this choke point.

Vendors can choose from various alternatives to use as the accelerator card's on-board microprocessor. CalComp opted for an off-the-shelf Texas Instruments 320C30 digital-signal processor (DSP) as the video processor on its accelerator. Other manufacturers have gone a step further and have crafted their own chips, called ASICs (application-specific integrated circuits). These chips, which are optimized for carrying out QuickDraw instructions, can execute some video commands 100 times as fast as your Mac's CPU can.

Although speeding up your Mac's CPU can also accelerate QuickDraw performance, the reverse is not true — accelerating QuickDraw does not result in faster CPU performance. Consequently, CPU-intensive tasks such as the use of Photoshop filters or Illustrator previews benefit greatly from a CPU accelerator but gain little from an accelerated-video card.

Limiting Travel Across NuBus

The less data that must travel over NuBus, the better. As already mentioned, a way of limiting this is to store all necessary video data on the
E-Machines continues to set the 16-inch standard for business productivity. With "switch-on-the-fly" dual resolutions, accelerated 24-bit color, video-out and integrated 10BaseT Ethernet networking. On one card, that drives any display, costs less than a single function card and takes up only one slot. You get the increased productivity of viewing
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card that contains the video processor, thus eliminating the need for video data required by the card’s processor to pass across NuBus. In addition, some accelerated-video cards include slots for GWorld memory. GWorld memory stores just the off-screen video data, resulting in an improvement in scrolling speed.

The RasterOps 24XLI and the SuperMac Thunder/24 both have sockets that accommodate GWorld memory. RasterOps also allows on-board memory that’s otherwise assigned to GWorld memory to serve as a RAM disk. Putting GWorld memory onto an accelerated card removes the NuBus bottleneck by placing the accelerator’s microprocessor chip and the memory in which it stores its image data on the same card. Unfortunately, few applications currently take advantage of GWorld memory.

The speedup potential of video acceleration is immense, once you consider the advantages of ASIC-based QuickDraw acceleration and efficient use of NuBus. But for all the cost of accelerated-video cards, the return can be small. In fact, many applications don’t benefit at all. For a program to take advantage of video acceleration, it must use QuickDraw. Not all programs do. Similarly, for an application to take advantage of GWorld memory, it must be written specifically to do so. Currently, most are not. The processing required for other operations — ordinary program overhead — is still handled by your Mac’s CPU and takes just as much time as before.

How Fast Is Fast?

To get our bearings on which applications benefit from accelerated-video cards, what form of acceleration is most effective, and exactly how much benefit you can expect from investing in specific products, we set up a series of structured tests based on real-world applications, including Photoshop, Word, Canvas, and PageMaker. We ran all the tests on the same system, a Mac IIfi, connected to the same monitor, to eliminate any hardware influence on the test results. Additionally, we set all the accelerated-video cards — except the CalComp ChromaVision QuickPlus, which operates only at 1,552 x 870 pixels — to a 1,024-x-768-pixel resolution.

For our control, we chose the Generation Systems Designer 24 as a representative unaccelerated-8/24-bit-color card. We also tried a Fusion Data Systems TokaMac IIi to discover what could be gained from a CPU accelerator. The TokaMac IIi uses a 68040 processor operating at 25 megahertz to boost CPU performance.

Publishing professionals who manipulate text and graphics all day long will appreciate the smoothness provided by an accelerated-video card. We discovered this by scrolling through and using the Zoom function on a Photoshop image. At a 50-percent scale, we scrolled through the

On the Horizon

Making screen response snappier by installing an accelerated-video card can reduce user frustration. But to really speed up your Macintosh’s performance, other solutions are necessary. According to one developer, QuickDraw operations actually represent only about 5 percent of the total processing time in any session; you can get better response from your Macintosh by accelerating the other 95 percent of the system. Consequently, many manufacturers are focusing their attention on CPU acceleration.

Radius, for example, is enhancing its Rocket CPU coprocessor technology. The company’s goal is to enable you to add multiple Rockets to your Mac, creating what it has named the Saturn V, after NASA’s giant ‘60s-vintage spaceship. Each of the Rockets comprising the Saturn V will be able to run a program (or part of a program) independently, as if each Rocket were a separate Mac.

You will, for example, be able to make a time-consuming manipulation in Photoshop more bearable by burying it in the background. Load the Photoshop job onto one Rocket, hide it under System 7, and then run another job on another Rocket while the first process continues. Because each job has its own Rocket, each will run at full speed. Although the video response may not be any quicker, you’ll get more work done in a day. And as developers bring out distributed-processing schemes for such CPU-intensive chores as rendering, you’ll be able to distribute parts of the same job to multiple Rockets, thus speeding up the total job significantly.

SuperMac is taking a different approach to acceleration. Rather than simply accelerating the entire Mac, it’s targeting the full strength of a 40-MIPS (millions of instructions per second) RISC processor directly at applications most used by DTP and DTV (desktop video) professionals. In June 1992, it plans to release the SuperMac ThunderBolt, a NuBus card based on the SuperMac Thunder/24, reviewed in this report (Thunder/24 owners will be able to upgrade their accelerated-video cards with a simple snap-in daughtercard).

The SuperMac ThunderBolt will require application-specific software modules that off-load processes from the Mac’s CPU and transfer them to a MIPS R3000 RISC processor — SuperMac is claiming performance improvements as great as 1,000 percent. Two sets of such modules — ThunderDTP and ThunderEffects — will be bundled with the ThunderBolt at release, and more are expected soon. ThunderDTP will allow users of page-layout packages such as QuarkXPress and PageMaker to drastically reduce the time needed to pour and modify text and also speed image and object repositioning. ThunderEffects will reroute the processing of Photoshop image-manipulation filters into the RISC processor, thus improving a common and time-consuming operation that’s immune to the effects of video accelerators.

The ThunderBolt comes complete with its own operating system, a debugger, and a development environment that SuperMac will be opening up to third-party developers later this year. Expect many of the top DTP and DTV vendors to develop their own modules as they try to keep demanding professionals happy during the wait for the Apple/IBM PowerPC. Pricing was not firm press time, but it’s consistent with SuperMac’s product line, expect the ThunderBolt with ThunderDTP and...
entire length of the image incrementally by clicking on the down arrow in the vertical scroll bar and holding down the mouse button, a 45-second chore without acceleration. Then we scrolled through the image from beginning to end in one 4-second jump by dragging the scroll box to the bottom of the vertical scroll bar.

The accelerated-video cards improved the rate of incremental scrolling more than the unaccelerated-video card and the CPU accelerator did. The best was the SuperMac Thunder/24, which was five times as fast as the unaccelerated-video card in 24-bit mode, followed closely by the SuperMac Spectrum/24 PDQ Plus, which was four times as fast. The other accelerated-video cards were two to three times as fast. The speed improvement in scrolling the full length of the image in one jump was more modest — at best about 27 percent, again with the SuperMac Thunder/24. The TokaMac ci provided no improvement in the one-step scroll and was actually 40 percent slower in the incremental-scroll test.

Word-processing applications also benefit tremendously from an accelerated-video card’s scrolling performance. Using Word 4.0, we timed how long it took to scroll through a ten-page test document. Word benefited tremendously from video acceleration — an ironic result, considering that accelerated-video cards are most likely to be used by graphic artists and DTP professionals, not users of word processors. The SuperMac Thunder/24 was more than six times as fast as the unaccelerated-video card in this test, with the SuperMac Spectrum/24 PDQ Plus second, at five times the speed. The other cards were about twice as fast as the control card. (We couldn’t include the TokaMac ci in this test, because at the time of our testing, Word 4.0 was incompatible with the 68040 microprocessor.)

Like most drawing programs such as FreeHand, Illustrator, and MacDraw Pro, Canvas uses QuickDraw. However, it still requires the main processor to compute changes to a document before QuickDraw updates the screen, so we weren’t surprised to discover that the CPU accelerator was the winner in the Canvas redraw test. We selected all the elements in a complex test document and then shifted the entire collection left by 1 pixel, thereby causing the image to be redrawn. The redraw took 20 seconds without acceleration. The CPU accelerator increased the redraw speed by more than 50 percent. The accelerated-video cards did not help at all.

We performed a zoom test on a PageMaker document composed of text and a color image, pulling back from a 400-percent view to a 100-percent one. After timing the first iteration of this operation, we zoomed back to 400 percent. Then we zoomed the screen back to 100 percent again in order to time the effect of any image buffering or other technique used.
by the various accelerators that would speed up subsequent redraws.

The initial zoom out was handled best by the TokaMac ci CPU accelerator, which redraw the screen nearly two and a half times as fast as the unaccelerated-video card did. The fastest accelerated-video card in this test, the Radius PrecisionColor 24X, almost doubled the zooming speed. On the other hand, the E-Machines Futura MX was slower than the Designer 24. On the second zoom, however, it pulled up to third place behind the

SuperMac Thunder/24 and the Spectrum/24 PDQ Plus. The CPU accelerator produced about the same performance gain as in the first zoom, and the Radius and the RasterOps accelerated-video cards were actually slower in the second zoom test than they had been in the first. The CalComp ChromaVision QuickPlus was unable to run these tests, because our test document was incompatible with its screen size.

We evaluated the effect of on-board GWorld RAM by running all the tests on the two products that offered it, both with the GWorld RAM switched on and with it switched off. No performance difference was discernible on any of the tests. The primary reason is that our tests — and most current applications — make little use of GWorld memory. Although PageMaker 4.0 employs the QuickDraw GWorld commands and the System 7 Finder takes advantage of GWorld to manage memory when shifting among applications, any pronounced performance advantage to be gained from

---

**Figure 1: Speed Results**

<table>
<thead>
<tr>
<th>Overall Speed</th>
<th>One-Step Photoshop Scroll</th>
<th>Incremental Photoshop Scroll</th>
</tr>
</thead>
<tbody>
<tr>
<td>SuperMac Thunder/24</td>
<td>Designer 24 in 24-bit mode</td>
<td>Generation Systems Designer 24 in 24-bit mode</td>
</tr>
<tr>
<td>SuperMac Spectrum/24 PDQ Plus</td>
<td>Designer 24 in 24-bit mode</td>
<td>Generation Systems Designer 24 in 24-bit mode</td>
</tr>
<tr>
<td>SuperMac Spectrum/24 Series III</td>
<td>Designer 24 in 24-bit mode</td>
<td>Generation Systems Designer 24 in 24-bit mode</td>
</tr>
<tr>
<td>Radius PrecisionColor 24X</td>
<td>Designer 24 in 24-bit mode</td>
<td>Generation Systems Designer 24 in 24-bit mode</td>
</tr>
<tr>
<td>RasterOps 24XLI</td>
<td>Designer 24 in 24-bit mode</td>
<td>Generation Systems Designer 24 in 24-bit mode</td>
</tr>
<tr>
<td>CalComp ChromaVision QuickPlus</td>
<td>Designer 24 in 24-bit mode</td>
<td>Generation Systems Designer 24 in 24-bit mode</td>
</tr>
<tr>
<td>RasterOps 24XLTV</td>
<td>Designer 24 in 24-bit mode</td>
<td>Generation Systems Designer 24 in 24-bit mode</td>
</tr>
<tr>
<td>E-Machines Futura MX</td>
<td>Designer 24 in 24-bit mode</td>
<td>Generation Systems Designer 24 in 24-bit mode</td>
</tr>
<tr>
<td>Fusion Data Systems TokaMac ci</td>
<td>Designer 24 in 24-bit mode</td>
<td>Generation Systems Designer 24 in 24-bit mode</td>
</tr>
<tr>
<td>Generation Systems Designer 24 in 8-bit mode</td>
<td>Designer 24 in 24-bit mode</td>
<td>Generation Systems Designer 24 in 24-bit mode</td>
</tr>
</tbody>
</table>

---

**Figure 1:** To find out if an accelerated-video card can improve the performance of some popular applications, we performed a suite of real-world tests. We ran all the tests on the same Mac IIci connected to the same monitor. We compared the results with those of a Generation Systems Designer 24 unaccelerated-video card in 24-bit mode. We also subjected the Designer 24 to the same tests in 8-bit mode and repeated the tests with a Fusion Data Systems TokaMac ci to see the effect of CPU acceleration.

**Overall Speed:** The SuperMac Thunder/24 and Spectrum/24 PDQ Plus were fastest overall, almost doubling the speed of the Designer 24 unaccelerated-video card in 24-bit mode.

**One-Step Photoshop Scroll:** Many users of 24-bit color frequently use Photoshop, so we scrolled through some 24-bit Photoshop images to see if the accelerated-video cards could beat our control product. The Thunder/24 was 25 percent faster than the unaccelerated-video card, and the TokaMac ci CPU accelerator offered no improvement at all.

**Incremental Photoshop Scroll:** In the incremental scroll, SuperMac's Thunder/24 was five times as fast as the unaccelerated-video card. The TokaMac ci was actually 40 percent slower.
moving GWoId from system RAM to an accelerator card apparently lies in the future.

**Fastest for Your Dollar**

Finding the right accelerator requires that you find the best fit among the specific products, the applications you want to speed up, and your budget. Besides matching a video accelerator with software that can best take advantage of its power, you also need to ensure that the card you choose will work with your monitor. If you want to be sure of a perfect match, you can buy any of these accelerators as part of a combination video-board-and-monitor system (for example, the CalComp ChromaVision QuickPlus is available only with a matching monitor). Alternatively, you can shop separately for a compatible monitor (see Table 2). Most of the accelerated-video cards support several monitor resolutions and scan rates, or timings, meaning that you can buy an inexpensive auto-synchronous monitor to get started and later move up to a larger, more expensive display.

Note that you need to match timings as well as resolution. Some cards make this easy. For example, during installation the SuperMac products cycle through their various resolutions and timings and you simply press a button when you see a clear image. The E-Machines Futura MX requires you to select timings with a special plastic tool, which is not shipped with the board!

After reading this report, do you still want to buy a video accelerator?

---

**Table:**

<table>
<thead>
<tr>
<th>Word Scroll:</th>
<th>Canvas Redraw:</th>
<th>PageMaker Zoom:</th>
</tr>
</thead>
<tbody>
<tr>
<td>To see if Word users stand to gain anything from video acceleration, we scrolled through a ten-page text document and found that the SuperMac Thunder/24 was more than six times as fast as the Designer 24. The SuperMac Spectrum/24 PDQ Plus came in a close second, and all the other cards were about twice as fast as the unaccelerated card. As 24-bit color seems a waste for Word users, we ran the same test on the Designer 24 in 8-bit mode and found that it was nearly three times as fast as in 24-bit mode, beating the majority of the accelerated-24-bit-color cards. We could not run the test with the TokaMac ci, because Word 4.0 is incompatible with the TokaMac ci's 68040 processor.</td>
<td>We were surprised to find that the accelerated-video cards did nothing to speed up a Canvas redraw. The one product that really helped in this task was the TokaMac ci, proving that this task was primarily a compute-intensive one, a task for which video accelerators are not well suited.</td>
<td>Finally, we zoomed out to a 100-percent view from a 400-percent view of a PageMaker document consisting of text and a 24-bit-color image. We then repeated the same test to see if the cards were caching any of the video data. All the accelerated-video cards, with the exception of the Radius PrecisionColor 24X and the two RasterOps cards, performed the second zoom much faster than they did the first. The Designer 24 card was slower in 8-bit mode than it was in 24-bit mode because the 24-bit graphic had to be dithered for the 8-bit display.</td>
</tr>
</tbody>
</table>
True-color (24-bit) video is slow on the draw. To speed it up, you need an accelerated-video card. But if you're looking for an enormous savings in the time you spend waiting for your computer to finish an entire task, you may be disappointed. If you're just looking for something to speed up your screen's response time to reduce your frustration at having to wait for it to be updated, an accelerated-video card may be just the ticket.

The fastest card we tested was more than six times as fast as an unaccelerated-video card in 24-bit mode when scrolling through a Word document and was five times as fast with Photoshop. However, an unaccelerated-video card in 8-bit mode proved to be almost as fast as the accelerated-24-bit-color cards in most tests. If cost is an issue and 24-bit color isn't, save yourself a big chunk of dough and stick with an 8-bit system.

For those who want the best-performing accelerated-video card and don't mind paying for it, the SuperMac Thunder/24 ($3,499 list, $3,149 street) proved itself far and away the leader — sometimes more than twice as fast as the accelerators from the other companies. It's also upgradable to SuperMac's ThunderBolt, which will be released soon: ThunderBolt promises to open up a whole new world of acceleration for publishing, graphics, and digital-video professionals.

If price is a major issue, your best choice is the Radius PrecisionColor 24X ($1,999 list, $1,668 street). It missed being least expensive by a mere $4, and it consistently delivered performance as good as or better than that of the other non-SuperMac products. Although it's not a particularly good match for PageMaker, it accelerated incremental scrolling of other programs by a factor of 2 to 3.

CPU acceleration made a noticeable difference to display speed in many of our tests, particularly for generating and re-drawing images. For those who create and view rather than scroll around, a CPU accelerator may improve the Mac's on-screen performance more dramatically than a dedicated video accelerator does.

If, however, you want the best possible display speed and cost is no object, take advantage of both strategies. Add both a CPU accelerator and a graphics accelerator to your Mac. You'll make yourself (and probably two manufacturers) happy.

Accelerated-video cards are expensive, but they can overcome some of the waiting caused by your Macintosh’s CPU as it processes raw video data and tries to squeeze this data through NuBus bottlenecks. Accelerated-video cards do make your screen snapper. But to get that Photoshop filter to go any faster, you still need a fast CPU or a CPU accelerator or one of a new class of accelerator products discussed in the “On the Horizon” sidebar.

Winn L. Rosch offers all-purpose computer knowledge in The Winn Rosch Hardware Bible.

### Table 1 Criteria

- **List price** — The manufacturer's suggested retail price.
- **Street price** — The average actual price charged by a sample of dealers around the U.S. in November 1991.
- **Maximum power draw** — The maximum amount of power the card requires, in watts.
- **Supported bit depths** — The number of bits per pixel the card can support.
- **Supported resolutions** — The number of pixels that can be displayed (horizontally x vertically).
- **NTSC or PAL output** — Does the card let you output to analog monitors? NTSC is the U.S. analog standard, and PAL is the European analog standard.
- **Bundled software** — The software that's shipped with the card.
- **Hardware features** — Effects, such as panning and zooming, that the card offers.
- **GWorld RAM** — The number of slots provided for attaching GWorld SIMMs and the maximum amount of RAM, in megabytes.
- **Type/speed of SIMMs** — The type of RAM SIMMs the card can accommodate and their speed, in nanoseconds.
- **Block transfers** — Does the card support NuBus block-mode transfers?
- **Resolution switching** — Does the card let you change resolutions without having to reboot?
- **Adapter for Mac IIsi** — Is an adapter card for the Mac IIsi shipped with the board?
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CIRCLE 39 ON READER SERVICE CARD.
# Video Accelerators

## Table 1: Features of Video Accelerators

<table>
<thead>
<tr>
<th>Feature</th>
<th>CalComp ChromaVision QuickPlus</th>
<th>E-Machines Futura MX</th>
<th>Radius PrecisionColor 24X</th>
<th>RasterOps 24XLi</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>$4,995</td>
<td>$1,995</td>
<td>$1,999</td>
<td>$2,499</td>
</tr>
<tr>
<td>Street price</td>
<td>$4,995</td>
<td>$1,448</td>
<td>$1,668</td>
<td>$1,950</td>
</tr>
<tr>
<td>Pros</td>
<td>Supports 38 virtual-screen sizes. Five-year warranty.</td>
<td>Lets you change resolutions on the fly.</td>
<td>One-year warranty.</td>
<td>Expensive. To take advantage of 10-MB RAM disk, you must install 16 MB of RAM.</td>
</tr>
<tr>
<td>Cons</td>
<td>Card not sold separately. No support for 16-bit color. High power consumption. Supports only one resolution.</td>
<td>Mechanical switch to change timings. Accelerated scrolling only.</td>
<td>One-year warranty.</td>
<td>Expensive. To take advantage of 10-MB RAM disk, you must install 16 MB of RAM.</td>
</tr>
<tr>
<td>Features</td>
<td>Maximum power draw</td>
<td>9.5 watts</td>
<td>5 watts</td>
<td>9 watts</td>
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<tr>
<td></td>
<td>Supported bit depths</td>
<td>1, 2, 4, 8, 16, 24</td>
<td>1, 2, 4, 8, 16, 24</td>
<td>1, 2, 4, 8, 16, 24</td>
</tr>
<tr>
<td></td>
<td>Supported resolutions</td>
<td>1,520 x 768</td>
<td>640 x 480, 800 x 600, 832 x 624, 1,024 x 768</td>
<td>560 x 760, 640 x 480, 640 x 876, 800 x 600, 1,024 x 768, 1,152 x 870, 1,152 x 882</td>
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<tr>
<td></td>
<td>NTSC or PAL output</td>
<td>no</td>
<td>yes (via adapter)</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>Utility software</td>
<td>CalComp control panel</td>
<td>E-Machines control panel 3.3</td>
<td>RadiusWare 2.02</td>
</tr>
<tr>
<td></td>
<td>Bundled software</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>Hardware features</td>
<td>On-Display template</td>
<td>none</td>
<td>none</td>
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<tr>
<td></td>
<td>GWORLD RAM</td>
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<td>none</td>
<td>none</td>
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<tr>
<td></td>
<td>Type/speed of SIMMs</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>Block transfers</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>Resolution switching</td>
<td>no</td>
<td>yes</td>
<td>no</td>
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<tr>
<td></td>
<td>Adapter for Mac IIci</td>
<td>no</td>
<td>no</td>
<td>none</td>
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<tr>
<td>Other</td>
<td>Warranty</td>
<td>2 years</td>
<td>5 years</td>
<td>1 year</td>
</tr>
<tr>
<td></td>
<td>Memory-back guarantee</td>
<td>none</td>
<td>through dealer</td>
<td>none</td>
</tr>
<tr>
<td>Company</td>
<td>CalComp, Inc. 65 River Rd. CS908</td>
<td>9325 S.W. Gemini Dr.</td>
<td>Radius, Inc. 1710 Fortune Dr.</td>
<td>RasterOps, Inc. 2500 Walsh Ave.</td>
</tr>
<tr>
<td></td>
<td>Hudson, NH 03051 (800) 225-0065 (603) 885-5855</td>
<td>Beaverton, OR 97005 (800) 344-7274 (503) 646-9269</td>
<td>San Jose, CA 95131 (800) 227-2795 (408) 434-1010</td>
<td>Santa Clara, CA 95051 (800) 729-2556 (408) 582-4200</td>
</tr>
</tbody>
</table>

*In 8-bit 640 x 480-pixel interlaced monochrome mode only. Color output requires a RasterOps Video Expander.

†On-board SIMM slots can also be configured as a RAM disk.

§All SIMMs must have the same capacity, and all four slots must be used.
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CIRCLE 108 ON READER SERVICE CARD.
## Table 1: Features of Video Accelerators, continued

<table>
<thead>
<tr>
<th>Features</th>
<th>RasterOps 24XLTV</th>
<th>SuperMac Spectrum/24 PDQ Plus</th>
<th>SuperMac Spectrum/24 Series III</th>
<th>SuperMac Thunder/24</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>$2,999</td>
<td>$2,399</td>
<td>$1,699</td>
<td>$3,499</td>
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<tr>
<td>Street price</td>
<td>$2,585</td>
<td>$2,149</td>
<td>$1,499</td>
<td>$3,149</td>
</tr>
<tr>
<td>Cons</td>
<td>Expensive. Highest power requirements.</td>
<td>No support for 16-bit color.</td>
<td>High power consumption. No support for 16-bit color. Supports only three resolutions.</td>
<td>Expensive. High power consumption. No support for 16-bit color.</td>
</tr>
<tr>
<td>Features</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum power draw</td>
<td>19.5 watts</td>
<td>10 watts</td>
<td>18.75 watts</td>
<td>14.65 watts</td>
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<tr>
<td>Supported bit depths</td>
<td>1, 2, 4, 8, 16, 24</td>
<td>1, 2, 4, 8, 24</td>
<td>1, 2, 4, 8, 24</td>
<td>1, 2, 4, 8, 24</td>
</tr>
<tr>
<td>Supported resolutions</td>
<td>640 x 480, 800 x 600, 1,024 x 768, 1,152 x 870</td>
<td>512 x 384, 640 x 480, 768 x 576, 832 x 624, 1,024 x 768, 1,152 x 870</td>
<td>640 x 480, 800 x 600, 1,024 x 768, 1,152 x 870</td>
<td>512 x 384, 640 x 480, 768 x 576, 832 x 624, 1,024 x 768, 1,152 x 870</td>
</tr>
<tr>
<td>NTSC or PAL output</td>
<td>yes</td>
<td>yes*</td>
<td>yes*</td>
<td>yes*</td>
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<tr>
<td>Bundled software</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
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<tr>
<td>Hardware features</td>
<td>pan, zoom, extended desktop, video capture, hardware pan and zoom, 4 virtual-desktop sizes</td>
<td>hardware pan and zoom, 4 virtual-desktop sizes</td>
<td>pan, zoom, and extended desktop **</td>
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<td>GWorld RAM</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>4 slots, 8 MB maximum</td>
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<td>Type/speed of SIMMs</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>GWorld SIMMs, 80 ns or faster</td>
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<tr>
<td>Block transfers</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
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<tr>
<td>Resolution switching</td>
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<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Adapter for Mac Ilsi</td>
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<td>Other</td>
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<td>30 days, through dealer</td>
<td>30 days, through dealer</td>
<td>30 days, through dealer</td>
</tr>
<tr>
<td>Company</td>
<td>RasterOps, Inc. 2500 Walsh Ave. Santa Clara, CA 95051 (800) 729-2656 (408) 562-4200</td>
<td>SuperMac Technology 485 Potrero Ave. Sunnyvale, CA 94086 (800) 334-3005 (408) 245-2202</td>
<td>SuperMac Technology 485 Potrero Ave. Sunnyvale, CA 94086 (800) 334-3005 (408) 245-2202</td>
<td>SuperMac Technology 485 Potrero Ave. Sunnyvale, CA 94086 (800) 334-3005 (408) 245-2202</td>
</tr>
</tbody>
</table>

*In 8-bit 640 x 480-pixel interlaced monochrome mode only. Color output requires a RasterOps Video Expander.

** NTSC and PAL output in analog RGB mode only; $399 option.

***100-pin OpenSlot connector supports future expansion.
Introducing a few surprises you won’t find in other $2,000 scanners.

There are certain things you’d expect from a 600 dp i color scanner. Rapid speed. A choice of 24-bit color or 256 shades of gray. Exceptional optical quality.

But nothing you’ve learned about other scanners will have prepared you for the new UC630, by UMAX®.

The items above are a good example. The lamp: There’s one inside the UC630. Only one. Most scanners have three. And because each of those three lamps wears out at different rates, next month’s scans may be weaker in reds than today’s. A couple months later, it might be the greens that suffer.

Eventually, our single lamp wears out, too. That’s unavoidable. But thanks to our auto-calibration, you’ll never have to put up with off-color scans.

The dots: The UC630 prints 600 of them to an inch. Other vendors choose to sell 300 dpi scanners that use software to bump the resolution up to 600 dpi. The software manipulation works, but the image quality is perceptibly less than from a 600 dpi machine. Like ours.

And finally, what about those feet? A reference to UMAX’s brutal drop test: We pick up a UC630 (in its original box), and drop it. Three feet down. And what happens next? It works. The optical mirror even realigns itself automatically.

Look, we’re already out of space and haven’t even touched on the UC630’s speed (up to 60% faster than others), optical precision (a system given top marks by MacUser and MacWorld), or dynamic range (accurate readings of 16.8 million colors, and all 256 shades of gray). Not to mention our 24-hour turnaround for repairs, and the free Adobe Photoshop™ we include with every UC630.

So do us both a favor: Call 800-562-0311 for your nearby UMAX dealer, and come take a look.

You’ll see we’ve kept a few other surprises for your visit.

UMAX®
Maximize your image™
3170 Coronado Blvd., Santa Clara, CA 95054
408-982-0771; 408-982-0776 (fax)
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CIRCLE 246 on reader service card.
### Table 2: Compatible Monitors

<table>
<thead>
<tr>
<th>Monitor (resolution and timing)</th>
<th>CalComp ChromaVision QuickPlus</th>
<th>E-Machines Futura MX*</th>
<th>Radius PrecisionColor 24X</th>
<th>RasterOps 24XLTv</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Macintosh 16&quot; Color Display (832 x 624 @ 75 Hz)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Apple Macintosh 21&quot; Color Display (1,024 x 768 @ 75 Hz)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>AppleColor 12&quot; High Resolution RGB Monitor (512 x 384 @ 60 Hz)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>AppleColor 13&quot; High Resolution RGB Monitor (640 x 480 @ 67 Hz)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>E-Machines ColorPage E16 (640 x 480 @ 67 Hz)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>E-Machines ColorPage E16 II (832 x 624 @ 75 Hz)</td>
<td>✔</td>
<td>✔</td>
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</tr>
<tr>
<td>E-Machines ColorPage E16 II (832 x 624 @ 75 Hz)</td>
<td>✔</td>
<td>✔</td>
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<td>✔</td>
</tr>
<tr>
<td>E-Machines T19, TX (1,024 x 768 @ 71 Hz)</td>
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<td>✔</td>
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<tr>
<td>NEC MultiSync 3FGx, 4FG, 5FG, 6FG (1,024 x 768 @ 60 Hz)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>NEC MultiSync 3FGx, 4FG, 5FG, 6FG (1,024 x 768 @ 60 Hz)</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>NEC MultiSync 3FGx, 4FG, 5FG, 6FG (512 x 384 @ 60 Hz)</td>
<td>✔</td>
<td>✔</td>
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<td>✔</td>
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<tr>
<td>NEC MultiSync 3FGx, 4FG, 5FG, 6FG (832 x 624 @ 75 Hz)</td>
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<td>✔</td>
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<tr>
<td>NEC MultiSync 4FG, 5FG, 6FG (1,024 x 768 @ 75 Hz)</td>
<td>✔</td>
<td>✔</td>
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</tr>
<tr>
<td>NEC MultiSync 4FG, 5FG, 6FG (832 x 624 @ 75 Hz)</td>
<td>✔</td>
<td>✔</td>
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<td>✔</td>
</tr>
<tr>
<td>NEC MultiSync 5FG, 6FG (1,024 x 768 @ 75 Hz)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>NEC MultiSync 5FG, 6FG (560 x 760 @ 72 Hz)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>NEC MultiSync 5FG, 6FG (640 x 870 @ 75 Hz)</td>
<td>✔</td>
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<td>✔</td>
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<tr>
<td>NEC MultiSync 5FG, 6FG (800 x 600 @ 67 Hz)</td>
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<td>✔</td>
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<td>✔</td>
</tr>
<tr>
<td>NEC MultiSync 5FG, 6FG (768 x 576 @ 50 Hz)</td>
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<tr>
<td>PAL RGB (768 x 576 @ 50 Hz)</td>
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</tr>
<tr>
<td>RasterOps 19&quot; Trinitron (1,024 x 768 @ 75 Hz)</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>RasterOps 19&quot; Trinitron (1,152 x 870 @ 75 Hz)</td>
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<tr>
<td>Radius 21&quot; Color Display 0348 (1,152 x 870 @ 75 Hz)</td>
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<td>Radius Color Pivot (560 x 760 @ 72 Hz)</td>
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<tr>
<td>Radius Color Pivot (640 x 870 @ 75 Hz)</td>
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<tr>
<td>Radius PrecisionColor Display/19 (512 x 384 @ 60 Hz)</td>
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<td>Radius PrecisionColor Display/19, Display/20 (1,024 x 768 @ 75 Hz)</td>
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<td>Radius PrecisionColor Display/20 (640 x 480 @ 67 Hz)</td>
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<tr>
<td>RasterOps 19&quot; Trinitron (1,024 x 768 @ 60 Hz)</td>
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<td>RasterOps 21&quot; Hitachi (1,152 x 870 @ 75 Hz)</td>
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<td>Super VGA (600 x 800 @ 60 Hz)</td>
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<td>Super VGA (600 x 800 @ 67 Hz)</td>
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<td>Super VGA High Refresh (600 x 800 @ 72 Hz)</td>
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<tr>
<td>SuperMac 18&quot; (1,024 x 768 @ 69 Hz)</td>
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<tr>
<td>SuperMac 18&quot; (1,024 x 768 @ 75 Hz)</td>
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<td>SuperMac 18&quot; Dual-Mode Trinitron (1,152 x 870 @ 75 Hz)</td>
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<tr>
<td>SuperMac 20&quot; Dual-Mode Trinitron (1,024 x 768 @ 75 Hz)</td>
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<td>SuperMac 21&quot; SuperMatch Two-Page Color (1,152 x 870 @ 75 Hz)</td>
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<tr>
<td>SuperMac SuperMatch 17 (1,024 x 768 @ 75 Hz)</td>
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<td>✔</td>
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<tr>
<td>SuperMac SuperMatch 17 (1,024 x 768 @ 75 Hz)</td>
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<tr>
<td>SuperMac SuperMatch 17 (640 x 480 @ 50 Hz)</td>
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<td>SuperMac SuperMatch 17 (640 x 480 @ 75 Hz)</td>
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<td>SuperMac SuperMatch 17 (640 x 480 @ 75 Hz)</td>
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<tr>
<td>SuperMac SuperMatch 17 (800 x 600 @ 60 Hz)</td>
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<td>✔</td>
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<tr>
<td>SuperMac SuperMatch 17 (800 x 600 @ 67 Hz)</td>
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<tr>
<td>SuperMac SuperMatch 17 (800 x 600 @ 72 Hz)</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>SuperMac SuperMatch 17 (832 x 624 @ 75 Hz)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>SuperMac SuperMatch 17 (832 x 624 @ 75 Hz)</td>
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<tr>
<td>SuperMac SuperMatch 20 Color (1,024 x 768 @ 75 Hz)</td>
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<tr>
<td>VGA (640 x 480 @ 60 Hz)</td>
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<tr>
<td>VGA High Refresh (640 x 480 @ 75 Hz)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

* = RasterOps' version of this resolution and timing
* = SuperMac's version of this resolution and timing
* The E-Machines Futura MX card supports third-party displays via a separate cable.
The latest twist on fonts is the AgfaType CD-ROM v3.0. It's what type on CD should be—the widest selection of fonts and typographic software plus a powerful set of free features.

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HOW DOES THE AGFATYPE CD-ROM V3.0 STACK UP?

<table>
<thead>
<tr>
<th>Feature</th>
<th>AGFA</th>
<th>ADOBE</th>
<th>NEC</th>
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<tbody>
<tr>
<td>PostScript Fonts</td>
<td>1,900+</td>
<td>1,000+</td>
<td>1,000+</td>
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<tr>
<td>Pi and Symbol Fonts</td>
<td>145</td>
<td>19</td>
<td>19</td>
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<tr>
<td>TrueType Fonts</td>
<td>Yes</td>
<td>No</td>
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<td>Multimedia Type Tutorial</td>
<td>Free</td>
<td>None</td>
<td>None</td>
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<td>Electronic Catalog</td>
<td>Free</td>
<td>None</td>
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<td>Type Applications</td>
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<td>No</td>
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<td>Shareware</td>
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<td>No</td>
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<tr>
<td>Upgrades</td>
<td>Free</td>
<td>?</td>
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</table>

$99

Get the AgfaType CD-ROM v3.0 with 20 exclusive Agfa headline faces unlocked plus a Pi and Symbols font of your choice. An $830 retail value.

TC Jasper
Metropolis
Modern Twenty
ORLANDO
Quirinus Bold
Seina Black
SECTION BOLD CONDENSED
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PL Tower Condensed
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## Video Accelerators

**Table 2: Compatible Monitors, continued**

<table>
<thead>
<tr>
<th>Monitor (resolution and timing)</th>
<th>RasterOps 24XLI</th>
<th>SuperMac Thunder/24</th>
<th>SuperMac Spectrum/24</th>
<th>SuperMac Spectrum/24 Series III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Macintosh 16&quot; Color Display (832 x 624 @ 75 Hz)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Apple Macintosh 21&quot; Color Display (1,152 x 870 @ 75 Hz)</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>AppleColor 12&quot; High Resolution RGB Monitor (512 x 384 @ 60 Hz)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>AppleColor 13&quot; High Resolution RGB Monitor (640 x 480 @ 67 Hz)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>E-Machines ColorPage E16 (540 x 480 @ 67 Hz)</td>
<td>●</td>
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<td>●</td>
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</tr>
<tr>
<td>E-Machines ColorPage E16, T16 II (832 x 624 @ 75 Hz)</td>
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<tr>
<td>Apple Macintosh 16&quot; Color Display (832 x 624 @ 75 Hz)</td>
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<tr>
<td>Apple Macintosh 21&quot; Color Display (1,152 x 870 @ 75 Hz)</td>
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<td>E-Machines ColorPage E16 (540 x 480 @ 67 Hz)</td>
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<tr>
<td>E-Machines ColorPage E16, T16 II (832 x 624 @ 75 Hz)</td>
<td>●</td>
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<td>●</td>
</tr>
<tr>
<td>NEC MultiSync 3FGx, 4FG, 5FG, 6FG (1,024 x 768 @ 70 Hz) r</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>NEC MultiSync 3FGx, 4FG, 5FG, 6FG (1,024 x 768 @ 60 Hz) r</td>
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<tr>
<td>NEC RGB (768 x 576 @ 50 Hz)</td>
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<tr>
<td>Radius 21&quot; Color Display (640 x 480 (1,152 x 870 @ 75 Hz)</td>
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<tr>
<td>Radius Color Pixel (560 x 768 @ 72 Hz)</td>
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<td>Radius Color Pixel (640 x 870 @ 72 Hz)</td>
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<td>Radius PrecisionColor Display (1,024 x 768 @ 75 Hz) s</td>
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<tr>
<td>RasterOps 19&quot; Trinitron (1,152 x 870 @ 75 Hz)</td>
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<tr>
<td>RasterOps 19&quot; Trinitron (1,152 x 870 @ 75 Hz) r</td>
<td>●</td>
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<tr>
<td>RasterOps 19&quot; Trinitron (1,152 x 870 @ 75 Hz) s</td>
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<tr>
<td>RasterOps 21&quot; Hitachi (1,152 x 870 @ 75 Hz)</td>
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<tr>
<td>Super VGA (800 x 600 @ 67 Hz)</td>
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<td>Super VGA (800 x 600 @ 67 Hz)</td>
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<tr>
<td>Super VGA High Refresh (800 x 600 @ 72 Hz)</td>
<td>●</td>
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<tr>
<td>SuperMac 19&quot; (1,024 x 768 @ 60 Hz) r</td>
<td>●</td>
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<tr>
<td>SuperMac 19&quot; (1,024 x 768 @ 60 Hz) s</td>
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<tr>
<td>SuperMax 19&quot; Dual-Mode Trinitron (1,152 x 870 @ 75 Hz)</td>
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<tr>
<td>SuperMax 20&quot; Dual-Mode Trinitron (1,024 x 768 @ 75 Hz) r</td>
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<td>●</td>
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<td>●</td>
</tr>
<tr>
<td>SuperMax 20&quot; Dual-Mode Trinitron (1,024 x 768 @ 75 Hz) s</td>
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<td>●</td>
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<td>SuperMax SuperMatch 17 (1,024 x 760 @ 75 Hz) r</td>
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<td>SuperMax SuperMatch 17 (800 x 600 @ 60 Hz)</td>
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<td>SuperMax SuperMatch 17 (800 x 600 @ 72 Hz)</td>
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<tr>
<td>SuperMax SuperMatch 17 (800 x 600 @ 72 Hz)</td>
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<tr>
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<tr>
<td>VGA (512 x 384 @ 60 Hz)</td>
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<tr>
<td>VGA High Refresh (640 x 480 @ 75 Hz)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

- r = RasterOps’ version of this resolution and timing
- s = SuperMac’s version of this resolution and timing
COLORFAST. THE PROFESSIONAL FILM RECORDER WITH A PERSONAL PRICE.

Now, you can produce your own professional-quality overhead transparencies, 35mm color slides, and prints, right at your desk. Without the high cost or long turnaround time associated with service bureaus. All it takes is your color-equipped Macintosh® and ColorFast™, the full-featured digital film recorder from GCC Technologies.

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Which means you can make those last minute decisions and changes without sacrificing the quality of your presentation. Or a major chunk of your budget.

Even with all it does, perhaps the most amazing thing about ColorFast is its price: just $5,999. This includes everything: film recorder, 35mm and Pack Film Camera adapters, instant 35mm slide processor, overhead enlarger, software, sample film, Microsoft PowerPoint demo disk, slide mounts, cables, and a two year warranty.

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Circle 164 on reader service card.
Inkjet Color Printers

Affordable quality color is no longer an impossible dream. Here’s one printer that makes it a reality and one that doesn’t quite measure up.

Until recently, a color printer was an expensive luxury. Only a few affordable color printers were available, and even the best ones were limited-duty machines. Although these printers were fine for printing charts and simple presentations, their low resolutions kept them from producing crisp, letter-quality text.

Times have changed. Since our last look at affordable color printers (see "The Affordable Rainbow: Color Inkjet Printers," October '91, page 140), two new models have taken up the challenge of providing low-cost, all-purpose color. One of these printers succeeds, and the other doesn’t.

The Technology

Both new printers — the Hewlett-Packard DeskWriter C and the Kodak Diconix Color 4 — use inkjet technology. Minute nozzles in each printer’s disposable print-head cartridges transmit tiny drops of ink onto plain or clay-coated paper. The spacing of these nozzles determines each printer’s resolution: laser-quality 300 dpi in the case of the DeskWriter C and an inferior 192 dpi in the case of the Diconix Color 4.

The DeskWriter C’s text quality is equal to that of Hewlett-Packard’s popular monochrome DeskWriter. This is no surprise, because the DeskWriter C is essentially a color-capable DeskWriter that requires you to manually switch between a three-color and
MACWEEK
"The only utility that offers application substitution, and its Launch Menu is our favorite."

MACUSER
"...it's indispensable."

MACINTOSH BUYER'S GUIDE
"It's a good value mid..."

MACWORLD
"HAND-Off can save you a good deal of trouble."

MACWEEK
"It's so good that Apple should have included it in System software."

MICROTIMES
"Connectix's technical support is second to none."

MACUSER
Gave HAND-Off II its highest rating—5 mice!

Stop the endless search for files with HAND-Off II, the productivity tool that makes file access a snap. As MacUser said, "...it's indispensable."

LAUNCH YOUR FILES FASTER
The HAND-Off II launch menu speeds access to any file with a single mouse click from anywhere. You can launch a group of files simultaneously. It's the most convenient way to find and launch documents, even if they're missing or have been moved. HAND-Off II works with both Systems 6 & 7.

FIND YOUR FILES FASTER
Quickly open documents, aliases, or applications directly from a multi-level Apple menu in System 7. This feature alone can save you hours.

OPEN FILES, EVEN IF THE APPLICATION IS MISSING
If the application you need is missing, HAND-Off II will launch your choice of a compatible substitute. It is the only program that automatically helps you set the substitutes you need. Say goodbye forever to the annoying "Application Not Found."

KEEP YOUR SCREEN CLUTTER-FREE
Eliminate the clutter of overlapping windows. With System 7, HAND-Off II's AutoHide shows only the windows you are using. It clears messy desktops automatically.

UPGRADE NOW FOR ONLY $39.95
Upgrade to HAND-Off II for only $39.95. Simply provide a photocopy of the master disk or manual cover with your order. If you don’t own a utility package, start off right. HAND-Off II is the productivity tool that the experts rave about. Order it today from your favorite software supplier, or directly from Connectix for the list price of $99.

HAND-Off II comes with a 30-day money back guarantee. Plus, you’ll get toll-free technical support and qualify for free updates when you register.

Order today by calling 800-950-5880 or by completing the coupon below. For even faster service, FAX your order directly to Connectix at 415-571-5195. Get HAND-Off II now and stop digging for files forever.

800-950-5880

Connectix Corporation
2655 Campus Drive • San Mateo, CA 94403

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CIRCLE 62 ON READER SERVICE CARD.
Inkjet Color Printers

Figure 2: Image Quality

<table>
<thead>
<tr>
<th>Product</th>
<th>Street price (in $)</th>
<th>Jury score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hewlett-Packard DeskWriter C</td>
<td>$725</td>
<td>4</td>
</tr>
<tr>
<td>Kodak Diconix Color 4</td>
<td>$680</td>
<td>3</td>
</tr>
<tr>
<td>Hewlett-Packard PaintWriter XL</td>
<td>$1,830</td>
<td>5</td>
</tr>
</tbody>
</table>

(Street price) Jury score

Figure 2: The Hewlett-Packard DeskWriter C offers exceptional print quality and is available for less than $800. Our jury scored output quality from the DeskWriter C and the Diconix Color 4, using as a reference the output from a Hewlett-Packard PaintWriter XL, a winner in our most recent comprehensive report on color inkjet printers. Output from the PaintWriter XL was assigned a reference score of 3 on a scale that ranged from 1 to 5.

Figure 3: Printing Time

<table>
<thead>
<tr>
<th>Product</th>
<th>Time in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hewlett-Packard DeskWriter C</td>
<td>2</td>
</tr>
<tr>
<td>Kodak Diconix Color 4</td>
<td>4</td>
</tr>
<tr>
<td>Hewlett-Packard PaintWriter XL</td>
<td>6</td>
</tr>
</tbody>
</table>

Time in minutes

Figure 3: Despite its 192-dpi resolution, the Kodak Diconix Color 4 took longer than the 300-dpi Hewlett-Packard DeskWriter C to print a simple Claris Resolve presentation page. It also took longer to print a complex presentation document. The 180-dpi PaintWriter XL, however, easily sped past the DeskWriter C and the Diconix Color 4.

a black print-head cartridge. The Diconix Color 4 has four cartridges: one each for cyan, magenta, yellow, and black.

Heavily saturated images can soak and wrinkle a page. This is especially noticeable on pages produced by the DeskWriter C. Clay-coated paper is more resistant to warping and provides improved color. When creating transparencies, be sure to use a medium that’s designed for inkjet printers. With the DeskWriter C, 3M CG3460 transparency film produces exceptionally fine results.

How They Rate

Whatever medium you choose, both printers are easy to set up and use. Whereas the Diconix Color 4 has only a serial port, the DeskWriter C also has a LocalTalk port, which allows network access. When you begin to print, prepare to wait. Neither printer has a PostScript interpreter or an internal microprocessor, so the Mac must prepare each page. Despite its 300-dpi resolution, which requires your Mac to calculate nearly two and a half times as many dots per page, the DeskWriter C beat the Diconix Color 4 in every test of printing time.

Our jury found the DeskWriter C’s output clearly superior to that of the Diconix Color 4 in each of our four test documents. Although the DeskWriter’s high resolution can share the credit, Hewlett-Packard’s vibrant inks and an excellent scatter dither are also responsible for the high quality of the output.

On the Horizon

Even though the DeskWriter C is currently the best affordable color printer, challengers are on the way.
YOU'RE USING PRESENTATION SOFTWARE AND THEIR EYES ARE STILL GLAZED OVER.

Let’s face it. Audiences today are bored to death with presentation software. Everyone on the planet is using it. And it all looks the same. But there is a way to break the snooze factor—project your software on one of In Focus’ new color LCD projection panels. Not only will your ideas look better, they’ll have the waking power you need.

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YOUR IDEAS SCREAM OUT

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CIRCLE 52 ON READER SERVICE CARD.
Inkjet Color Printers

Figure 4: Output Samples

Although the Hewlett-Packard DeskWriter C can print on plain paper (left), printing on a special clay-coated medium (right) produces superior results.

A scatter dither generally produces better photo-realistic images (left, from the Hewlett-Packard DeskWriter C) than does a pattern dither (right, from the Kodak Diconix Color 4).

Canon, for example, has announced the BJC-820 printer, which employs an inkjet technology called bubblejet. The BJC-820 boasts 360-dpi output on plain paper as large as 11 x 17 inches.

When you choose the DeskWriter C’s three-color cartridge, you’re limited to composite black — an inferior almost-black that’s created by overlapping the cyan, magenta, and yellow inks. We wouldn’t be surprised if HP introduced an affordable four-color high-resolution printer — soon.

The Bottom Line

No longer are color printers too expensive and too limited for general use. The Hewlett-Packard DeskWriter C combines laser-quality text with excellent color output. Despite its limitations, it’s an excellent personal printer and a great home-office choice.

— Rik Myslewski

Table 1: Features of Inkjet Color Printers

<table>
<thead>
<tr>
<th>Feature</th>
<th>Hewlett-Packard DeskWriter C</th>
<th>Kodak Diconix Color 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>$1,095</td>
<td>$895</td>
</tr>
<tr>
<td>Street price</td>
<td>$725</td>
<td>$680</td>
</tr>
<tr>
<td>Cons</td>
<td>User must switch between black and color cartridges. Ink warps page.</td>
<td>Poor print quality. Limited print area. Low (192-dpi) resolution.</td>
</tr>
<tr>
<td>Company</td>
<td>Hewlett-Packard</td>
<td>Eastman Kodak Co.</td>
</tr>
<tr>
<td></td>
<td>19310 Prunetrige Ave.</td>
<td>901 Elm Grove Rd.</td>
</tr>
<tr>
<td></td>
<td>Cupertino, CA 95014</td>
<td>Rochester, NY 14653</td>
</tr>
<tr>
<td></td>
<td>(800) 752-0900</td>
<td>(800) 255-3434</td>
</tr>
<tr>
<td></td>
<td>(408) 725-0900</td>
<td>(716) 253-0740</td>
</tr>
</tbody>
</table>
Have you ever wondered what your design would look like printed on a grocery bag? Okay, maybe not. But when you're working with a Phaser™ III color printer, your thoughts do tend to go a little wild.

Because you can feed the Phaser III any kind of paper, from 80 lb. bond to acetate. Even paper towels. It also takes sizes up to 12" x 18" for printing tabloid bleeds. And with 16.7 million colors delivered at 300 dpi, you get gorgeous color on any media.

It's driven by a 24 MHz RISC chip with 10 MB RAM. Fast enough for you? And with Adobe's PostScript™ Language Level 2, your message will come out loud and clear.

The only thing you need is a well-fed imagination. Call 1-800-835-6100 Dept. 21A for your free output sample.
The thermal-wax-transfer printer faces formidable challenges to its reign as the most popular color printer for publishing and design professionals. New phase-change printers offer plain-paper convenience, and improved continuous-tone printers produce output quality that manufacturers of thermal-wax-transfer printers can only dream of.

But don’t count the old DTP workhorse out just yet: Vendors are slashing prices and adding features. As manufacturers strive to reduce the time it takes to produce high-quality color prints, speedy RISC microprocessors are becoming standard equipment in thermal-wax-transfer printers.

The Technology

When MacUser Labs last tested thermal-wax-transfer color printers (see “Easy Hard Copy: Color PostScript Printers,” May ’91, Buyer’s Guide page 38), only one—the Seiko ColorPoint PS—used a RISC microprocessor. Since then, five new RISC-based thermal-wax-transfer color printers have appeared. This month we tested four units: the General Parametrics Spectra®Star 430, Seiko ColorPoint PSX Model 14, Seiko Personal ColorPoint PS, and Tektronix Phaser II PXi. The fifth, the CalComp ColorMaster Plus, will be covered in a future report.

Every thermal-wax-transfer printer places images on the page in the same way: Colored wax comes on plastic ribbons in page-sized blocks of cyan, yellow, and magenta; some ribbons also include black. A thermal printing head melts only the wax that’s required for the image onto a special paperlike medium at a resolution of 300 dpi. The “paper” is then peeled away, and the melted wax adheres to the paper; the unmelted wax remains on the ribbon.
If you can’t see the difference, why pay the difference?

The Popular $30,000 Printer. The $10,999 RasterOps CorrectPrint 300.

Introducing the RasterOps CorrectPrint 300. The only truly affordable photorealistic printer.

Until now, only high priced printers gave you high quality color output.

But here's the new RasterOps CorrectPrint 300. An incredibly inexpensive printer that uses dye sublimation technology at 300 dpi to give you dramatic, continuous tone color at every pixel, without dithering.

A printer that turns out low cost, professional-looking comps and proofs.

A printer that uses a 33-MHz RISC processor to get the job done fast.

The new CorrectPrint 300 even includes PostScript®. And it has four networking ports for shared environments.

Wouldn't a printer like this, at a price like this, make a tremendous difference in your company?

Find out today. See your dealer or call 1.800.SAY.COLOR.
Figure 2: Image Quality

Thermal-Wax-Transfer Color Printers

<table>
<thead>
<tr>
<th>Printer Model</th>
<th>Price (Street)</th>
<th>Jury Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tektronix Phaser II PXi</td>
<td>$6,950</td>
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</tr>
<tr>
<td>General Parametrics Spectra*Star 430</td>
<td>$5,900</td>
<td>2</td>
</tr>
<tr>
<td>Seiko ColorPoint PSX Model 14</td>
<td>$10,900</td>
<td>4</td>
</tr>
<tr>
<td>Seiko Personal ColorPoint PS</td>
<td>$4,400</td>
<td>1</td>
</tr>
</tbody>
</table>

How They Rate

A PDL (page-description language) tells the printer exactly where to put each of the 300 dots per inch. The Phaser II PXi features Adobe's PostScript Level 2 PDL; this major rewrite of original PostScript improves printing speed and will enable superior color control once the proper driver software has been provided by Adobe. Both Seiko printers use the PhoenixPage PostScript Level 1 emulator, and the Spectra*Star 430 uses the PowerPage emulator, from Pipeline Associates.

In past testing, we've discovered that the performance of PostScript clones rarely matches that of the real thing. This month's testing confirms that observation: The Phaser II PXi processed all our test documents — from simple presentations to scanned photographs — faster than any other color printer using any technology.

Surprisingly, however, when we printed the test documents on our reference printer, a Tektronix Phaser PX, a moderately slow non-RISC-based printer (and a top pick in our May '91 report, because of its excellent output quality), it was faster than each of the new RISC-based printers except the Phaser II PXi when printing a simple presentation page.

The Tektronix Phaser II PXi was not only the fastest printer we tested but its output also tied for top thermal-wax-transfer print-quality honors with that produced by the General Parametrics Spectra*Star 430, according to our jury. What's more, each produces exceptional transparencies — an important advantage over the competing phase-change Tektronix Phaser III PXi, which produces bright prints...
The Pinnacle

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Introducing the Pinnacle Micro REO-130S rewritable optical drive featuring the new Sony 3.5" mechanism. With its 38 msec access time, the REO-130S is the perfect storage solution for personal computing, desktop publishing, multimedia, data distribution and backup.

Pricing advantage over Bernoulli® and Syquest™. Pinnacle's REO-130S offers a lower cost per megabyte compared to its magnetic storage competition. Users now need fewer disks while getting more storage capacity at a lower price.

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Type: 3.5" Optical
Capacity: 128 MB
Size: 6.75"(H) x 2.125"(W) x 8.25"(L)
Mounting: Vertical or Horizontal
Thermal-Wax-Transfer Color Printers

on opaque media but can manage only dull transparencies. It isn’t surprising that the Phaser II PXi and Spectra*Star 430 should tie for top honors. Both use essentially identical Sharp printing engines.

Output from the two Seiko printers was not as impressive as that from the other two units, but it was better than output from most of the printers in our May ’91 report. However, don’t believe the Seiko Personal ColorPoint PS ads that tout its ability to print on “laser plain paper.” When we did so, the results were far from satisfactory.

On the Horizon

Even when printed on a medium designed especially for thermal-wax-transfer printers, images from the Personal ColorPoint PS sometimes had drops that tiny spots where wax failed to adhere to the page. The Personal ColorPoint PS’s most outstanding feature is its price: less than $5,000. By the time you read this, Tektronix should have released some serious competition—the RISC-based Phaser II PXe. The Phaser II PXe’s price will match that of the Personal ColorPoint PS and will include PostScript Level 2, with all its advantages.

The Bottom Line

Price competition is but one indication that manufacturers of thermal-wax-transfer printers are trying hard to maintain their machines’ popularity among DTP and graphics professionals. They’re also adding RISC power, new features such as automatic switching among multiple ports (found on all four printers), and enhanced upgrade paths—the General Parametrics Spectra*Star 430, for example, can be upgraded to the model 440, which includes an internal hard drive, or to the 450, which adds a 35mm slide maker. The General Parametrics Spectra*Star 430 and its faster, more expensive PostScript Level 2 cousin, the Tektronix Phaser II PXi, are our choices for the best thermal-wax-transfer printers.

—Rik Myslewski

<table>
<thead>
<tr>
<th>Table 1: Features of Thermal-Wax-Transfer Color Printers</th>
</tr>
</thead>
<tbody>
<tr>
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<td><strong>Cons</strong></td>
</tr>
<tr>
<td><strong>Company</strong></td>
</tr>
</tbody>
</table>
How to Master 20 Popular Macintosh Programs
Without Ever Reading The Manuals

Macintosh Programs Can Be Learned in a Few Hours With the Right Training

Over the past four years I've been associated with over 50,000 people attempting to learn the Macintosh computer. I've watched as each person wages their own personal, private battle to master the computer and the most popular Macintosh programs.

I've seen their frustration, have empathized with their confusion, and understood their computer fears. I've talked to workers who have had new computers and new programs simply dropped on their desk with the directive to, "learn this." I've listened to people who have struggled night after night trying to read and understand a computer manual. Can you imagine trying to understand and master 4th Dimension from the manual?

You would be surprised at the number of people who have confided in me the fact that they've given up trying to learn some of the programs. They put the box on the shelf and write the expenditure off as a bad investment.

Hard Earned Money Wasted

Can you imagine how much money has been wasted on programs and computers that are sitting abandoned? Right now think of the people working on Macs in your office. Do they really understand the computer? Do they know what to do when it goes down? How many programs are each of your people using? Have they really mastered the programs they're using? Do they know the short-cuts and valuable techniques that will save you time, money, and increase their professionalism?

An Excellent, Low Cost Training Answer

Four years ago I founded MacAcademy. My purpose was to create a training organization that provided training similar in nature to the Macintosh itself - simple, easy to use, and effective.

Now, four years later the concept has proven to be a great success. Right now people are benefiting from MacAcademy training in over 100 cities in the U.S., in Canada, Great Britain, Australia, Japan, Hong Kong, and 22 additional countries throughout the world.

MacAcademy training is successful for one reason - it works!
Phase-Change

Color Printers

A new technology offers tabloid-sized output, PostScript Level 2, and brilliant colors on plain paper. Is this the end of the familiar thermal-wax-transfer color printer?

Figure 1: The Tektronix Phaser III PXi offers brilliant colors on letter- or tabloid-sized plain paper — if you’re not in a hurry.

The Technology

Phase-change printing is so named because its solid color-carrying medium, dye-impregnated wax, changes its phase — or physical state — to a liquid when it melts before being transferred to the page and then back to a solid as it hardens on the page. The phase-change color printer we examined for this update report, the Tektronix Phaser III PXi, secures the wax to paper by applying cold pressure of 3,000 pounds per square inch.

Three advantages of this technology stand out: First, the color-carrying medium is an inexpensive, easily handled “crayon.” Second, phase-change technology lets you print on almost any medium that can fit through the printer — plain paper, transparencies, card stock, or tissue paper. The cost savings can be substantial: The Phaser III PXi prints a tabloid page for 50 cents, compared with more than a dollar for a typical page produced by a thermal-wax-transfer printer. Third, the colors in the wax can be brilliant — for example, the magenta dye used in the Phaser III PXi actually fluoresces, unlike printing inks; this brilliance can cause color-matching problems, however.
### Power Up To Maximum Ram

<table>
<thead>
<tr>
<th>Memory Kits</th>
<th>SIMM Sizes Available</th>
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<tbody>
<tr>
<td>1MB</td>
<td>2MB 3MB 4MB 6MB 8MB 16MB</td>
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<td>Macintosh Plus</td>
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<td>Macintosh SE</td>
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<td>PowerBook 170</td>
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**Cards**

- Macintosh LC - 512K RAM - LC FPU
- Macintosh IIsi - Adapter Card - Adapter Card with FPU
- Quadra 700/900 - 256K RAM
- Macintosh Ile - Cache Card

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800-866-2785

Circle 105 on header service card.
Figure 2: Image Quality

<table>
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<th>Score</th>
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<td></td>
</tr>
<tr>
<td>Tektronix Phaser PX ($5,250)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Seiko ColorPoint PSX Model 14 ($10,900)</td>
<td>4</td>
<td></td>
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Figure 2: Our jury compared output samples from a Tektronix Phaser III PXi, which can print tabloid-sized pages, with samples printed by two thermal-wax-transfer printers: a letter-sized page from a Tektronix Phaser PX, a winner in our most recent comprehensive report on color PostScript printers, and a tabloid-sized sheet from a Seiko ColorPoint PSX Model 14. The Phaser PX’s output was assigned a reference score of 3 on a scale of 1 to 5.

Figure 3: Printing Time

<table>
<thead>
<tr>
<th>Product</th>
<th>Simple page</th>
<th>Complex page</th>
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<tr>
<td>Tektronix Phaser III PXi</td>
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<td>9</td>
</tr>
<tr>
<td>Tektronix Phaser II PXi</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Tektronix Phaser PX</td>
<td>7</td>
<td>12</td>
</tr>
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</table>

Figure 3: Although the Tektronix Phaser III PXi’s fast RISC microprocessor can quickly prepare a page for printing, the print head is in action for as long as eight minutes. We compared the time a Phaser III PXi and two Tektronix thermal-wax-transfer color printers took to print a letter-sized presentation page. The older Phaser PX, with its proprietary PostScript-clone interpreter, was the slowest when printing a page filled with complex PostScript images.

How It Rates

The Phaser III PXi has at least three more shortcomings: It produces second-rate transparencies (our jury determined the image quality it produces on paper to be superior to that produced by any thermal-wax-transfer printer we’ve tested, however). Another problem is that the unit is large: At 90 pounds and with a 35-x-25-inch footprint, it’s hardly a personal desktop printer. Also, our tests showed it to be slower than many thermal-wax-transfer printers when printing simple or complex presentation pages.

Although its powerful Am29000 RISC microprocessor can process images as fast as the microprocessor of an equally powerful thermal-wax-transfer printer can, the Phaser III PXi uses a bulky 10-pound print head to transfer wax onto a page, a process that can take as long as eight minutes for a full tabloid image.

On the Horizon

The Phaser III PXi’s performance will improve when Adobe’s PostScript Level 2 driver software, with its improved color-handling and image-compression capabilities, is finally released. Other phase-change printers are also appearing, and one of them — the Dataproducts Jolt PS — will also incorporate Adobe’s PostScript Level 2 page-description language. The Jolt PS, powered by a Weitek 8220 RISC microprocessor, will list for less than $7,000 and will be released soon after Adobe releases its Level 2 driver — probably later this year.

Brother is readying its own phase-change — or what the company calls hot melt — printer. Using a proprietary page-description language, BR
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- 24 Bit Video Interface
- Extended Keyboard
- 16” Color Monitor
- Color Management System
- VariColor™ Publishing System Software Package

2990B Color Publishing System
As above and also includes:
- 829 MB Internal Hard Drive
- 68 MB of RAM
- 20” Color Monitor

2990A/4990A System Bundle
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- BarneyScan CIS Color Access Software
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Phase-Change Color Printers

Figure 4: Output Samples

The Tektronix Phaser III PXi prints crisp images on plain paper. On the right is a sample of Phaser III PXi output on plain paper, magnified two times. The image on the left is printed by a thermal-wax-transfer printer on a special medium. The difference is imperceptible.

The bright magenta dye used by the Phaser III PXi (right) results in a "hotter" purple than that produced by the thermal-wax-transfer Phaser II PXi (left). The bottom row shows each sample magnified four times to demonstrate the dither pattern.

Script, a prototype of this as-yet-unnamed printer produced the finest transparencies we've ever seen.

The Bottom Line

If you're considering a high-end color printer but are concerned about the limitations of thermal-wax-transfer technology, take a close look at the Tektronix Phaser III PXi. It may be big and slow — and its phase-change technology may not have the millions of hours of real-world experience of thermal-wax-transfer technology — but it prints beautifully on almost anything, and for a tabloid-sized high-quality PostScript Level 2 printer, it's priced right.

— Rik Myslewski

Table 1: Features

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<thead>
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<th></th>
<th>Tektronix Phaser III PXi</th>
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<td>List price</td>
<td>$9,995</td>
</tr>
<tr>
<td>Street price</td>
<td>$9,000</td>
</tr>
<tr>
<td>Pros</td>
<td>Bright, saturated colors. Low cost per page. Prints on most media. Very good print quality.</td>
</tr>
<tr>
<td>Cons</td>
<td>Mediocre transparency quality. Requires 20-minute warm-up. Magenta may be too bright for some uses. Large. Slow.</td>
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<tr>
<td>Company</td>
<td>Tektronix, Inc.</td>
</tr>
<tr>
<td></td>
<td>P.O. Box 500</td>
</tr>
<tr>
<td></td>
<td>Wilsonville, OR 97077</td>
</tr>
<tr>
<td></td>
<td>(800) 835-6100</td>
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Continuous-Tone
Color Printers

Sometimes only the best will do. Perfection is still expensive, but a new, aggressively priced crop of photo-quality printers will ease your access to excellence.

What is acceptable print quality? The answer involves not only what you plan to do with a printed page but also who decides what’s acceptable — you or the client you’re trying to impress.

Despite the dominance of thermal-wax-transfer printers and the introduction of phase-change technology, a new high-quality standard is beginning to emerge: continuous-tone printing. As familiarity with the near-photographic quality of continuous-tone output becomes more widespread, users will no longer be satisfied with the dot-ridden output of other color technologies. The definition of acceptable is about to change.

The Technology

A non-continuous-tone printer creates patterns of cyan, magenta, yellow, and black dots that fool your eye into seeing colors that aren’t really there. A continuous-tone printer, as its name suggests, avoids this dithering process by blending the colors as they are printed, rather than making your brain perform the chore.

The Mitsubishi International CHC-S445, like most current continuous-tone printers, uses a technology called dye sublimation. Colored dyes, supplied on ribbons similar to those used in thermal-wax-transfer printers, vaporize when heated and blend when they are absorbed into the required special medium. Instead of the 300 dots per inch printed by thermal-wax-transfer and phase-change printers, the CHC-S445 prints 300 areas per inch — and these areas blend seamlessly together.

How It Rates

The CHC-S445’s Shinko print engine controls the amount of cyan, magenta, yellow, and black that is released into each area: either 64 or 256 levels per color. The 256-level option gives each pixel access to the 16.8 million colors that are available in a Mac with 32-bit QuickDraw, but it doubles the printing time. Although the CHC-S445 uses a powerful Am29000 RISC microprocessor, 256-level printing is slow when compared with RISC-based thermal-wax-transfer printing.

The CHC-S445’s output is impressive — our jury rated it higher than that of any other printer tested this month — but this printer suffers from the same handicap as did the two continuous-tone printers we’ve tested previously (the Mitsubishi Electronics S340-10, included in “Color on the Page” [May ’90, Buyer’s Guide page 56], and the Kodak XL 7700, reviewed in January ’91 [page 62]): It was not designed expressly for the Mac. For example, the RISC-based RIP (raster-image processor) is in an external unit that includes a non-Mac-like 5.25-inch floppy-disk drive for upgrades to its PowerPage PostScript-clone interpreter, from Pipeline Associates.

On the Horizon

The CHC-S445’s non-Mac lineage will become less of an issue later this year, when Mitsubishi International
Figure 2: Image Quality

Mitsubishi International CHC-S445 ($17,000) Better
Tektronix Phaser II PXi ($6,950)
Tektronix Phaser PX ($5,250)

Reference standards

Jury score

1 2 3 4 5

(Street price)

Table 1: Features

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<th>Features</th>
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<td>$18,750</td>
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<tr>
<td>Street price</td>
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<tr>
<td>Pros</td>
<td>High-resolution continuous-tone process provides near-photo-quality output. Small footprint, 24-bit palette.</td>
</tr>
<tr>
<td>Cons</td>
<td>Expensive. Five dollars per page. External processor required for PostScript. (New model scheduled for midyear with PostScript clone on add-in card and automatic port switching.)</td>
</tr>
<tr>
<td>Company</td>
<td>Mitsubishi International Corp.</td>
</tr>
<tr>
<td></td>
<td>701 Westchester Ave.</td>
</tr>
<tr>
<td></td>
<td>White Plains, NY 10604</td>
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<td></td>
<td>(914) 997-4999</td>
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The quality of continuous-tone printing is impressive, but it doesn't come cheap. Our jury compared a set of output samples from the Mitsubishi International CHC-S445 with the same images printed by a Tektronix Phaser PX, a winner in our most recent comprehensive report on thermal-wax-transfer printers, and its newer sibling, the Tektronix Phaser II PXi. The Phaser PX's output was assigned a reference score of 3 in a scale that ranged from 1 to 5.

releases the CHC-S446i ColorStream/DS, which includes an internal RIP; slots for function cards such as a PowerPage PostScript-clone interpreter; and automatic emulation switching among Centronics, RS-232, and AppleTalk ports (an optional TCP/IP Ethernet port is also planned).

The ColorStream/DS will have plenty of competition. The RISC-based RasterOps CorrectPrint 300 will include two Ethernet ports — 10BASE-T and thick coaxial — along with AppleTalk and serial ports. It will list for $10,999 — but without RAM. At current prices, you'll spend more than $1,000 extra to supply it with the recommended 36 megabytes of RAM.

The RISC-based GCC ColorTone, also targeted at the $10,000 level, will include 10 megabytes of RAM and a 100-megabyte internal hard drive that will store fonts, allow easy upgrades to its PhoenixPage PostScript-clone interpreter, and provide full-page buffering.

Mitsubishi International's sibling rival, Mitsubishi Electronics, has announced the DiamondColor Print 300. This $14,995 unit is promised to print faster than its competition and will include 32 megabytes of RAM, a full-page buffer, and front-panel-operated color-correction capability.

Kodak's hefty XL 7700 is being upgraded to the XLT 7720. The unit will be able to produce better transparencies and will have improved memory management, a Photoshop plug-in, a Chooser-level driver, and a proprietary PostScript-clone interpreter. Seiko also is planning to introduce a $19,999 QuickDraw-based model, the ColorPoint SSC.

Table 1: Features

The Bottom Line

Printers, such as the Mitsubishi International CHC-S445, that use dye-sublimation-technology are making continuous-tone printing the new standard for high-end presentations and publishing proofs. Although the CHC-S445 has its strengths, we recommend that you wait for one of the many new continuous-tone printers before making a choice. Competition is about to heat up, and when it does, prices usually drop.

— Rik Myslewski
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MacWEEK Review

"The editor's choice: 21" SuperMatch™ display with a Spectrum/24™ PDQ board or, better yet, the super-fast Thunder/24™."

Macworld Magazine

"Best Products of 1991 Award: Thunder/24 from SuperMac."

Byte Magazine

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CIRCLE 131 on reader service card.
## Color Directory

### Calibration Systems

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<tr>
<th>Company</th>
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<td>Electronics for Imaging, Inc.</td>
<td>950 Elm Avenue, San Bruno, CA 94066</td>
<td>(415) 742-3400</td>
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<tr>
<td>Cachet</td>
<td>$595</td>
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<td>Pantone, Inc.</td>
<td>55 Knickerbocker Road, Moonachie, NJ 07074</td>
<td>(201) 935-5500</td>
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<td>Broadcast Color System</td>
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<td>Process Color Imaging Guide</td>
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<td>Professional Color Toolkit</td>
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<tr>
<td>Radius, Inc.</td>
<td>1710 Fortune Drive, San Jose, CA 95131</td>
<td>(800) 227-2795, (408) 434-1010</td>
</tr>
<tr>
<td>PrecisionColor calibrator</td>
<td>$999</td>
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<tr>
<td>RasterOps</td>
<td>2500 Walsh Avenue, Santa Clara, CA 95051</td>
<td>(800) 729-2656, (408) 562-4200</td>
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<tr>
<td>Color Transform Engine card</td>
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<td>CorrectColor Calibrator</td>
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<td>System software</td>
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<tr>
<td>Savitar</td>
<td>139 Townsend Street, Suite 203, San Francisco, CA 94107</td>
<td>(415) 243-3030</td>
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<tr>
<td>ScanMatch for Flatbed</td>
<td>$199</td>
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<td>Scanners</td>
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### Display Systems

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<td>SuperMac Technology</td>
<td>485 Potrovo Avenue, Sunnyvale, CA 94086</td>
<td>(800) 334-3095, (408) 245-2202</td>
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<tr>
<td>Macintosh Professional Color Matching System</td>
<td>$599</td>
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<tr>
<td>Technical Publishing</td>
<td>2205 Sacramento Street, San Francisco, CA 94115</td>
<td>(415) 921-8500</td>
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<tr>
<td>Color Calibration Software</td>
<td>$695</td>
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<tr>
<td>Tektronix, Inc.</td>
<td>P.O. Box 1000, MS#63-630, Wilsonville, OR 97070</td>
<td>(800) 835-6100, (503) 627-7111</td>
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<td>TekColor for the Macintosh</td>
<td>$999</td>
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<tr>
<td>Eastman Kodak Co.</td>
<td>343 State Street, Rochester, NY 14650</td>
<td>(800) 242-2424, (716) 724-4000</td>
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<tr>
<td>Digital Camera System</td>
<td>$19,995 to $24,995</td>
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<td>Sony Corp.</td>
<td>Sony Drive, Park Ridge, NJ 07656</td>
<td>(201) 930-6432</td>
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<td>Digital Camera System</td>
<td>$19,995 to $24,995</td>
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<tr>
<td>DIH-2100 Still-Video</td>
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<td>Transceiver</td>
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<td>Media Mover Mac-Input Module</td>
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<tr>
<td>ProMavica still-video cameras</td>
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<td>E-Machines, Inc.</td>
<td>3305 S.W. Gemini Drive, Beaverton, OR 97005</td>
<td>(800) 344-7274, (503) 646-6699</td>
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<td>ColorPage E16/Futura SX system</td>
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<td>Generation Systems, Inc.</td>
<td>2648 Patton Road, St. Paul, MN 55113</td>
<td>(800) 325-5811, (612) 633-5294</td>
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<td>Color Display</td>
<td>$5,495</td>
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<tr>
<td>Infotronic America</td>
<td>8834 N. Capital of Texas, Highway, Suite 200, Austin, TX 78759</td>
<td>(512) 345-9646</td>
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<td>Info Mac 3224</td>
<td>$3,995</td>
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<tr>
<td>Mass Microsystems, Inc.</td>
<td>810 W. Maude Avenue, Sunnyvale, CA 94086</td>
<td>(800) 325-7907, (408) 522-1200</td>
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<td>Rival 19&quot; monitor</td>
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<td>Mirror Technologies, Inc.</td>
<td>2644 Patton Road, Roselle, NJ 07073</td>
<td>(800) 654-5294, (612) 633-4445</td>
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<td>Mirror 16&quot; Trinitron System</td>
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<td>Mirror ProView V24 (Hitachi)</td>
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<td>Mitsubishi Electronics</td>
<td>5665 Plaza Drive, Cypress, CA 90630</td>
<td>(800) 843-2515, (714) 238-6352</td>
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<td>DiamondPro 14 auto-scan monitor</td>
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<td>Nanao USA Corp.</td>
<td>23355 Tejo Avenue, Torrance, CA 90605</td>
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<td>1414 Massachusetts Avenue</td>
<td>(800) 632-4636</td>
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<td>Boxborough, MA 01719</td>
<td>(508) 264-8000</td>
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<td>Nissei Sangyo America/Hitachi</td>
<td>800 South Street</td>
<td>(800) 441-4832</td>
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<td>Waltham, MA 02154</td>
<td>(617) 893-5700</td>
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<td>320 S. Milpitas Blvd.</td>
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<td>Samsung Information Systems</td>
<td>3655 N. First Street</td>
<td>(800) 446-0262</td>
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<td>San Jose, CA 95134</td>
<td>(408) 434-5482</td>
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<tr>
<td>Seiko Instruments USA, Inc.</td>
<td>1130 Ringwood Court</td>
<td>(408) 922-5900</td>
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<td>Sigma Designs</td>
<td>47900 Bayside Parkway</td>
<td>(510) 770-9101</td>
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<tr>
<td>SuperMac Technology</td>
<td>485 Potrero Avenue</td>
<td>(800) 334-3005</td>
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<td>Sunnyvale, CA 94086</td>
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<tr>
<td>Truevision</td>
<td>7340 Shadeland Station</td>
<td>(317) 841-0332</td>
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<td>TVM</td>
<td>1109 W. Ninth Street</td>
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<tr>
<td>Management Graphics</td>
<td>1401 E. 79th Street</td>
<td>(612) 854-1220</td>
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<tr>
<td>Mirus Industries Corp.</td>
<td>758 Sycamore Drive</td>
<td>(800) 942-9770</td>
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<tr>
<td>Polaroid</td>
<td>575 Technology Square</td>
<td>(800) 225-1618</td>
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<td></td>
<td>Cambridge, MA 02139</td>
<td>(617) 577-2000</td>
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(503) 646-6699  
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Futura/MX, $1,995  
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(800) 227-2795  
(408) 434-1010  
PrecisionColor 24x interface, $1,999  
QuickColor, $795  
QuickColor Graphics Accelerator (not including video card), $395  
Radius QuickCAD Graphics Engine, $1,495  
Radius QuickColor Graphics Engine, $595  
RasterOps  
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Santa Clara, CA 95051  
(800) 729-2856  
(408) 562-4200  
RasterOps 24XLI, $2,499  
RasterOps 24XTV, $2,999  
RasterOps Accelerator 881, $499  
SuperMac Technology  
485 Potrero Avenue  
San Francisco, CA 94080  
(800) 334-3005  
(408) 245-2202  
Spectrum/24 PDS, $999  
Spectrum/24 PDS Plus, $2,399  
Spectrum/24 Series III, $1,699  
SuperMac Thunder/24, $3,499

Image-Editing Software  
Adobe Systems  
1565 Charleston Road  
P.O. Box 7900  
Mountain View, CA 94039  
(800) 833-6867  
(415) 961-4400  
Photoshop, $895  
Aldus Corp.  
411 First Avenue S.  
Seattle, WA 98104  
(800) 333-2958  
(206) 628-2320  
Aldus Gallery Effects — Volume 1: Classic Art, $199  
Digital Darkroom, $395  
DTI (Digital Technology International)  
500 W. 1200 S.  
Orem, UT 84058  
(801) 226-2984  
SpeedSep, $4,995  
Evergreen Technologies, Inc.  
Diamond Farm Office Park  
849-M Quince Orchard Blvd.  
Gaithersburg, MD 20878  
(301) 948-1800  
MedVision, $895 per module  
Fractal Design Corp.  
101 Madeline Drive, Suite 204  
Aptos, CA 95003  
(408) 688-8800  
ColorStudio (includes Shapes), $795  
Leaf Systems, Inc.  
250 Turnpike Road  
Southboro, MA 01772  
(508) 460-8300  
Phottone Pre-Press, $1,995  
MediaLab Technologies  
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Foster City, CA 94404  
(415) 345-4620  
PictureAccess, $295  
Olduvai Corp.  
7520 Red Road, Suite A  
South Miami, FL 33143  
(800) 822-0772  
(305) 665-4665  
VideoPaint, $495  
Pre-Press Technologies  
2443 Impala Drive  
Carlsbad, CA 92008  
(619) 931-2995  
SpectreTouch, price unavailable at press time

Ray Dream, Inc.  
1804 N. Shoreline Blvd.  
Mountain View, CA 94043  
(415) 960-0765  
JAG (Jaggies Are Gone), $99.95

Spectral Innovations  
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Suite 450  
Santa Clara, CA 95054  
(408) 727-1314  
Lightning Effects (DSP card and software), $1,295

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Seattle, WA 98104  
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(206) 628-2320  
SuperPaint, $199

Delta Tao Software, Inc.  
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(800) 827-9316  
(408) 790-9336  
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Monet, $399  
Zeus, $499

Deneba Software  
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Miami, FL 33122  
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(305) 594-6965  
Canvas 3.0, $399  
UltraPaint, $199

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San Mateo, CA 94404  
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(415) 571-7171  
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Microtek removes the biggest barrier to owning a Slide Scanner

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The ScanMaker 1850 sports a formidable set of specs. 35 x 35mm scanning area. 24-bit color. 8-bit gray-scale. 1850 dpi resolution. Best of all, it's so easy to use. Just drop in any slide and you're ready to start scanning.

The ScanMaker 1850 gives you everything you need to go from comp to final color separations. It even comes bundled with PhotoStyler for the PC or Adobe Photoshop for the Mac.

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Minneapolis, MN 55430
(800) 685-6322
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Easy Color Paint, $89
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Des Moines, IA 50322
(800) 388-8109
(515) 270-8109
Color It!, $119.95
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Marina del Rey, CA 90291
(310) 822-9200
Photon Paint, $149.95
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Sunnyvale, CA 94086
(800) 334-3005
(408) 245-2202
PixelPaint Professional, $799
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Santa Rosa, CA 95407
(707) 576-7722
Oasis, $795

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Lake Success, NY 11042
(516) 488-6700
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ColorCross
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Norcross, GA 30071
(404) 840-6500
Plain-Paper Full-Color Printer, $34,995
Eastman Kodak
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Rochester, NY 14650
(800) 242-2424
(716) 724-4000
Kodak P6600 Color Video Printer, $4,300
Kodak S6600 Color Video Printer, $4,300
Kodak XL 7700, $19,770
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Albuquerque, NM 87113
(505) 822-1123
StarBurst Dual Mode Color Printer, $15,000
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Cypress, CA 90630
(800) 843-2515
(505) 822-1123
Mitsubishi S340-10, $13,995
Mitsubishi International Corp.
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White Plains, NY 10604
(914) 997-4999
CHC-S445, $18,750
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SmartJet 4012, $39,000
Sharp Electronics Corp.
Sharp Plaza
Mahwah, NJ 07430
(800) 237-4277
Sharp JX-730 Color Ink Jet, $1,995; cut-sheet feeder, $480; paper-roll feeder, $40

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Cupertino, CA 95014
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(408) 725-8900
Hewlett-Packard 7475/A-1, $1,995
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ColorStation 424 CX, $34,895
ColorStation 436 CX, $44,895
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Irvine, CA 92714
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BJC-820 BubbleJet, $2,995

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(408) 725-8900
Hewlett-Packard DeskWriter C, $1,095
Hewlett-Packard ColorJet XL, $2,495; Mac PrintKit (required), $125
Hewlett-Packard PaintWriter, $1,095
Hewlett-Packard PaintWriter XL, $2,595

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Iris 3847, $123,500
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NEC Colormate PS Model 80, $7,599

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QMS ColorScript 100 Model 30iP, $11,995

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(703) 556-0666  
(301) 997-4999

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(503) 627-7111

Phaser II PX, $5,995

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Phaser II SX, $5,290

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Toyot PTP-4300/MIP, $10,500

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(800) 444-6983  
(603) 882-5200

Scanmaster D4000, $39,700

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Fremont, CA 94538  
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If you've ever wished you could afford to print in vivid color, the new Canon Color Bubble Jet™ printers are for you. The first thing you'll notice is the brilliant, rich color. That's because both the BJC-800 and the BJC-820 print up to 360 dpi using four snap-in ink cartridges: black, cyan, magenta, and yellow. So you get true black and richer darker shades.

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You'll even be impressed with the cost. Both printers are a lot less than you'd expect, and the cost per page is remarkably low when compared with most other color printers.

Simply call 1 (800) 848-4123, and see how easily you can afford to improve your image.

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BJC-800/BJC-820

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If there were a printer that could give you this kind of color, would you still make your presentations in black and white?

Do your business presentations go in one eye and out the other? The Colormate™ PS can easily and affordably give them the impact they deserve. Enhancing your work with truly amazing color, from brilliant primaries to soft pastels. All Pantone® approved.

The Colormate PS integrates readily with any network, PC or Mac. And it's compatible with most popular business presentation and graphics software. Of course, Adobe® PostScript® is standard. The Colormate PS comes in two models—the economical Model 40 with 4MB of memory and 17 resident fonts, and the fully featured Model 80 with 8MB of memory and 35 resident fonts. Both feature reliable 300 DPI thermal transfer technology.

For your free Color Presentations Guide and more information, call 1-800-NEC-INFO. Or call NEC FastFacts, 1-800-366-0476, document #26567, for info via fax.

After all, the world isn't black and white, why should your presentations be?
Any questions?

If so, keep reading.

We know there's nothing like a bottleneck to slow down traffic.

So eliminate the Macintosh SCSI bottleneck with the QuickSCSI NuBus card and you could enjoy an increase in data transfer rates up to 300 percent. When you install QuickSCSI in your Mac II-series computer, you can reach data transfer rates up to 30 percent faster than the Quadra.

One backup you’ll appreciate.

With QuickSCSI's disk mirroring, backups occur automatically and immediately on a second drive, so you don't have to worry about losing valuable data due to disk failure. You can even mirror up to three drives at once! Think of it as getting the performance of a Corvette for the cost of a Miata. In addition, most hard disk and removable media drives are supported.

Both internal and external drives can be connected to QuickSCSI, and an additional seven SCSI devices can be added for every QuickSCSI installed. And because QuickSCSI doesn’t disable the Mac's existing SCSI port, up to 14 devices can be connected simultaneously.

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<td><strong>With QuickSCSI</strong></td>
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PLI's drives are supported by our toll-free technical support, 24-hour BBS, 30-day money-back guarantee and five-year warranty.

The Most Trusted Name in Storage Solutions.
RagTime has changed hands yet again — to MacVONK USA, a subsidiary of the Dutch company MacVONK. The document-processing program is being repositioned to cash in on the integrated-applications boom. The low-end RagTime Classic has been reborn as HandiWorks (an address-manager database was added), and System 7 Extensions for RagTime 3.1, the flagship product, should finally be released this spring.

By Aileen Abernathy

**Picture this:** You drop off a roll of 35mm film for developing and request a set of prints on paper — and on CD. You read right: For around $20 for 24 exposures, many photo labs will soon be able to return photographs as “digital negatives” on a CD. The Photo CD system, from Eastman Kodak, may revolutionize the way we store and use photographs. You’ll be able to view the images on television, using a CD-I drive or a dedicated Photo CD player. Electronic publishers will be able to access the images with a CD-ROM XA drive, edit them, and place them in page layouts. Eventually, Photo CDs will also hold sound, graphics, and text, enabling you to produce complete (dare I say multimedia?) presentations. Each image will use Kodak’s PhotoYCC color-encoding scheme for storage and will be available in several resolutions: a thumbnail view for previewing, low- and medium-resolution images for viewing and manipulation, and high-resolution compressed files for photographic-quality work. To access and use the images, you’ll need a Photo CD-compliant application. Kodak is already marketing a $695 developer toolkit; look for the first compatible products before the end of the year from companies such as Adobe and Aldus. For programs without built-in support, Kodak offers Photo CD Access, a $150 utility for the Mac and Windows platforms that can open images and convert them to standard file formats. (716) 724-4000.

**Palatable offering:** Zephyr Palettes is a clever utility for PageMaker and FreeHand that eliminates endless trips to the Type menu. Implemented as an Addition in PageMaker 4.2 (or as a control panel/INIT in version 4.0), Zephyr Palettes lets you display as many as seven small floating palettes for font-related activities. Fonts are automatically grouped by family, and you can create custom font sets. The version for FreeHand 3.0 and 3.1 offers eight palettes, including pen width and special effects. Coolest feature: You can change the font size, leading, tracking, and pen width on the fly by scrolling down the palettes. $79.95 per program, from Zephyr Design. (206) 324-0292.

**Fearless fonts:** Both Bitstream and Monotype now offer typeface packages for novice type users. Monotype’s Desktop Solutions series offers Type 1 fonts that are appropriate for reports and presentations, forms and catalogs, and newsletters and booklets. Each $179 package includes an informative design guide, a publishing glossary, and a type-specimen book. (312) 855-1440. **Bitstream’s Type Essentials** series is similarly organized; each $149 package contains Type 1 and TrueType versions of 13 Bitstream typefaces. A fourth package, Headlines ($99), contains seven complementary display faces. (617) 497-6222.
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Put the MicroNet SBT-1288NP to work for you. Improve productivity, save valuable time, and increase profits. Because we're not the only ones who should be proud. You too can achieve award winning performance with the SBT-1288NP. Call our sales department today for more information and the name of a MicroNet Reseller near you. 1-714-837-6033.

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CIRCLE 136 ON READER SERVICE CARD.
Fonts on Demand

Unlockable-font CD-ROMs give you instant access to entire type libraries at crowd-pleasing prices.

By Kathleen Tinkel

It sounds almost too good to be true: For less than $100, most type foundries are selling a CD-ROM that contains their complete PostScript-typeface library. The catch: Only a few fonts are available at purchase time. The rest are hidden away until you call a toll-free number and trade your credit-card number for the access codes.

The technology underlying these unlockable-font CD-ROMs lets you have an entire font library at your fingertips without having to pay for it all at once. Adobe's Type On Call CD-ROM, for example, has a list price of $99 and gives you immediate access to up to 26 "free" fonts. The rest of the Adobe Type Library is in encrypted form until you pay to unlock one or more typefaces. In comparison, Adobe's Font Folio provides the entire Adobe Type Library — already unlocked — on CD-ROM or hard disk, but it costs $14,000.

Unlockable-font CD-ROMs are a good deal for users and vendors alike. For the vendor, the discs provide a highly efficient, cost-effective means of distributing type. A CD-ROM can store 650 megabytes of data — plenty of room even for a very large type collection. Users pay a minimal fee to gain virtually instant access to new fonts, often at discounted prices. Even the environment gets a break: Distributing a few CD-ROMs instead of many floppy disks saves a lot of plastic and packaging material.

Image Club Graphics was the first company to offer its typeface library on a CD-ROM containing unlockable fonts, in 1989. It took a couple of years for CD-ROM drives to become affordable and for a healthy user base to develop, but most major foundries now offer their typeface collections on-disc.

At this writing, eight vendors — Adobe, Agfa, Bitstream, The Font Company, Image Club, Monotype, NEC, and URW — have introduced font CD-ROMs (see Table 1). Somewhat confusingly, these eight products represent four general font collections. Bitstream and Image Club sell their own libraries, and The Font Company and URW market different collections of URW fonts. The other four vendors sell the basic Adobe Type Library plus their own libraries, a combination commonly called the type consortium, because many of the fonts are cross-licensed by Adobe, Agfa, Linotype, Monotype, and Varityper.

If you own a CD-ROM drive, the low cost of unlockable-font discs may tempt you to buy a handful, putting the entire type libraries of several foundries at your disposal. In deciding which one(s) to buy, ask yourself some questions: What typefaces are on the CD-ROM? From which foundries? Are all the fonts in PostScript Type 1 format, or are TrueType faces also available? How much do individual typefaces cost? How easy is it to unlock fonts? How frequently is the disc upgraded to include newer typefaces? How good is the accompanying type catalog? What else is on the disc?
What’s the Difference between a Font and a Typeface?

...And what’s all this about PostScript versus TrueType? Is there a difference between tracking and kerning? What is an outline font, anyway?

At Altsys, we've spent the last 6+ years understanding and developing Macintosh software for creating and editing type and fonts. And during that time, a special vocabulary has developed just for computer type. It's made up of new words and different uses of traditional typographical terms.

So, to help you understand fonts in this age of technology, we'd like to offer you a free copy of our booklet, Type Terminology on the Desktop. Just call us at the phone number and extension below or use the enclosed magazine reader reply card.

Available Typefaces

The discs from Bitstream, The Font Company, Image Club, and URW are the most straightforward of the unlockable-font CD-ROMs, because each contains the typeface library of a single font foundry. Although URW is a company unfamiliar to many American type buyers, it has converted traditional typefaces into digital form for most of the world’s foundries. URW also functions as a foundry, creating original typefaces of its own, and it manufactures the Ikarus font-making tools used by many foundries to create typefaces. The Font Company and URW are each working from the same basic set of URW font outlines. The Font Company offers a broadly useful CD-ROM library of 1,600 fonts whereas URW has selected 500 typefaces for which it provides five additional PostScript variations — outline, in-line, relief, drop-shadow, and rounded. (The URW TypeWorks CD-ROM was not shipping at press time, but it will be distributed by the company’s U.S. office.)

Adobe, Agfa, Monotype, and NEC offer the Adobe Type Library on their discs. Adobe's library contains several faces cross-licensed from Agfa (Garth Graphic and Shannon, for example) and Monotype (Bembo, Gill Sans, and Plantin, for example). Adobe has made a few changes, such as renaming the fonts and adding kerned pairs. Because of these cross-licensing agreements, there are two versions of some typefaces on the Agfa and Monotype discs. For instance, the AgfaType CD-ROM contains two versions of Garth Graphic: Agfa's and Adobe's. These typefaces are not identical; they have subtle differences that can affect how they look on a page. To minimize the confusion, Monotype is incorporating the Adobe versions into the Monotype library for the next version of its FontFonts CD-ROM.

The only way to access the full Agfa and Monotype font libraries is from their CD-ROMs. Each company offers unique faces that Adobe has not yet licensed. For example, Agfa has a striking collection of 126 Pi and Symbol fonts, and Monotype includes a selection of fonts from the Font Bureau, a type-design boutique run by David Berlow and Roger Black. On the other hand, Adobe has an exclusive license to sell typefaces from Berthold, Europe's leading font foundry, so the version of the Adobe Type Library on the Agfa, Monotype, and NEC discs doesn't contain such well-known Berthold faces as Nofret and Poppl-Pontifex.

Every company except Image Club gives you free access to all bit-mapped (screen) fonts. You can use the unlocked bit-mapped version to sample a font before you buy it. By using the bit-mapped font in a layout or by printing a sample in the available point sizes (generally 10, 12, 14, 18, and 24 points), you can get an

CLASSIFICATIONS

A type classification system can be helpful when selecting various type styles or when building your personal type library.

There are many systems used to classify type: historic, design origin, and so forth. The classification system presented here is based on visual design characteristics of type.

Figure 1: Agfa takes the best advantage of CD-ROM technology, using CD-ROMs as more than just a distribution medium for fonts. The AgfaType disc offers nearly 7 megabytes of shareware; unlockable commercial programs; and an interactive HyperCard tutorial that covers type history, classification, terminology, and design.
idea of how the font will look.

What about the frequency of upgrades? NEC has the most ambitious scheme, offering free quarterly updates of Type Gallery PS, so NEC is probably the most up-to-date source for the Adobe Type Library. In general, vendors plan to update their font CD-ROMs only once or twice a year, meaning that the discs won’t contain the most recently released typefaces. If you want the latest fonts, you’ll still have to buy them on floppies.

Other Goodies

Even a very large font library consumes only 200 or 300 megabytes of disc space. How companies use the rest of the disc varies dramatically, from The Font Company’s no-frills approach to Agfa’s everything-but-the-kitchen-sink collection of shareware, commercial programs, and multimedia type tutorials.

In the freebies categories, all the discs include utilities such as Font/DA M over which contains the most recently released typeface. ATM, and the 13 standard fonts (Helvetica, Times, Symbol, Courier, and so on). Bitstream supplies Analogoue, a DA that cross-references all known names of a particular font. All this pales in comparison with Agfa’s 7 megabytes of up-to-date shareware, which includes such popular utilities as Address Book, CheckList, Compact Pro, FlashWrite, PopChar, and theFONDler.

The Agfa, Monotype, NEC, and URW discs include commercial software that can be unlocked in the same way as fonts and are available at attractive discounts. Agfa has the most robust selection: LetraStudio, MasterJuggler, Metamorphosis Professional, OnLocation, and TypeStyler. NEC offers ATM, SmartArt, Suitcase II, TypeAlign, and Type Reunion. URW supplies Mac versions of its font-making tools, Ikarus-M and Linus-M.

The AgfaType CD-ROM also has the most impressive on-line presentation, with useful HyperCard tutorials on typograp

<table>
<thead>
<tr>
<th>Discount Font Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>FontHaus</td>
</tr>
<tr>
<td>15 Perry Avenue, Suite A7</td>
</tr>
<tr>
<td>Norwalk, CT 06850</td>
</tr>
<tr>
<td>(800) 842-9110</td>
</tr>
<tr>
<td>(203) 846-3087</td>
</tr>
<tr>
<td>Phil’s Photo</td>
</tr>
<tr>
<td>2380 Champlain Street N.W.</td>
</tr>
<tr>
<td>Washington, DC 20009</td>
</tr>
<tr>
<td>(800) 424-2977</td>
</tr>
<tr>
<td>(202) 293-2214</td>
</tr>
<tr>
<td>Precision Type</td>
</tr>
<tr>
<td>47 Mall Drive</td>
</tr>
<tr>
<td>Commack, NY 11725</td>
</tr>
<tr>
<td>(800) 248-3668</td>
</tr>
<tr>
<td>(516) 884-1024</td>
</tr>
</tbody>
</table>

Most of the unlockable-font CD-ROMs are available at substantial discounts through mail-order companies such as MacConnection and MacWarehouse. Here are three other sources that also offer attractive prices on font CD-ROMs:

| FontHaus               |
| 15 Perry Avenue, Suite A7 |
| Norwalk, CT 06850 |
| (800) 842-9110 |
| (203) 846-3087 |
| Phil’s Photo          |
| 2380 Champlain Street N.W. |
| Washington, DC 20009 |
| (800) 424-2977 |
| (202) 293-2214 |
| Precision Type        |
| 47 Mall Drive         |
| Commack, NY 11725   |
| (800) 248-3668 |
| (516) 884-1024 |

Unlocking the Technology

All the discs, except The Font Company’s, use a control-panel utility to unlock typefaces (see Figure 2). You install the control panel in the System Folder on your hard disk. When you open the control panel, you see the seed code. You
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Figure 2: The Bitstream control panel is typical of those on CD-ROMs that use the And Group’s unlocking technology. To unlock a font, you call the vendor and provide the Customer Key (seed code), along with your serial number, credit-card information, and the name of the font(s) you want. The vendor then gives you one access code for each font or package you’re ordering. After you’ve typed the codes into the New Access Key box, the desired fonts become visible on the desktop.

provide this code to the vendor, along with the CD-ROM’s serial number, your credit-card information, and the font(s) you want. In return, the vendor gives you one access code for each font or package you order. Once you’ve typed the codes into the control panel, the desired fonts become visible on the desktop.

The Font Company uses a small application called FontBuyer that automatically generates an order form that includes the CD-ROM’s serial number and the seed code. You supply your credit-card information, and fax or modem the order form to The Font Company. Usually within an hour, the company sends you the access codes for unlocking the fonts.

Although the fonts should remain accessible on the disc once you’ve unlocked them—as long as you retain a copy of the control panel, which stores the access codes— it’s a good idea to copy newly unlocked fonts onto your hard disk immediately and to make backup copies on floppy disks too.

Four of the CD-ROMs (from Adobe, Agfa, Bitstream, and Image Club) use the same unlocking technology, from the And Group, a Canadian company that co-developed the technology with Image Club. The NEC disc uses a similar system, from Trantor, and The Font Company uses its own technology, implemented through the FontBuyer utility. At press time, URW hadn’t decided which technology to use.

Monotype recently implemented a new unlocking technology, from the Israeli company Galliad, that enables its FonelFonts CD-ROM to take a single set of font data and provide typefaces that are compatible with Mac or PC platforms, making it the first cross-platform font CD-ROM.

In general, the still-evolving unlocking technology does have a few annoyances. Once you’ve given a vendor a seed code, you must leave the control panel open until you’ve received and entered the access codes. Ordinarily this shouldn’t be a problem, because vendors usually provide the codes right away. If you close the control panel or crash after supplying the seed code, however, the unlocking
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software will not accept the access codes, because every time you open the control panel, you’ll see a new seed code, which requires different access codes to unlock the font(s). The unlocking process should be simplified for the next versions of the font discs that use the And Group’s technology. The software has been upgraded to allow you to close the control panel while you wait for the access code.

With the exception of a few packages, vendors issue a separate access code for every font you buy — a nuisance when you want to unlock several at one time — and you must type them in, one at a time, without error. It would be preferable if the unlocking technologies could be upgraded to permit bulk-entry of the codes or allow a single code to unlock all the fonts purchased at one time.

Cost Considerations

Figuring out the real cost of fonts on a CD-ROM is tricky. You must factor in the cost of the disc, the value of the “free” faces (count only the fonts you would have bought anyway — the others are a bonus but aren’t nearly as valuable as the ones you need), the value of any other premiums (Image Club gives you a volume of clip art, for example), and the cost of unlocking each font.

In general, you’ll get better prices if you buy CD-ROMs from dealers — not foundries — because dealers are more likely to offer good discounts. Mail-order companies, for example, sell Adobe’s Type On Call for about half its list price. For other places to get good deals on unlockable-font CD-ROMs, see the “Discount Font Sources” sidebar.

Because the initial price is only part of the total cost when you buy fonts, you should find out how much it costs to unlock the fonts — it would be a poor deal to save $10 or $20 on the disc and then pay relatively high prices for the fonts. One nice feature of font CD-ROMs, however, is that you can buy single typefaces rather than font families, which lets you spend less money to get a face you need for a specific project.

Also consider which fonts are free when you buy the CD-ROM. Some vendors limit your choices, which can reduce the disc’s value if you don’t need those fonts. The Font Company gives you just a single font — either Torino or Koloss. AgfaType comes with a preselected set of 20 free display faces, although you also get to choose one of Agfa’s useful Pi and Symbol fonts. (Agfa also gives you Garth Graphic, but if you like the face, you’ll need to buy the other five weights.) Image Club supplies 20 free fonts — 10 preselected faces that are already accessible when you receive the CD-ROM and another 10 that you can choose and unlock after obtaining the access codes.

NEC’s Type Gallery PS is the least restricted — you can choose any three Adobe packages, with a limit of 15 fonts, when you buy the disc. Adobe supplies
26 fonts — 13 are unlocked when you purchase the disc, and you can choose which two packages (13 fonts) to unlock from a list of eight packages. NEC’s disc, at $399, is substantially more expensive than the other CD-ROMs; it becomes a bargain, though, when you buy it with a NEC CD-ROM drive, which costs only another $100. If you need a CD-ROM drive, this is clearly the best value.

Aside from cost, you should also consider convenience. Some vendors let you unlock fonts during local working hours only, and others are open 12 hours a day to accommodate users nationwide. The Font Company recently instituted the first round-the-clock service, but it’s available only by modem.

The Bottom Line

If you own a CD-ROM drive and have a fairly consistent need for new typefaces, unlockable-font CD-ROMs are an unbeatable deal. Unlocking fonts as needed is a flexible way of acquiring faces — even if single weights are all you want — without having to plan ahead or invest in extended families (unless you want to).

The CD-ROMs may seem similar, but there are distinct differences in available fonts and software, pricing structure, hours of operation (for unlocking), and frequency of upgrades. You could buy one CD-ROM from each of the four general collections — Bistream, Image Club, URW (from either URW or The Font Company), and the type consortium. Or you could buy all eight CD-ROMs for less than $900 at street prices and get 99 fonts at an average of less than $9 each. But be forewarned: The instant gratification that unlockable-font CD-ROMs provide can change your type-buying habits from deliberate purchases to impulse buys.

If you don’t have a CD-ROM drive, should you make the investment? That depends on your needs. If you will need to buy several typefaces in the next year or want the convenience of immediate access to fonts, then the answer is probably yes. Some type vendors even offer special bundling deals with popular CD-ROM drives (see Table 1). A CD-ROM drive will probably prove to be a valuable investment, as more collections of photography, clip art, games, and commercial software become available for this roomy storage medium (for more on CD-ROM drives, see “Is It Time for CD-ROM?”, June ’91, page 150).

Finally, if you operate a publishing empire or an output service, you might want to consider getting an already unlocked CD-ROM or a hard drive instead. Most type vendors sell their entire library, unlocked, at prices that are bargains on a per-font basis. A 1,000-font library may work out to less than $12 or $15 per font, but that’s still $12,000 to $15,000.

Contributing editor Kathleen Tinkel is a type-loving graphic designer and co-publisher of MacPrePress, a weekly faxed newsletter.

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### Table 1: Features of Unlockable-Font CD-ROMs

<table>
<thead>
<tr>
<th></th>
<th>Adobe Systems</th>
<th>Agfa Compugraphic</th>
<th>Bitstream</th>
<th>The Font Company</th>
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<tr>
<td><strong>List price</strong></td>
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<td>$99</td>
<td>$99</td>
<td>$69</td>
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<td>Disc/drive bundle</td>
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<td>$695 (Toshiba XM3301)</td>
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<td>(model)</td>
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<td>NA</td>
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<tr>
<td></td>
<td>Per font style/weight</td>
<td>$50</td>
<td>$50 (4 fonts minimum order)</td>
<td>$25 to $39</td>
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<td><strong>Comments</strong></td>
<td>No frills. Skimpy type-sample poster. Exclusive supplier of Berthold library.</td>
<td>Great value: Many free faces. Tons of shareware, interactive type tutorial in 7 languages.</td>
<td>No frills.</td>
<td>Useful Analogue DA.</td>
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<tr>
<td><strong>Disc contents</strong></td>
<td><strong>Total number of fonts</strong></td>
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<td>1,900</td>
<td>1,030</td>
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<td>yes (20)</td>
<td>yes (40)</td>
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<td>LetraStudio, MasterJuggler, Metamorphosis Professional, OnLocation, TypeStyler</td>
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<tr>
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<td>13 ATM fonts</td>
<td>Garth Graphic</td>
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<tr>
<td></td>
<td><strong>Call to unlock</strong></td>
<td>13 fonts from 2 packages</td>
<td>20 display faces, 1 Pi and Symbol font</td>
<td>6 fonts</td>
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<tr>
<td></td>
<td><strong>Restrictions</strong></td>
<td>choose 2 of 8 packages</td>
<td>no choice on display faces; choose from 126 Pi and Symbol fonts</td>
<td>choose from 20 fonts</td>
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<td><strong>Font availability</strong></td>
<td><strong>Who sells the disc?</strong></td>
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<td>Adobe</td>
<td>Agfa</td>
<td>Bitstream and 2 dealers</td>
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<td><strong>Toll-free number for unlocking</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td><strong>Hours of access for unlocking</strong></td>
<td>5 A.M. to 9 P.M. PST, weekdays; 8 A.M. to 4 P.M., Saturday</td>
<td>8 A.M. to 8 P.M. EST, weekdays</td>
<td>8 A.M. to 6 P.M. EST, weekdays; 24 hours, 7 days (modem)</td>
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<td>Adobe Systems</td>
<td>Agfa Compugraphic</td>
<td>Bitstream</td>
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<tr>
<td></td>
<td>Company</td>
<td>1585 Charleston Rd.</td>
<td>90 Industrial Way</td>
<td>215 First St.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P.O. Box 7900</td>
<td>Wilmington, MA 01887</td>
<td>Cambridge, MA 02142</td>
</tr>
<tr>
<td></td>
<td>Mountain View, CA 94939</td>
<td>(800) 833-6987</td>
<td>(800) 424-9773</td>
<td>(600) 237-3335</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(600) 367-9533 (Canada)</td>
<td>(600) 367-9533 (Canada)</td>
<td>(600) 497-9222</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(415) 961-4400</td>
<td>(508) 686-6500</td>
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</tbody>
</table>

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S.S. OCEAN DUCHESS

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Circle 162 on reader service card.
Table 1: Features of Unlockable-Font CD-ROMs, continued

<table>
<thead>
<tr>
<th>Feature</th>
<th>Image Club Graphics Art + Type Vendor</th>
<th>Monotype Typography</th>
<th>NEC Technologies Type Gallery PS</th>
<th>URW TypeWorks*</th>
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</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Disc only</td>
<td>$99</td>
<td>$49.99</td>
<td>$399</td>
<td>$96</td>
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<tr>
<td>Disc/drive bundle (model)</td>
<td>NA</td>
<td>$550 (NEC CDR-72 or PL)</td>
<td>$499 (NEC CDR-66)</td>
<td>NA</td>
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<tr>
<td>Per font style/weight</td>
<td>$25</td>
<td>$29 to $45</td>
<td>$49</td>
<td>$40 to $60</td>
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<tr>
<td><strong>Disc contents</strong></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Total number of fonts</td>
<td>620</td>
<td>1,580</td>
<td>1,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Foundries represented</td>
<td>Image Club</td>
<td>Monotype, Adobe, Font Bureau</td>
<td>Adobe</td>
<td>URW</td>
</tr>
<tr>
<td>TrueType fonts</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Unlocked screen fonts</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Free software</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Unlockable software</td>
<td>Digit-Art (20 volumes)</td>
<td>ATM Agency Fit X-Tension Type Reunion</td>
<td>ATM, Adobe Plus Pack, Smart Art, Suitcase II, TypeAlign, Type Reunion</td>
<td>Ikarus-M, Linus-M</td>
</tr>
<tr>
<td>Upgrade frequency</td>
<td>1 year</td>
<td>4 to 6 months</td>
<td>3 months</td>
<td>1 year</td>
</tr>
<tr>
<td>Upgrade cost</td>
<td>$25</td>
<td>free to registered users</td>
<td>free to registered users</td>
<td>nominal</td>
</tr>
<tr>
<td>Free fonts</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Unlocked on disc at purchase</td>
<td>10 fonts</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Call to unlock</td>
<td>10 fonts, 1 volume of clip art</td>
<td>8 fonts</td>
<td>3 packages, limit of 15 fonts</td>
<td>6 fonts</td>
</tr>
<tr>
<td>Restrictions</td>
<td>none</td>
<td>choose from 88 fonts</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Font availability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Who sells the disc?</td>
<td>direct, selected dealers</td>
<td>direct, selected dealers</td>
<td>dealers</td>
<td>direct, selected dealers (no mail order)</td>
</tr>
<tr>
<td>Who unlocks fonts?</td>
<td>Image Club</td>
<td>Monotype or dealers</td>
<td>NEC</td>
<td>URW</td>
</tr>
<tr>
<td>Toll-free number for unlocking</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Hours of access for unlocking</td>
<td>8 A.M. to 5:30 P.M. MST, weekdays</td>
<td>8 A.M. to 5:30 P.M. CST, weekdays</td>
<td>7 A.M. to 9 P.M. CST, weekdays</td>
<td>8 A.M. to midnight EST, weekdays</td>
</tr>
<tr>
<td>Unlocking technology</td>
<td>And Group</td>
<td>Galliard</td>
<td>NEC Technologies</td>
<td>URW</td>
</tr>
<tr>
<td>Company</td>
<td>Image Club Graphics 1902 11th St., S.E. Suite 5 Calgary, Alberta T2G 3G2 Canada (800) 661-9410 (403) 262-8008</td>
<td>Monotype Typography 53 W. Jackson Blvd. Suite 504 Chicago, IL 60604 (312) 855-1440</td>
<td>1255 Michael Dr. Wood Dale, IL 60018 (001) 826-2255 (708) 860-9500</td>
<td>4 Manchester St. Nashua, NH 03060 (603) 882-7445</td>
</tr>
</tbody>
</table>

*Not shipping at press time.
IF YOU DON'T HAVE THE PLP II, YOU'LL NEED SPECIAL EQUIPMENT TO GET EDGE-TO-EDGE PRINTING.

If you want a printer that's a cut above the competition, look no further than the $999 Personal Laser-Printer™ II (PLP™ II) from GCC Technologies®. GCC's exclusive edge-to-edge printing gives you the power to produce larger graphics, flow charts, and much more. With other printers, like the Apple® Personal LaserWriter® LS, you're forced to cope with margins that confine your graphics and narrow your options.

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- **Greater scaling capabilities.** Scales from 25% to 400% in 1% increments, compared with the Personal LaserWriter LS, which is limited to 50% and 75%.
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- **New! Background printing.** Lets you get back to work on your computer faster, and allows sharing using AppleShare® with System 7.0.
- **Faster print time.** Prints faster than the Personal LaserWriter LS. In fact, MacUser (May 1991) found the PLP II to be 20% faster than the Apple Personal LaserWriter LS on their Microsoft® Word test document, 40% faster on their MacDraw® II test, and twice as fast on their Excel test.
- **On-screen page preview.** Saves time, toner and paper.

Of course, the PLP II also features the unmatched reliability and innovation that go hand-in-hand with the GCC Technologies name. It's the name to count on when you're looking for a high-quality, affordable laser printer. And there's no margin for error.

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**Circle 165 on reader service card.**
Creating a Woodcut Look

You can imitate the look of a traditional woodcut by layering simple black and white shapes.

By Janet Ashford

One virtue of a drawing program is that its tools produce a uniform line, in whatever weight you specify. Sometimes, however, an illustration calls for an irregular thick-and-thin line. You could use a painting program to create such lines, but you would lose the advantages of a drawing program's object-oriented, resolution-independent image. You can, however, create a line of varying thickness in drawing programs by using overlapping polygonal shapes.

Designer John Odam created the illustrations on this page as chapter-opening art for Reading for Understanding, a college textbook published by Wadsworth Publishing Co. All the shapes were drawn with a straight-line tool to imitate the way a knife cuts lines into a block of wood.

Odam used FreeHand 3.0, but the same technique could be used in Canvas, MacDraw, SuperPaint, or Illustrator. Every drawing program has a pen or polygon tool, and each can layer a series of opaque objects. In addition, FreeHand 3.1 has a pressure-sensitive freehand tool that lets you draw a line (actually an object) of varying thickness.

Each illustration begins with a black rectangle that has overlapping white border lines. The lines are actually long thin polygons drawn with a pen or polygon tool. To create a duck-shaped hole inside a white shape, Odam begins by drawing a duck shape, starting at the tail. Rather than closing the path at the tail, however, he doubles back and traces around the outside of the duck (left). When the shape is filled with white and placed on top of the rectangle, the black background shows through the hole, creating a duck (right).

Illustrations that resemble traditional woodcuts are easy to create in any drawing program, look good in black-and-white and in color, and stand up well to resizing and less-than-perfect paper and printing conditions.
**Drawing Black Shapes**

An additional white area is drawn to the left of the duck shape. Odam next draws a black shape that trims back the white edges around the top half of the duck and blends in with the black background. The shapes of the baby ducks are drawn over the white background and filled with black. Additional white and black marks (thin polygons) are added to imitate the look of knife gouges.

**Adding Final Details**

White shapes that represent eyes and feather details are added to the ducks' bodies. Two long white zigzag shapes are placed along the ground to complete the image.

**Using Color**

These illustrations are designed to be printed in black-and-white, but it's easy to add color. Simply change the white shapes to a light color and the black ones to a dark color. Woodcut illustrations can be rendered in one color plus black (top) or in two colors (bottom).

**Auto-Tracing a Real Woodcut**

Another way to bring the quaint, rough look of a woodcut into the PostScript or QuickDraw environment is by auto-tracing a genuine woodcut such as this one from a mid-19th-century artist. The sequence above shows how the auto-tracing program — in this case, Streamline 2.0 — builds up the illustration layer by layer, moving from the largest shape to the smallest. Auto-tracing tools can also be found in Canvas, FreeHand, Illustrator, SuperPaint, and UltraPaint.
**Smartcom II Mac 3.3**

Smartcom II for the Macintosh is praised by software reviewers and users as the most reliable, easiest to use Mac communications software available. 

**Smartcom II takes full advantage of the power and unique graphics capabilities of all Macintosh computers, including special support for System 7, providing support for all popular modems, and offers a simple, but powerful interface to the advanced features of Hayes SmartmodemSM and Vseries® products, including LTX™, S300/90/102, ANSi, PrestInt™, and Show Control terminal emulation and Isotope Protocol, Xmodem, Zmodem Standard, Zmodem CRC, Xmodem, Xmodem-G, Zmodem, Kermit®. CompuServe®, B Plan file transfer protocols. Publisher: Hayes COMM0015

**NightWatch II**

NightWatch II assures you of the most rigorous, yet friendly hard disk protection in the industry. Publisher: Kent Marsh Ltd., UTR0252

**TAL or Timeslips III 2.1**

TAL-Timeslips Accounting Link extends Timeslips III with or without general ledger accounting software. Generates customized income reports and balance and payment data from Timeslips III to the accounting program. FINO129 $55.

**Timeslips III 2.1** is a complete time keeping and billing package for people whose work is in trade or clerical. Some time data with T5 timer DA. When the time comes to send the bill, TS Report will extract the data and generate invoices and reports in a wide variety of formats. Hands the big job: 250 users, 250 different activities, and over 12,000 clients, with up to 128 projects per client. Publisher: Timeslips Corporation BUS0043

**WriteNow 3.0 with FREE Grammatik Mac 2.0**

NEW VERSION! WriteNow 3.0 is one of the finest Macintosh word processor and has long been considered by the industry experts to be one of the oldest. With this new version of Mac's best New Word Processor Award, WriteNow, includes a lightning-fast 135,000-word spelling checker, a 1.4 million-word thesaurus database, one of the most powerful paragraph and character style sheets of any Mac word processor, a robust print preview, System 7 compatibility, and a FREE full version of Grammatik Mac 2.0, one of the best selling grammar/style checkers (a $99 value). Completely compatible with Microsoft Word, Works, MacWrite II, PC-Write2Perfect and other popular Mac formats. Publisher: T/Maker WB0001

**Ray Dream Designer 2.0**

You don't have to settle for flat illustrations and designs any longer. Ray Dream Designer's drawing and text tools, for creating lines, circles, ellipses, polygons, Bezier, colors and shadings, are virtually the same as those in most 3D illustration programs. The only difference is, now your objects have the realistic look of three dimensions. Wrap them around an object or text for instant dimension. Comes with a library of 3D solid textures you can use as is or customize. Lighting, shadows, transparency, reflections and best of all, perspective are all handled automatically. Requires Mac II family with coprocessor, 32-bit QuickDraw, 6MB ROM and hard drive. Publisher: Ray Dream GM0002

**WindOwatch**

Track the hours you spend on a project with WindOwatch. It's a must for professional who bill their services by the hour (or minute). WindOwatch operates in the background, automatically generating a timesheet in your work. Use WindOwatch to collect and merge timesheets from team members over the network or export timesheet information to a spreadsheet. Don't miss any opportunity to accurately bill your clients. Abbrev. time is money. Publisher: ASD Software UTR0264

**Welcome**

Many of our products come with a thirty day money back guarantee. If you are not completely satisfied, ask for details when you place your order.
White Knight V.11

The perfect low-cost solution to almost any Mac telecommunication's needs. Offers the kind of power associated with products costing hundreds of dollars more, but is easier to learn and more flexible. 270+ page user manual is geared to all levels of experience. Winner of 11 awards including MacWorld's World Class Software Award 1987-1991. Publisher: Freesoft

WordScan or WordScan Plus*

WordScan offers the most accurate OCR with a wealth of conveniences. WordScan reads all documents-even dot matrix and fax files. Standard features include preview scan, deferred processing and the Verify feature allows you to find OCR costing hundreds of dollars more. UTO0215 $249.
WordScan Plus is the game changer for OCR costing hundreds of dollars more. UTO0215 $299.
Publisher: Recognition Systems

MacKids Preschool Pack

The MacKids Preschool Pack consists of six color programs that are entertaining, simple to record, easy to understand. AlphaWorks teaches letter recognition and keyboard layout. Bar Math teaches the basic concepts of numbers using blocks. Concentration develops short-term memory skills or players try to match picture cards. Connect the Dot teaches number and letter sequence. Counting 1-12 develops counting skills, and ShapeWorks teaches shape, color and size recognition. Publisher: Nordic Software

Aldus SuperPaint or Aldus Gallery Effects*

Aldus SuperPaint 3.0
Five time winner of MacUser magazine's World Class Award, new Aldus SuperPaint combines painting, drawing, and image enhancement, and includes 1 thru 24 bit color, textures, gradients, and EPS graphics. GRA0112 $533.
Aldus Gallery Effects 1991 MacUser's Editors Choice Award for Best Visual Resource. Aldus Gallery Effects automatically transforms grayscale and color bitmap images into stunning, sophisticated art, with 16 master effects including Graphic Pen, Watercolor, and Charcoal. Works directly within programs like SuperPaint and Photoshop, or as an application or DA. Publisher: Aldus

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The UnMouse does everything a mouse can—only faster, easier, and in less space. To move the cursor, simply slide your finger over the glass surface. To make a selection merely press down. The UnMouse also serves as an extended keyboard. Tap the large red button and you have a Power Keypad with 16 keys instantly available to execute macros (60 advanced model). With its one million touch points the UnMouse also performs as a small graphics tablet. Manufacturer: Microtouch INP0864

MacGlobe

MacGlobe, the extraordinary geographic tool for the Macintosh, provides vibrant maps, extensive graphs and an annually updated database for 150 countries and dependencies all at your fingertips. It delivers a variety of maps, including each country’s major cities, topography and major geographical features as well as regional maps. MacGlobe's maps and graphics can be exported as PICT files to other popular programs, making it the perfect tool for preparing reports, overheads and presentations. The database provides details about demographics, health statistics, major cities, and economics. Learn about populations, ethnic groups, birth and death rates, literacy rates, schools, medical facilities, and more. Publisher: PGra GBA0245

Notify! 1.1

Notify! adds the power of remote wireless messaging to dozens of existing applications. Working in the background, it dials into any paging system to deliver full text messages to any pocket pager. Supports unlimited pagers, groups and services. Network version enables wireless messaging on all machines from a single server. Requires modem, pager and service. Manufacturer: Ex Machina, Inc. Network Version COMO112 $279. Personal Edition COMO111 $109

Paintbrush

Paintbrush, America’s first professional painting program for the Macintosh, offers advanced image editing features like blur and sharpening filters and includes a free brush clip art disk ($24.95 value). Publisher: Softsys, Inc. GBA0018

MacWares

Vocabulary

Vocabulary is now available in Level III and Compact Disc. Expand your vocabulary with thousands of new words and phrases! Vocabulary 85x35 ea. Compact Disc $69 ea. Full line available.

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Penton Overseas has developed a stimulating way to break the global language barrier...PICTURE IT! offers a highly interactive "bilingual" approach to a foreign language dictionary, complete with more than 500 high resolution graphics, native pronunciation, and expandable resource file. Publisher: Penton Overseas Full line available.

IN CONTROL

Get organized instantly with IN CONTROL, the To-Do List Manager that combines outlining and easy-to-use database features. Create an outline of your activities, then create new columns to track priorities, deadlines, people responsible, or anything else. Quickly select and sort to see just the activities you want, in any order. Collapse or expand the outline to see any level of detail. From the creators of FileMaker. Publisher: Attain BUS02

DayStar Digital

DayStar FastCache™

Give a boost to everything you do. DayStar’s family of high-speed cache cards are available for the Macintosh II, IIx, and the Quadra 700 or 900. You’ll see performance gains up to 150%. Quarter gains of 5-50%, depending on the application. Includes PowerMatrix software. The FastCache II includes the DualPort IIIs adapter which doubles the expansion capability of the FastCache IIs, the optional 20MB math chip really accelerates recalc and scientific tasks. All FastCache products are upgradeable to DayStar’s PowerCache. 100% compatible. 5-year warranty. See listings for pricing. Manufacturer: DayStar Digital DRT0224 FastCache IIx

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More After Dark—Over 25 incredible new displays for After Dark, the Ultimate Screen Saver. Offers advanced image editing features like blur and sharpening filters, and many beautiful new fish! It features winners Mowin’ Man, Tornado, Group8, and many other new fish like Kiores, Art Museum, and Lunatic Fridge. Game module helps save your screen from phosphor burn-in. (Requires After Dark software.) UTO250 $25.

Notify! 1.1

Tell your messages in your pocket while away from your desk, with Notify!, the revolutionary software extension for System 7. Notify! adds the power of remote wireless messaging to dozens of existing applications. Working in the background, it dials into any paging system to deliver full text messages to any pocket pager. Supports unlimited pagers, groups and services. Network version enables wireless messaging on all machines from a single server. Requires modem, pager and service. Manufacturer: Ex Machina, Inc. Network Version COMO112 $279. Personal Edition COMO111 $109

Paintbrush

Paintbrush, America’s first professional painting program for the Macintosh, offers advanced image editing features like blur and sharpening filters and includes a free brush clip art disk ($24.95 value). Publisher: Softsys, Inc. GBA0018

More After Dark Bundle

Buy both and save. UTO254

Notify! 1.1

Tell your messages in your pocket while away from your desk, with Notify!, the revolutionary software extension for System 7. Notify! adds the power of remote wireless messaging to dozens of existing applications. Working in the background, it dials into any paging system to deliver full text messages to any pocket pager. Supports unlimited pagers, groups and services. Network version enables wireless messaging on all machines from a single server. Requires modem, pager and service. Manufacturer: Ex Machina, Inc. Network Version COMO112 $279. Personal Edition COMO111 $109

Paintbrush

Paintbrush, America’s first professional painting program for the Macintosh, offers advanced image editing features like blur and sharpening filters and includes a free brush clip art disk ($24.95 value). Publisher: Softsys, Inc. GBA0018

More After Dark Bundle

Buy both and save. UTO254

Paintbrush

Paintbrush, America’s first professional painting program for the Macintosh, offers advanced image editing features like blur and sharpening filters and includes a free brush clip art disk ($24.95 value). Publisher: Softsys, Inc. GBA0018
KaleidaGraph 2.1

@ KaleidaGraph is the easy way to analyze and present complex data. It simplifies the process of analyzing and presenting statistical information. Provides 16 different graph structures, including scatter, histogram, probability plot, polar, as well as more common types, such as line, bar, pie. You can crunch large amounts of data (up to 32,000 points per column), and plot up to 20 variables at once. Supports both the LaserWriter and the ImageWriter (and color on the ImageWriter II). Requires: Mac Plus or higher. Publisher: Synergy Software STU0018

$149

Active Memory 2.0

@ Turn your PowerBook into a power organizer with Active Memory! When traveling, manage info like sales leads, field results or travel expenses. Enter data your way in a free-form info field. Once back at headquarters, remind network co-workers about upcoming deadlines. Import contact lists and setup reminders to call them. For journalists, use Active Memory to print your things-to-do list or travel itinerary. Make it easier to manage your data in the office or on the road. Publisher: ASD Software BUS0007

$125

Accountant, Inc. 3.0

@ BEST ACCOUNTING PACKAGE! 1991 MacUser's Editors' Choice Award. More features, more power, more flexibility. It's easy to use and gives you exceptional scalability, power. You only have to enter information once. Every transaction is automatically posted to your General Ledger. Accountant, Inc.'s new revolutionary System 7 design gives you the advantage of customizing your forms, screens and reports by hot linking with your favorite form design, spreadsheet and database programs. You get Invoicing, Accounts Receivable, Inventory, Account payable, Check Writing, Integrates General Ledger and Payroll. Accountant, Inc. is now available in single and multiuser versions. Publisher: Softsync, Inc. FIN0048

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@ AutoDoubler is the easiest way to increase your hard disk capacity. It works in the background to automatically keep your hard disk compressed. It's lightning quick and completely transparent, so it won't interrupt your work. In truth, AutoDoubler's new patent-pending technique lets your Macintosh use files and applications while they are still compressed! It's 100% compatible with all applications, desk accessories, and system extensions. ITU0254 $49.

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@ DiskDoubler gives you total control of file compression-expanding for modern transfer, compressed backup, self-expanding files, and fast copying of files. AutoDoubler and DiskDoubler combined give you the ultimate in speed, confidence, and control. System 7 Savvy! Publisher: Salient UTI0179

$49

Fair Witness

@ 1991 MacUser Editors' Choice Award for Best Organizational Tool. This information organizer is a powerful new way to organize your work. Fair Witness lets you create outlines, add columns for text, numbers, dates, pictures, sound, and much more. A click of the mouse allows you to include formulas for the numbers, show the dates on a time-line, add checkmarks and other styling. Prioritize, sort, and search using any criteria you set for the information you need to see. Saves you for instant access to specific information. Fair Witness is said to be one of the best programs used for planning. Publisher: Abreadata BUS0028

$65 ea.

Design Your Own Home:

@ Design Your Own Home: Architecture, Interior, or Landscape. Create floor plans and building plans with structural details. Do individual room plans and kitchen/bathroom design. Then complete your dream house with graphic landscape plans. Interiors and landscape programs generate a site views from top-view perspective. Sample plans included. Publisher: Abreadata BUS0028

$65 ea.

Virtus WalkThrough 1.1

@ The latest version of this award winning program provides everything you need to quickly capture and explore your ideas in 3-D. Virtus WalkThrough's intuitive interface and complete set of drawing and presentation tools make it ideally suited for designers of all types. Version 1.1 includes: real-time 3-D presentations, QuickTime® and PICS animated movies, perspective pictures, enhanced data exchange capabilities for 3DSF, 3DF, PICT, EPS, CD -.iso and MacDraw. Winner of MacUser's Breakthrough Product of the Year Award 1990. Publisher: Virtus Corporation GRA0278

$249

MacPrint 1.3

@ Use a Macintosh with non-Apple printers. Print Mac applications on HP LaserJet, DeskJet or compatible printers including all Series Il, IIs and the DeskJet 500. Prints text and graphics at the printer's maximum resolution. Does not require PostScript. Cable is included. Publisher: Insight Development UTI0098

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The Mac Classic comes with a standard 1MB of memory, which is surface mounted (soldered) to the motherboard. Additional memory for your Mac Classic is provided by Expansion Boards which slide into a slot on the Classic's motherboard. The Expansion Board can be purchased with surface mounted memory (for a total of 2MB), and then two 1MB SIMMs can be added to the Expansion Board later for a total of 4MB. Or, you can install a 1MB Expansion Board, which boosts your Mac Classic up to its full 4MB. CHP0050 1MB Expansion Board...$49

The Mac Plus and Mac SE have four available SIMMs slots (two on motherboard, two on expansion card) which originally contain 1MB SIMMs modules - installing 4MB SIMMs modules will double your memory. To upgrade, you can replace each 1MB module with a 2MB module, but you must do this in pairs. Replace two 1MB modules and you will have a total of 4MB memory. That's the new 1MB modules just the original 1MB modules in the slots. Replace one 1MB module with a 2MB module and you will have 3MB. (You should save the 2MB modules for later use if you want to pass your Mac on to someone else.)

The Mac Plus or SE has four available SIMMs slots (two on motherboard, two on expansion card) which originally contain 1MB SIMMs modules - installing 4MB SIMMs modules will double your memory. To upgrade, you can replace each 1MB module with a 1MB module, but you must do this in pairs. Replace two 1MB modules and you will have a total of 4MB memory. That's the new 1MB modules just the original 1MB modules in the slots. Replace one 1MB module with a 2MB module and you will have 3MB. (You should save the 2MB modules for later use if you want to pass your Mac on to someone else.)

The Mac LC comes with a standard 2MB of memory, which is surface mounted (soldered) to the motherboard, with two slots available for additional memory. The Mac LC can be upgraded to 6, 10 MB, depending on whether you are using 1MB, 2MB or 4MB SIMMs. If you are upgrading a Mac LC, you must use SIMMs rated at 80ns or faster. CHP0011 4MB SIMMs - 100ns...

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We Connect People And The Computers They Use.
IBM’s Networking Systems division may seem like an unlikely place to develop an AppleTalk router, but stranger things have happened. IBM’s 6611 Network Processor (catchy name, huh?) is a multiprotocol bridge/router that supports such protocols as AppleTalk (EtherTalk and TokenTalk only; not LocalTalk), TCP/IP, DECnet, SNA, and IPX (NetWare). The four-slot Model 140 will list for $9,995, the seven-slot Model 170 for $18,640. Available in late summer.

By Henry Bortman

Mac apps on UNIX: A/UX? PowerOpen? Nope. Quorum’s Compatibility Engine, which enables Mac programs to run under UNIX without looking Mac-like. The Compatibility Engine maps Mac-style menus, dialog boxes, buttons, scroll bars, and the like to the equivalent elements of UNIX-workstation graphical interfaces such as OPEN LOOK (Sun SPARCstations) and Motif (Silicon Graphics IRIS workstations). Sun and Silicon Graphics were among the first vendors to announce support for Quorum’s products. Mac applications behave functionally on UNIX workstations as they do on the Mac, but they don’t retain the copy-me-and-I’ll-sue-the-pants-off-you Mac look and feel. ★ Quorum offers two products: Latitude, available in the first half of 1992, lets developers recompile Mac-based source code to create a new version of their programs that runs under UNIX. Aldus, Quark, and Adobe have all hinted that they are interested. Quorum Equal, available in the second half of 1992, will emulate the Mac’s 680x0 processor on a UNIX RISC machine, enabling users to run virtually any Mac application on UNIX workstations without modification. Pricing was not available for either product at press time. (415) 323-3111.

Still more UNIX: NeXT is back in the news, with Release 3.0 of its NeXTstep operating system, scheduled to ship this spring, and 33-megahertz versions of its 68040-based workstations. Of note for Mac users: NeXTstep 3.0 includes AppleShare- and NetWare-client software and allows NeXT computers to read Mac-formatted 1.44-megabyte floppy disks directly. Built in to NeXTstep 3.0 is an interactive version of Renderman, Pixar’s powerful 3-D-rendering software, and a database toolkit that simplifies the process of developing front ends for mainframe database-management systems. For those partial to Intel chips, NeXT will offer a 486-based version of NeXTstep 3.0, scheduled to be available in late summer. (415) 366-0900.

UNIX at your service: If AppleShare 3.0 is too sluggish for you, you might want to move up to Helios’ EtherShare 2.0.1, which runs on DEC, IBM, Sony, and Sun UNIX machines. This comprehensive package provides an AFP-compliant file server, a print spooler, and E-mail capabilities as well as an AppleTalk router with an AFP-to-NFS gateway. An EtherShare file server can support as many as 245 concurrent users. $4,495 for workstations; $5,995 for servers. (408) 864-0690.
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Have Data, Will Travel

Having problems connecting your palmtop or laptop to your Mac? Getting data across may be easier than you think.

By Andy Ihnatko

So maybe the PowerBook’s not your style. Sure, as five-to-seven-pound Macs go, it’s great, but some of us want to operate more like the Jetsons. After all, this planet is crammed to the gills with tiny electronic devices. We’ve got laptop word processors, palmtop computers, executive organizers — even data-bank wristwatches that make the thought of cheating on an exam by writing the answers on your socks seem rather quaint. We’re surrounded by these cool portable data buckets — but how do we make them talk to our Macs when we get back home? Are we stuck buying only products that advertise “Mac connectivity” kits — which usually cost at least as much as four Tom Clancy hard covers?

Take heart. Fact is, if a data bucket has a serial port and some sort of communications utility, you can use common interfaces and data formats to put together your own “connectivity solution.” All you have to do is save the file in a format your Mac can read, find a way to cable the two computers together, and then run software to transmit the file. It’s that simple! Well, almost.

Data-Sharing Secrets Revealed!

The first question is, “Does my data bucket store data in a format my Mac can understand?” No problem! All computers smaller than a two-car garage use the ASCII standard to represent alphanumerical data — letters, numbers, and symbols — internally. You can generally fall back on the ASCII file format to move data from one piece of software to another, because almost all of them can read from and write to the ASCII format. Be forewarned, however: Passing straight ASCII text is a good way to lose all of your file’s formatting information (which text is in italics, where a new row starts on a spreadsheet, and so on).

The best solution is to find a more advanced file format that your portable and your Mac software both recognize. You can save most palmtop spreadsheets in WK1 format, which most Macintosh spreadsheet programs can open directly. Similarly, you can often save database files in dBASE format (DBF), which many Macintosh database programs can open. Word-processing formats are less universal, but you may be able to save your word-processing files in WordPerfect or Microsoft Word format. If your Macintosh software can’t import these formats directly, you can buy a commercial data-translation utility such as DataViz’s MacLinkPlus/PC (which includes a serial cable as well as data translators for many types of data) or Argosy’s Software Bridge (for word-processing-format translations) to help your data make the leap.

If your data bucket isn’t friendly enough for this answer, don’t despair. You still have some options for adding transferable formatting information to your ASCII files, if you don’t mind getting fairly friendly with the nuts and bolts of RTF (Rich Text Format) or tab-delimited format.
RTF is a word-processing format in which text-formatting commands are embedded within the text itself. For example, "Fleshy-headed mutant" looks like this: "Fleshy-headed (i mutant)" — and there's lots of header information (about fonts, margins, and the like) in front of it. Normally this RTF "code" is generated by a word processor, but it's possible to write it all in by hand as you compose the document on your data bucket. You can download complete documentation on the RTF format from ZiffNet/Mac, MacUser's on-line service. Look for the filename RTFD0C.TXT in Library 7 (Reference) of the Download & Support Forum.

The tab-delimited format, which most spreadsheet and database software can read, is much more straightforward. A spreadsheet has each of its rows on a separate line, with tabs separating the data in individual columns. In a database, each line is a separate record, with tabs separating the fields within each record.

Rolling your own tab-delimited files can add a lot of flexibility to a data bucket. Almost all palmtops, for instance, have some sort of text editor built in, but many lack a spreadsheet program and only a few have a database manager. If your primary on-the-road use for these two programs is data entry, you can use your text editor to enter the data once you know how your Macintosh spreadsheet and database files are structured.

Say you want to collect data for a FileMaker contacts database, with Name, Title, and Company fields, in that order. Using your palmtop's word processor, you can easily construct a tab-delimited database file by hand, using the format shown in Example 1.

When you import the data into FileMaker, it'll work like a charm — just as though you'd blown four grand on a PowerBook and had a Mac with you on the road. But because you didn't, you still have to deal with the question of how you're going to pour that data from your data bucket into your Mac.

Making the Connection

If you're lucky, both of your devices will have fairly standard RS-232 connectors. RS-232 is the universal serial interface standard — it does for data transmission what ASCII does for representing numbers and letters (the Macintosh uses an RS-422 interface, which is 232 with a few enhancements). A full-blown RS-232 connector consists of 25 pins, each of which has its own function. Table 1 lists the important pins and what they do, but you won't need to know these details if the strategy I'm about to describe (The Easy Case) works. If it doesn't, you'll have to pull out your line tester and breaker box and resort to the strategies described in The Gnarly, Difficult Case. We'll get to that later.

The Easy Case: Laptop PC/Generic Device.

If your portable device has an RS-232 connector of the type represented in Table 1, you should be in luck. Boy, is this one easy. Plug a Mac modem cable in to your Macintosh. Plug an IBM-type modem cable in to the laptop. Each of these cables will end in a standard 25-pin connector. To link the two, get a null-modem adapter (see the "Tools of the Trade" sidebar). You may have to stick a gender changer in there too.

Next, run communications software on both computers. A generic telecommunications program such as ZTerm (freeware you can get from on-line services or Macintosh user groups) doesn't have the friendly face of a custom-written palmtop-to-Macintosh file-transfer program, but it does precisely the same job. Get this...
program running on each machine, with identical communication settings (transmission rate, data bits, stop bits, parity). The actual settings aren’t important at this stage; you just want to find out whether or not your cable configuration works. For the sake of accuracy, though, set the transmission rate to something slow, either 300 or 1,200 bits per second.

Now type on the laptop’s keyboard. If everything’s hunky-dory, the words should appear on your Macintosh’s screen. Try it the other way around too. If you can type from the Macintosh’s keyboard to the laptop’s screen, you will know you have a solid connection for transmitting files.

By the way, don’t be surprised if either or both of the computers don’t echo what’s being typed on their own keyboard. Normally you won’t see what’s being typed “locally” unless the program’s local-echo feature has been enabled.

If the two machines don’t seem to be communicating or if nothing but garbage seems to be coming through, check to make sure that all the cables are securely fastened and that the communications parameters for the two programs are identical. If the cause of the problem doesn’t turn up in these areas, then it’s time to resort to the strategies described in the next example.

The Gnarly, Difficult Case: The Tandy WP-2 Portable Word Processor. Gnarly, difficult cases are never generic, so I need to use a specific example here (which will explain many universally applicable techniques, of course). In this case, let’s say that you used a null modem and a gender changer, as with the DOS laptop, and tried to get a Tandy machine talking to a Mac. No dice. You look at the pinout for the WP-2’s serial connector (see Table 2) and the corresponding pinout for the Mac (see Table 3). This situation calls for a line tester and a serial breakout box (see the “Tools of the Trade” sidebar).

The line tester helps you figure out which signals are necessary for data communications and which aren’t. Once you’ve plugged the WP-2 in to the line tester, the LEDs corresponding to DTR (Data Terminal Ready), DSR (Data Set Ready), and CTS (Clear To Send) light right up, which tells you that these three signals are necessary. If one of them is connected incorrectly, the cable Just Plain Won’t Work. These three signals allow communications to start — or prevent them from starting.

Because this sort of problem usually requires trial and error, you use the breakout box to test various configurations until you find one that works. You start by following the two basic rules of wiring two computers together: The SG (Signal Ground) pins must be connected, and the SD (Send Data) pin of each device must be connected to the RD (Receive Data) pin of the other.

Now you have to deal with the remaining pins of interest, RS-232’s traffic-control signals: the Mac’s DTR and CTS and the WP-2’s DTR, DSR, and CTS. Here’s what these signals do, roughly speaking: The DTR and the CTS pins are usually connected in crisscross fashion, as the SD and RD pins are. Although the pins’ uses vary, most often the two devices use them to signal each other that they’re powered up and ready to go.

A DSR pin’s function is similar to a DTR pin’s. Because the Mac’s serial ports have no DSR pin, the WP-2’s DSR pin can perform no useful function in this case except to cause things not to happen — in spectacular fashion — if it’s not connected to something. A DSR pin normally allows communication to take place if it receives a CTS signal, so you can bamboozle it by connecting it to its own CTS pin, on that same connector.

With the breakout box, you set up the configuration in Example 2.

---

**Example 1: Database Records in Tab-Delimited Format**

<table>
<thead>
<tr>
<th>Greer Grant &lt;Tab&gt;</th>
<th>Exec. VP &lt;Tab&gt;</th>
<th>Felix Ltd. &lt;Return&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frank Castle &lt;Tab&gt;</td>
<td>Consultant &lt;Tab&gt;</td>
<td>Kevlar World &lt;Return&gt;</td>
</tr>
</tbody>
</table>

**Example 2: Mac-to-Tandy WP-2 Pin Connections**

<table>
<thead>
<tr>
<th>Macintosh pin</th>
<th>Tandy pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (DTR) to Tandy pin 8 (CTS)</td>
<td>Macintosh pin 4 (SG) to Tandy pin 8 (CTS)</td>
</tr>
<tr>
<td>Macintosh pin 2 (CTS) to Tandy pin 4 (DTR)</td>
<td>Macintosh pin 3 (SD) to Tandy pin 2 (RD)</td>
</tr>
<tr>
<td>Macintosh pin 3 (SD) to Tandy pin 2 (RD)</td>
<td>Tandy pin 6 (DTR) to Tandy pin 8 (CTS)</td>
</tr>
</tbody>
</table>

**Figure 1: Tip for Creating a Custom Cable**

Figure 1: Apprehensive about soldering a mini-8 connector? Do it the easy way! Just cut off the modem end of a Macintosh modem cable, so you've got a mini-8 and a cable, and then solder the wires at the cut end to your other connector.
Lo and behold, it works! Admittedly, I'm not writing about the hour I spent trying strategies that didn't work, but you get the general idea. For a more in-depth discussion of tackling RS-232 connection problems, consult Joe Campbell's *The RS-232 Solution* (Alameda, California: Sybex, 1989; $24.95)—it's unquestionably the best book on the subject, mixing hard details with practical tips and examples.

**Tools of the Trade**

Sure, you may be able to get by with just a soldering iron, but purchasing a few inexpensive gizmos can give you a formidable arsenal for solving cabling problems. All can be found at your local electronics store.

- **Breakout box.** It's indispensable when you don't know what you're doing. Stick it between the two computers, and then try various configurations just by plugging in jumpers between numbered holes.

- **Gender changers.** These snap on to the end of a cable, allowing you to use a male cable with a female socket and vice versa.

- **Line tester.** Exactly what a computer tool should be: a compact plastic box studded with flashing LEDs. Each light represents a line of the interface that's "awake" and needs to be tended to for communications to work properly. Tools that combine a breakout box with a line tester are also available.

- **Null-modem adapter.** Use one of these as your "first guess" when trying to get two computers to talk to each other. Inside, they're wired to make the interconnections that most devices need for proper communication.

I recommend avoiding mini-8 connectors for projects such as this, because they're tiny and darn near impossible to solder neatly. Whenever I whip up a cable, I just get a standard Macintosh modem cable, lop off the modem end, and then solder that free end into whatever connector I need. It costs about six dollars...
Transferring Files

Ahh... good to have all that hard work behind you, eh? A mere cakewalk lies ahead. If you've been following instructions and not merely reading along, you've already managed to assemble a working cable. You also have communications software running on each machine, and you've verified the connection by typing on both keyboards. All that remains is to jack up the transmission speed as high as you can and transfer the file. In theory, you should be able to zip the file through at 57,600 bps, but in practice, you'll find that things will begin to go haywire once you've broken 9,600. To find the fastest speed your setup can attain, start at around 300 bps and keep increasing the speed until what you type at one end no longer comes out at the other end. A rather empirical solution, but it works.

Finally, choose a good file-transfer protocol that's common to both machines. Most palmtops don't have nifty protocols such as Zmodem built in, so you'll probably have to settle for plain old Xmodem (known as Modem7 on older machines). Give the command for one machine to transmit a file, and then tell the other one to start receiving. A few seconds later, the transfer will finish. Things shouldn't really go wrong at this point if you're using the same transfer protocol on both machines; if they do go wrong, verify that the communications settings are correct and that your cables haven't come loose.

The Bottom Line

Packaged connectivity solutions for Macs and DOS portable devices make life easier, but you can't always find one that meets your needs and that doesn't cost more than you want to pay. The techniques I've described here can free you from depending on commercial solutions — and also enhance your prestige! There's nothing quite like the looks of admiration and rapt attention you attract when friends and coworkers see you brandishing a soldering iron near a $4,000 computer.

Although contributing editor Andy Ihnatko uses a CP/M laptop for his portable-computing needs, he wishes to stress that he wouldn't turn down a free PowerBook II Apple were to offer him one.
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<thead>
<tr>
<th></th>
<th>RealTech Laser</th>
<th>QMS 2210</th>
<th>Hewlett-Packard IIIsi</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price</strong></td>
<td>$4495</td>
<td>$9995</td>
<td>$6995</td>
</tr>
<tr>
<td><strong>Pros</strong></td>
<td>Weitek RISC processor</td>
<td>Motorola 88020</td>
<td>RISC-based formatter</td>
</tr>
<tr>
<td></td>
<td>8 ppm 11x17</td>
<td>11 ppm 11x17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15 ppm 8.5x11</td>
<td>22 ppm 8.5x11</td>
<td>17 ppm 8.5 x 11*</td>
</tr>
<tr>
<td></td>
<td>2 paper trays</td>
<td>Optional 2nd paper tray*</td>
<td>2 paper trays</td>
</tr>
<tr>
<td></td>
<td>300 or 400 dpi</td>
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<td></td>
<td>SCSI port</td>
<td>SCSI port</td>
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<tr>
<td></td>
<td>4 mb RAM upgradeable to 16</td>
<td>4 mb RAM</td>
<td>5 mb RAM upgradeable to 17 mb</td>
</tr>
<tr>
<td></td>
<td>PostScript Level 2</td>
<td>PS Level 1</td>
<td>PS Level 1</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td>Limited supply</td>
<td>Very expensive</td>
<td>Expensive</td>
</tr>
<tr>
<td></td>
<td>until 4/92</td>
<td>Limited to 300 dpi</td>
<td>Limited to 300 dpi</td>
</tr>
<tr>
<td></td>
<td>1-800-972-3018</td>
<td>Poor paper handling</td>
<td>No 11x17 output, no SCSI port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slow for complex graphics;</td>
<td>* Optional double-sided printing costs $995; not practical for most applications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 mb RAM maximum</td>
<td></td>
</tr>
</tbody>
</table>

*Note: 11x17 output; no SCSI port.*

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Parlez-Vous UNIX?

If you want your Mac to talk to a UNIX workstation, you'll either have to hire a translator or teach one of them the other's language.

By Kurt VanderSluis

If you've ever exchanged files (or tried to) between a Macintosh and a UNIX machine such as a Sun SPARCstation or one of Silicon Graphics' IRIS Indigo workstations, you know that the two computer systems are radically different. Besides having obvious disparities in user interface and price, UNIX machines and Macs use different file systems and network protocols.

These differences present a networking problem that's similar to the situation of a Frenchman and an American who need to communicate with each other. They have three choices: The Frenchman can learn English, the American can learn French, or they can hire an interpreter. Each choice solves the problem and has its own merits. Perhaps the two will use an interpreter at first, but if they need to exchange ideas regularly, they will probably adopt one of the other two choices. If they usually see each other in New York, the Frenchman may learn English. If most of their conversations are in Paris, the American will probably take French lessons.

Three Choices

You also have three choices for establishing communications between a Mac and a UNIX machine: You can make the UNIX computer speak like a Mac; you can make the Mac talk like the UNIX machine; or you can install a gateway, or "interpreter," between the two computers. Whichever option you choose, you'll have to make an additional investment in software or hardware. The purchase that's best for your network depends on criteria that are similar to those of our human example. If you need a Mac-to-UNIX hookup only once in a while, use a gateway as a translator. If your users work on Macs and use a UNIX workstation simply for file storage, make the UNIX machine learn the Mac's language. If your network has mainly UNIX users who work on Macs occasionally, your best bet is to make the Mac speak like a UNIX machine. There are more variables, such as price and manageability, to consider, but these are the basic criteria for making the choice.

Now that we've outlined the possibilities, let's peer inside the technology and see how the options work.

Although a Mac and a UNIX workstation are quite different, they do have one similarity on the networking front: Neither one uses its native file system to communicate over a network. Instead, each uses a network-oriented file system to exchange files with other computers and manage remote volumes and files.

The Mac, for example, uses HFS (Hierarchical File System) to manage the files on volumes to which it is directly attached, such as hard disks, floppy disks, and SyQuest cartridges. But it uses AFP (AppleTalk Filing Protocol) as a filing system when it exchanges data with other computers, even other Macintoshes. The AFP language includes the nouns and adjectives necessary to refer to the attributes and contents of files, volumes, and directories, and it additionally has the verbs that are necessary to access and manipulate files. The AFP language is referred to as a file metalanguage, because it refers to file-system
components and commands in a generic language that isn’t specific to a particular type of computer.

To continue our human-language analogy, let’s suppose that someone developed a metalanguage for humans. The Frenchman could translate his thoughts into this metalanguage, and the American could translate from the metalanguage into English. Using this system, all the people on the planet could communicate if they knew only two languages — their native language and the metalanguage.

This might sound like quite a boon to humankind, but the metalanguage would probably not convey information with the richness and nuances of a natural human language. This can also be a problem with file-system metalanguages, but we’ll save that discussion for another day.

**Frenchman Learns English**

Because all Macs can use AFP and because Apple publishes the specifications for (and licenses) the AFP metalanguage, programmers can create software that allows other types of computers to perform the translation between AFP and their native file systems. Pacer Software’s PacerShare and Information Presentation Technologies’ uShare are examples of applications that enable some UNIX computers to function as AFP file servers while retaining their native network capabilities.

To a Mac user, a UNIX workstation running PacerShare or uShare looks just like an AppleShare server. It appears in the Chooser when you select the AppleShare icon. If you mount it, it appears as a hard-disk icon on the Mac’s desktop. When you double-click on the disk icon, it opens a normal Mac window with icons for the UNIX machine’s files and folders. All the differences between the Mac and the UNIX system are masked through the use of AFP.

In AFP terminology, the server is the computer that makes portions of its file system available for access by client computers. The portions of the server’s file system that are made available are called volumes, and they can be mounted by the clients. AFP is an example of an asymmetrical protocol, in which the client is the partner that drives the relationship. The server doesn’t initiate actions but merely responds to the client’s requests. System 6 offered built-in AFP client capabilities, which enabled any Mac to be a client of an AFP server. System 7 adds file sharing, which allows Macs to be AFP servers as well.

In their native state, UNIX computers use a file metalanguage called NFS (Network File System). NFS, developed by Sun Microsystems, is a standard part of most UNIX systems. On a UNIX machine with NFS, an NFS daemon (background process) provides the translation between the machine’s native file system and NFS. Information in the NFS metalanguage is transported to other NFS devices via
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TCP/IP protocols, much as data in the AFP metalanguage is transmitted via AppleTalk protocols.

**American Learns French**

Just as there are programs such as PacerShare and uShare that add AppleTalk capabilities to a UNIX machine, there are applications that create NFS and TCP/IP processes on Macs. An example of such a program is NFS/Share, from InterCon Systems. NFS/Share provides the translation between HFS and NFS. It comes with Apple’s MacTCP extension, which adds TCP/IP protocols to supplement the Mac’s AppleTalk networking capabilities.

With NFS/Share, you use a unique icon in the Chooser to locate the servers, but virtually everything else is the same as usual. NFS/Share also makes the UNIX device appear as a server volume on the desktop, with folder and file icons. (Note that you can instead use the UNIX utilities telnet and ftp — which come with many UNIX computers and TCP/IP routers — to exchange files between a Mac and a UNIX machine, but they use the UNIX syntax and are therefore difficult for most Mac users to master.)

**Hiring an Interpreter**

The third choice for Mac-to-UNIX communications is to use an interpreter. Cayman Systems’ GatorBox with GatorShare software is one such device. In this setup, the Mac speaks AFP to the GatorBox, which speaks NFS to the UNIX machine. The situation is reversed in the UNIX-to-Mac direction. The GatorBox is called a *gateway*, because it does the translation between the AFP and NFS metalanguages.

To a Mac, the NFS volumes accessible through the GatorBox look like one or more AppleShare servers, each of which can have multiple volumes available for mounting. To a UNIX user, the GatorBox appears to be just another NFS client uploading or downloading files. The Mac and UNIX computers never communicate directly with each other; they always use the GatorBox as an intermediary.

Each of the three Mac-to-UNIX options can be tricky to set up, because you must be familiar with AppleTalk, TCP/IP, and NFS to do so. Next time, I’ll troubleshoot a typical situation in which a client had trouble configuring an NFS server to work correctly with a GatorBox.

Kurt VanderSluis is president of The Network Group, a training and consulting firm in Seattle.

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When MacUser ran its first big feature on multimedia in 1989, we included a photo of a trout in a pitcher of milk. When puzzled readers asked why, we claimed to be referring to a quote from Thoreau. Now it can be told: We were actually predicting that almost four years later, The Voyager Company ([310] 451-1383) would release Schubert’s Trout Quintet ($59.95) as its latest CD Companion CD-ROM Guide. And the milk? That must have been the About Cows CD-ROM, from Wayzata.

By James Bradbury

**PowerBook dieting:** When selecting applications for your PowerBook, think small. Here are some suggested lean-and-mean substitutions: Instead of Word 5.0 or WordPerfect, try the new version of WriteNow ($249), from T/Maker ([415] 962-0195). For a flat-file alternative to Claris’ FileMaker, try the $395 Panorama, from ProVue ([714] 892-8199). Panorama and WriteNow each fit nicely on a RAM disk, keep data in RAM, and save files efficiently. **Consider it a bonus** that WriteNow is faster and Panorama is more powerful *(and faster)* than the leaders in their respective markets.

**Hearing aids:** This isn’t a reason to buy a Mac, but it’s a nice unexpected benefit: the ability to keep instruments in tune. For people of less-than-Mozartean abilities, that previously meant buying an electronic tuner. Now you can do it with a Mac (especially convenient for PowerBook owners) and a $69.95 software package called Master Tuner, from Andromeda Computer Systems ([403] 247-5300). Although Master Tuner is great for that [banjo in your closet](#), you can also use it to experiment with various tempered tunings on pianos and other keyboard instruments. When composer/conductor Carl Davis had the job of teaching Paul McCartney how to write classical music, he suggested that the former Beatle listen to Benjamin Britten’s *The Young Person’s Guide to the Orchestra*. Mindful of his age and station, perhaps, Paul declined. Carl might want to try again, though, with the AudioNotes edition of the piece ($79.98), from Warner New Media ([818] 955-9999). No guarantee about whether users will be able to write their own oratorios, but it’ll be educational.

**Living trusts** are increasingly popular, and for good reason — they minimize the red tape and maximize the estate for beneficiaries. Now you can draft your own trust documents with LivingTrustBuilder ($139), from JIAN Tools for Sales ([415] 941-9191), or Living Trust ($55.95), from Nolo Press ([510] 549-1976). Doing it yourself won’t be easier than hiring a lawyer, but it’ll be a lot less expensive. From heirs to airfares: If Macs can (partially) replace lawyers, then why not travel agents? The OAG (Official Airline Guide) has long been available as an on-line service for you to (theoretically) find and book your own flights. What really makes this practical is a $129 graphical user interface for the OAG called Take Flight!, from Lateral Thoughts ([617] 491-0274). It asks you your requirements and then, after calling up the OAG either directly or via CompuServe, shows you a graphical representation of available flights and connections. Once you’ve decided what you want, the program can book your flights for you and print your itinerary. Best of all, you have to tell it your [frequent-flier number](#) only once. From heirs to airfares: If Macs can (partially) replace lawyers, then why not travel agents? The OAG (Official Airline Guide) has long been available as an on-line service for you to (theoretically) find and book your own flights. What really makes this practical is a $129 graphical user interface for the OAG called Take Flight!, from Lateral Thoughts ([617] 491-0274). It asks you your requirements and then, after calling up the OAG either directly or via CompuServe, shows you a graphical representation of available flights and connections. Once you’ve decided what you want, the program can book your flights for you and print your itinerary. Best of all, you have to tell it your [frequent-flier number](#) only once. From heirs to airfares: If Macs can (partially) replace lawyers, then why not travel agents? The OAG (Official Airline Guide) has long been available as an on-line service for you to (theoretically) find and book your own flights. What really makes this practical is a $129 graphical user interface for the OAG called Take Flight!, from Lateral Thoughts ([617] 491-0274). It asks you your requirements and then, after calling up the OAG either directly or via CompuServe, shows you a graphical representation of available flights and connections. Once you’ve decided what you want, the program can book your flights for you and print your itinerary. Best of all, you have to tell it your [frequent-flier number](#) only once. From heirs to airfares: If Macs can (partially) replace lawyers, then why not travel agents? The OAG (Official Airline Guide) has long been available as an on-line service for you to (theoretically) find and book your own flights. What really makes this practical is a $129 graphical user interface for the OAG called Take Flight!, from Lateral Thoughts ([617] 491-0274). It asks you your requirements and then, after calling up the OAG either directly or via CompuServe, shows you a graphical representation of available flights and connections. Once you’ve decided what you want, the program can book your flights for you and print your itinerary. Best of all, you have to tell it your [frequent-flier number](#) only once.
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The Best for the Brightest

Are your kids using the Mac to play games, get an education, or both? Here's a rundown on software that will get kids (and parents) excited about learning — plus two great (free) PowerBook utilities.

By Steven Bobker

Far too many educators find computers useful only for rote drills and for keeping students occupied. The creative advantages inherent in good educational software are often totally ignored. It's a shame — nearly a crime — to use a Mac merely as a robotic proctor, because there's more to educational software than Carmen Sandiego.

I recently had the pleasure of moderating a Macworld Expo panel called The Macintosh Student Forum. The panel consisted of three high school sophomores and two college students. The high school students — Ben Herlihy, Kerrie Keller, and Daniel Pieracci, from San Jose's Lincoln High School — presented excellent short subjects that they'd created in MacroMind Director and transferred to videotape. The students had not only learned about the subject matter but had also managed to master Director (no mean trick) and video production. Their knowledge had been enhanced in a wide range of areas.

The college students — Audrey Huang and Mark Tozer-Vilchez — attend the University of California at Berkeley. They built excellent, useful health and campus-computing resource stacks in HyperCard and SuperCard for distribution to the student body. Their work shows that with help and encouragement from educators, Macs are a potent educational tool.

Teachers also can use tools such as HyperCard and SuperCard to build courseware. Online services and user groups have many stacks that can be easily modified to suit the needs of any course of study. More-specialized tools, such as Director and other presentation packages, take more effort to master and may not be worthwhile for all teachers. HyperCard, on the other hand, is universal (not to mention affordable — a copy still comes with every Mac) and should be included in all educational programs.

Watch out for this year's trend in Mac educational software: QuickTime/multimedia. QuickTime promises great programs and great possibilities. Hardware is presently a problem, because most schools and students have slow, older Mac models. QuickTime either can't run on them at all (it can't run on Classics, for instance), or it runs so slowly that even the most avid students will turn away. That should change by this time next year, so multimedia and QuickTime will become practical for many more schools. Less expensive and faster hardware is on the way, but until then, more-traditional tools can suffice if you add enough imagination.

Software for Learning

Finally, after many lean years, the educational-software market is booming. Companies such as Great Wave Software, MECC, and Davidson formerly eked out a living amid the spreadsheet and word-processor giants. Now the tide is turning, helped by blockbusters such as Brøderbund's The Playroom and its 1991 Eddy Award winner KidPix ($49.95
No One Knows How To Work The System Like Don Crabb.
Calc+), noted users' dismay and has created a wonderful small freeware extension called Caps Lock. Once you install it, it beeps and flashes a brief warning at the bottom center of the screen when you turn Caps Lock on or off. This great contribution to better PowerBooking is in Library 3 of the MacUser Forum on ZiffNet/Mac and is called CAPSLO.CPT.

More PowerBook cases have come my way recently, including a truly great bag from West Ridge Designs, a set of three from ComputerAid, and easy-to-find Targus bags in leather and heavy nylon.

The bag from West Ridge Designs (800) 548-0053 or (503) 248-0053) is made of heavy nylon and is well padded on all sides. Priced at $80, it holds any PowerBook, the AC adapter, and some spare batteries and has ample space for books, papers, and other accessories. It's the best-balanced bag I've seen and makes toting ten or so pounds of computers and books a relatively pleasant chore.

The MacSac bags, from ComputerAid (800) 343-3388 or [508] 674-0860), range from a plain unpadded nylon slipcase without a handle or strap ($10) to a PowerBook-sized small padded case with a handle ($32) to a full briefcase-sized padded unit ($64.50).

The bags from Targus (714) 523-5429) come in a variety of sizes and cost $70 to $180. Although they're touted as universal cases for any notebook computer, the models I saw fit the PowerBooks very well. One caveat: the nice FolioPac leather bag is unpadded. The leather and nylon LapPac, Premier, and Universal series are well padded.

**Pick of the Month**

Programs that change the way most people compute don't come along every month or even every year. Frontier ($179), from UserLand ([415] 325-5700), has the potential to be one of those rare great programs.

At first glance, Frontier is yet another programming language, but it's more than that. It's a key and a glimpse. The key is that it lets users open the door to cooperative computing, in which applications, rather than contending with each other for precious CPU time, work together to make the sum of their usefulness greater than that of their parts.

The glimpse is just that: Version 1.0 is a tease. To get the most out of it, you need programming ability and patience, because it can be slow. You also need to be able to look past Frontier's file-naming conventions, which only a committed nerd could understand and love. Its language is somewhat like C, and although programming in Frontier isn't too difficult, it isn't for most of us either.

The saving grace in this version is that programmers can write what Frontier calls desktop scripts. These scripts allow Frontier users to simply use the power of the program. One example of a desktop script is called the PowerBook suite. This script is installed on a desktop Mac and on a PowerBook. When the two Macs are connected on a personal network and the suite is activated, it checks all the files in a designated folder on the PowerBook and on the desktop Mac. Then it moves files around so that both locations have the latest versions of all the files in either folder — it's slick and useful.

Don't be intimidated by Frontier's verbs and roots. Take a look at Frontier. If you like what you see now, buy it. If not, call Dave Winer at UserLand and tell him to hurry up with version 2, the one for all of us.

**Post-Easter Egg**

Excel took on Lotus 1-2-3 Mac via Easter egg. Did you think that the Mac team at Lotus would let that pass? Certainly not! I've heard that Lotus 1-2-3 for the Mac contains two Easter eggs, but I've been able to find only one. Here it is.

Set your Mac's date to any full-moon date. (It's better to set it back rather than ahead, because if you have alarms set and you set the date ahead, the alarms will go off. Oops.) Now select the About 1-2-3 box from the Apple menu, and press the Command key while you click on the right-hand area where the registration information is recorded. Watch the scrolling list carefully. It consists of the names of the team that produced 1-2-3. Pay careful attention to the last line.

Here are some 1992 full-moon dates: 2/18, 3/18, 4/17, and 5/17. The absolute last chance to see this Easter egg is 7/30/96. After that date, it ceases to work.

I'm still looking for the other Easter egg in Lotus 1-2-3 as well as the one in Word 5.0. If you know where to find either one or any other interesting Easter eggs, please drop me a line.

Steven Bobker, a former editor-in-chief of MacUser, currently keeps busy, amid other projects, acting as system operator (sysop) for MacUser's on-line service, ZiffNet/Mac.
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Our portable notebook computer weighs only 6.25 lbs. Yet it has so many features that it's capable of being your only computer. With 25 MHz of computing speed and a math coprocessor, it's faster than a Mac IIsi; its specifications are comparable to a Mac IIci. The TRAVLER includes a standard SCSI port. It only takes a minute to connect it to your network or a computer to transfer data, or to use as a hard drive.

Don't judge a book by its cover!

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8 Mb RAM...and an 80 Mb hard drive!
The TRAVLER 880 has 8 Mb of RAM, upgradable to 14 Mb (nearly double the RAM in the Apple PowerBook 170)...enough memory to run almost any Macintosh program. (The TRAVLER 1480 has a whopping 14 Mb of RAM.) And with its high-speed, high-capacity 80 Mb hard drive, there’s plenty of storage.

Can be connected to any Macintosh desktop computer.

Unlike the Apple PowerBook 170, the RealTech TRAVLER’s SCSI port and cable (included free) make it easy to connect to any Macintosh computer with a SCSI port. Upon start-up, the TRAVLER’s hard drive and floppy will appear directly on your Macintosh desktop, just like any other hard drive or floppy. You no longer need to maintain two versions of each file (one for the desktop Macintosh and one for your notebook), since all of your files will permanently reside in the TRAVLER. When you’re ready to leave the office, just shut down the desktop Macintosh, disconnect the TRAVLER’s SCSI cable, and you’re on your way. No more disk swapping to maintain your files.

Takes the place of a Mac IIci. So you only need one computer, not two. Now you only need one computer for office and travel, and only ONE set of data files!
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In less than a week, I became so attached to my TRAVLER that I wouldn’t give it up, even for a day. I do a lot of traveling, and it quickly became indispensable to my productivity. I made the agency wait ‘til TRAVLERS were rolling off the line, then sent the agency one to shoot for this ad.

Now I have another problem...I can’t get the agency president to return it. After she used it for a day, she was hooked, too!"

Real Provencher
President
Hardware That Fits

"I can’t give up the prototype model, it’s too powerful!

I’ve been using it for a week now, and I’m completely hooked. It’s the best portable solution available. It’s powerful enough to handle just about any task, and it’s priced over $1000 lower than the Apple PowerBook 170.

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CIRCLE 239 ON READER SERVICE CARD.
How to Buy Secondhand Equipment

It may seem as though the Mac's been around forever, but it's only eight years old. With new models appearing almost every year, older Macs such as the Mac II and the Plus seem a little quaint next to their newer streamlined brethren. But before you shell out money for a new machine that you might use only for business emergencies or for personal use, consider secondhand Macs, because many still have plenty of life left in them. Of course, there are always hazards when buying used equipment, but if you follow these suggestions, you can minimize the risks and avoid buying a lemon.

By Victoria von Biel

Secondhand Macs are available through several sources: classified ads, user groups, auctions, computer swaps, and companies that specialize in selling used Macs. You'll pay more if you buy through a company, but you should get some sort of guarantee — often money-back — in return for the higher price. When buying privately, a user group is a good bet, because of the technical support that's available.

Be careful when buying bargains — the less expensive the Mac, the more likely it is that you'll have to spend money and time either fixing it or upgrading it. If you know what you're doing, a damaged Mac can be a great deal. If you don't, you'll probably end up with a useless box.

A secondhand Mac's age is not as important as its condition: Appearance is a good indication of how the Mac's been treated.

Check out Mac Plus for a good low-end bargain. It's possible to find Pluses with 4 megabytes of memory for around $500. Before buying a Plus, though, you should ask whether it has its original power supply. If it does, there's a good chance that it will need a new one before long.

Another good deal is an SE without an internal hard drive. Add your own hard drive for a low-priced, reliable machine.

Are you looking for something more advanced than a Plus or an SE? By adding some simple upgrades (such as a PMMU chip and a high-density floppy drive) to a Macintosh II, you'll get reasonable performance for a very reasonable price. Apple also sells a relatively inexpensive logic-board upgrade for Mac IIs to IIfx's.

To avoid some expensive repairs, examine the floppy-disk drive carefully when you're checking out a used Mac. Make sure that it can initialize a new disk, that it can read some good disks you've brought from home, and that the Eject function works smoothly.

If the Mac's performance is noticeably slow, you can check its speed with the System Index utility, included with Mac expert Larry Pina's Macintosh II Repair and Upgrade Secrets (Carmel, Indiana: Hayden Books, 1990). This utility includes a test and a chart that tell you how fast Macs — starting with the Plus — should be. A significant speed problem can be fixed only by upgrading the logic board.

When buying a Mac with a 9-inch screen (an SE or a Plus, for example), take along a measuring tape so you can check the screen size. It should measure a little less than 7.25 x 4.75 inches. If the screen is smaller, the power supply may be in trouble or the Mac may not have been properly maintained.

If you'll be connecting an external drive, modem, or printer to the Mac, make sure you test these connections before buying to make sure they work properly.

It's not worth buying secondhand peripherals such as hard-disk drives or modems. New models are more reliable, have warranties, and are competitively priced.
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By John Rizzo

Tools of the trade: Central Point Software has revamped MacTools in a comprehensive 2.0 package. It features automatic-backup, data-recovery, and virus-protection capabilities. Automatic backup is supported over a network and on all types of tapes, cartridges, and optical discs. The six data-recovery modules can even restore Microsoft Excel and Word files — the latter are usually difficult to recover, because of Word’s flaky Fast Save format. The interface, which is identical in all the modules, is one of the best of any data-backup/recovery package. $149; upgrade, $49. (503) 690-8090. ✩ If you don’t like the keyboard command equivalents for the Finder commands — Command-W for Close and so forth — you can change them with Finder 7 Menus!, one of the utilities in Insanely Great Software’s System 7 Pack ($29.95), written by teenage whiz-kid Adam Stein. Another goody in the package, Rename Delay, lets you rename files as soon as you’ve clicked on them, à la System 6. (908) 549-0590.

Problematic PowerBooks: If you get stuck on the road with a misbehaving PowerBook, try these tricks. Some PowerBook 140s and 170s have a known bug, attributable to faulty shielding, that prevents you from writing anything onto a floppy disk. Try turning down the screen brightness — this often makes the drive start working. If your screen suddenly goes blank or displays random lines, you haven’t lost the spreadsheet you’ve worked on for the past 100 miles. Gently squeeze the right side of the screen bezel, and the picture should return. If you have a third-party RAM card installed and the PowerBook suddenly won’t boot, giving you discordant chimes instead of the usual startup sound, try visiting an authorized dealer and having the RAM card removed. If you get really stuck, you can call Apple’s PowerBook Hotline at (800) 505-2772 for advice.

Simply serial: Orange Micro’s Grappler, one of the first packages that let you print to non-Mac laser, inkjet, and dot-matrix printers, has been upgraded to Grappler IIsp ($159). The new version includes TrueType fonts and a serial-to-parallel conversion cable that supports throughput speeds as high as 57.6 Kbps. You also get GrapplerShare, a spooler that allows anyone on your network to access a printer that’s connected to your Mac. (714) 779-2772. ✩ Hayes Connect 3.0 ($130) is a serial server that lets you put any Mac serial device, such as a label maker, a plotter, or a modem, onto a network. Its best feature is the ability to create a device pool: If one modem is busy, the software automatically picks another for you. (404) 441-1238.

MacUser May 1992 213
More PowerBook Power

PowerBooks are lighter than their Portable predecessor, but at a price: shorter operating time away from an electrical outlet. Here's what you need to know to keep your PowerBook running as long as possible.

By James Bradbury

If you buy a PowerBook and then tote it on your next transcontinental flight to New York, you may be in for a surprise long before you cross the Mississippi. The "You are now running on reserve power and your screen has been dimmed..." message is likely to flash on your screen a few hours after takeoff, especially if you don't know these power-saving tips.

Screen
- The PowerBooks' backlit screens are their biggest power consumers. The rule of thumb is to keep your screen as dim as possible whenever your machine isn't plugged in. This means that if you're planning to work during a long plane flight, don't take the red-eye unless you've got room in your carry-on bags for a flashlight.
- In a well-lit room, the 170's active-matrix screen can be used with backlighting turned completely off, but partial dimming saves power. The 140 and 100 screens are unusable without some back-lighting, but keep it as low as you can.

Memory
- The Memory control panel has a cache-size setting that should be adjusted, depending on how much memory is installed in your PowerBook. The cache size determines how often you access (and wake up) your hard-disk drive. For a 2-megabyte PowerBook, set the cache to 64K; for 4 megabytes, set it to 128K; for 6 megabytes, 192K; and for 8 megabytes, 256K.
- If you have 6 or more megabytes of RAM, set up a RAM disk as a startup disk. This technique is especially useful for PowerBook 100 owners, because they can shut down their Macs without losing the RAM disk. To find out how to create a RAM disk, see page 108 of the PowerBook User's Guide.
- Don't use virtual memory when you're running on battery power.

Clock Speed
- For PowerBook 170 owners, an important part of extending battery life is turning the Power Saver option on in the Battery DA (you need to click on the flag at the right of the palette to display this option). This causes the microprocessor speed to switch from 25 megahertz to 16 megahertz, which Apple says can extend battery time by 30 minutes.

Batteries
- Apple recommends that you drain the nickel-cadmium batteries that come with the PowerBook 140 and 170 once every three months. Whether this process actually improves performance is debatable, but it can't hurt. To drain the battery, leave the PowerBook on and ignore the successive warning messages that you are about to run out of power. The PowerBook 100 uses lead-acid batteries, which should never drain completely.
- When you're recharging batteries, make sure that there's power coming from the electrical outlet. The charging indicator in the Battery DA tells you that a plug is physically inserted, not that any electricity is flowing through it. You might see a warning dialog box that tells you that the plug is inserted without any charging occurring, but this happens only if your battery level is already below a certain point.
- Apple says that batteries should last a year if well cared for. That's probably a conservative estimate, but if a battery doesn't seem to hold a charge, it might be time to replace it. When you're ready to get rid of a battery, don't throw it away; take it to your Apple dealer for recycling.
Drives

• The PowerBook's hard-disk drive is a big power drain, so the less you access it, the better.
• Keep your drive in Sleep mode as much as possible. From the Portable control panel, set the hard disk's Minutes Until Automatic Sleep at between one and two minutes. This stops the drive from spinning automatically when you aren't accessing it.
• The Portable control panel also lets you set how many minutes your PowerBook can be inactive before the entire system automatically goes to sleep. Set this control panel for convenience, but don't rely on it as a way to put your PowerBook to sleep. It's better to get in the habit of manually putting the PowerBook to sleep whenever you plan to stop working for more than a few minutes. Although you can put the PowerBook to sleep from either the Battery DA or the Special menu, a better method is to use the freeware Fkey program PowerSleep (available from ZiffNet/Mac and other on-line services). PowerSleep lets you use a keyboard command equivalent to put the system to sleep, and unlike other methods of invoking Sleep, it won't wake up a sleeping hard disk, which can be a significant power drain.
• On the road, avoid using disk-intensive applications such as HyperCard, database programs, or anything that uses QuickTime. If an application gives you the option of keeping the program or files in memory (as Microsoft Word does, for instance) and you have enough RAM, do it.
• Open files in batches rather than individually when you know you're going to be working on several documents simultaneously. This trick avoids making the disk spin up more than once.
• Quit from telecommunications applications as soon as you're finished using them, because the modem continues to use power while the applications are open.
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One look and Apple Chairman and CEO John Sculley called it “a spectacular product.”* You see, this isn’t just another version of a Lotus®1-2-3® spreadsheet. It’s a program that really grasps hold of the full power of Macintosh. Its friendly Mac®interface makes working with data, text and graphics fast and easy. Plus, you’ll have features that push the capabilities of System 7 to the limit. Like Publish and Subscribe, Apple®Events, Data Access Manager and Balloon Help.*

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Apple's default installation of System 7 hogs nearly 4 megabytes of hard-disk space. But do you really need everything the Installer stuffs into your System Folder?

By Bob LeVitus

Believe it or not, when the Mac first arrived in 1984, you could fit everything you needed for a day's work — your System Folder, a copy of MacWrite or MacPaint, plus a document or two — on a single 400K floppy disk.

My, how times have changed. System 7 can require ten times as much disk space as System 1 did — a real challenge to PowerBook users. But don't despair. Although you can buy a bigger hard-disk drive, there are less radical (read: less expensive) ways you can reduce System 7's overhead. I'm going to show you how to tweak the Installer and create the smallest possible System Folder for your needs. Then I'll go through the System Folder and suggest files that can be deleted. Finally, I'll take a brief look at using file-compression utilities, perhaps the best way of getting the most out of your current hard drive. One note before we begin: The file sizes mentioned in this column are estimates; your mileage may vary.

**Customizing the Installer**

Although the Apple Installer is easier to use than installers on other platforms (ever tried to install Windows?), it's also far from perfect and not very smart. If you choose Easy Install, as most users do, the Installer will install 48 files, many of which you will never need. If you try to remedy the situation by choosing Customize, you're presented with a confusing list of almost 40 items.

Apple cryptically recommends using the Customize option "only if you are sure that you want other than the recommended software." The Customize option is barely mentioned in the System 7 documentation, and many people are justifiably confused about how to use it, so here's a brief tutorial.

First, click on the Customize button. You'll be presented with a dialog box containing a scrollable list of items available for installation; choose the ones you want to install, by Shift-clicking on them. To find out more about an item, click on it; an explanation appears below the scrolling list.

Three categories of software — system software, printer software, and file-sharing/networking software — are arranged in five sections in the scrollable list. Let's start by deciding which system software to install:

- **System Software for any Macintosh** (the first choice on the list) or **System Software for [a specific Mac model]**.

  System Software for any Macintosh installs everything you need to start up any Mac model from your hard disk. System Software for [a specific Mac] installs only the resources that model requires. So, for example, if you choose System Software for Macintosh Plus, control panels such as Monitors and Colors are not installed. If you never expect to use your hard drive with a different Macintosh model, choose System Software for [your particular model]. But if there's a chance you'll someday need to use your hard drive with a
Beating the System

The last section of the list contains a set of items called Minimal Systems. These are used only to create high-density (FDHD) startup floppies. (Even a minimal installation of System 7 is too big to fit on an 800K floppy.) Min System for any Macintosh creates a startup floppy that works with any Mac model. Min System [for a specific Mac] creates a startup floppy that works with that particular model. Minimal System installs a System and the Finder and little else — no control panels, extensions, or DAs. The Installer does place the standard five subfolders (Apple Menu Items, Extensions, and so forth) inside the System Folder, however, and it provides an empty Control Panels folder as a DA. (It also installs a single font, 9-point Geneva in the System file.)

You must next decide which printer drivers to install — LaserWriter, ImageWriter, Personal LaserWriter LS, StyleWriter, and so on. Shift-click on each one you'll need. You also can choose Software for all Apple Printers, which automatically installs all eight drivers.

Finally, if you're on a network and will be sharing files, Shift-click on File Sharing Software. If you'll be using an EtherTalk or TokenTalk network, Shift-click on those items as well.

Now click on the Install button, and feed your Mac disks as it asks for them.

 Shrinking the System (Folder)

Even if you've customized your System 7 installation, there are probably a few files you don't need in your System Folder. If you used the Easy Install option, that's almost certainly the case. If you have loads of empty space on your hard disk, getting rid of these files is probably more trouble than it's worth. But if your hard disk is almost full, you can free up as much as a megabyte through judicious file deletion.

For what it's worth, your Mac can function with nothing more than a System and the Finder in the System Folder. You don't need DAs, control panels, or extensions, although doing without some of them — such as the Chooser and General Controls control panels — would be inconvenient, to say the least.

If you do decide to delete files and later realize that you need or want them, you can run the Installer once more to create fresh copies of them. (Some files, such as control panels, can be copied directly from the master system disks.) If reinstallation is too much trouble, copy each file to a floppy disk before you trash it. Then if you need it later, just drag it from the floppy to your System Folder.

We'll start with the Extensions folder, because it's most likely to contain stuff you can live without. First and foremost, if you're not connected to a network and aren't 'sharing files, get rid of AppleShare (72K), File Sharing Extension (168K), and Network Extension (93K). These files, along with the File Sharing Monitor and Sharing Setup control panels (more about them later), are needed only if you share files with other Macs. Not only that, but file sharing uses about 300K of RAM when it's turned on.

Next, get rid of printer drivers for printers you'll never use. So if you don't have an ImageWriter, trash the file named ImageWriter (45K); if you don't have a Personal LaserWriter SC, trash its file (72K). And so on.

A couple of other extensions you might want to trash are DAL (84K) and Finder Help (36K). DAL is used for accessing networked or remote databases; Finder Help contains the five screens you see when you choose Finder Shortcuts from the Help menu. (I suggest that you read the screens before deleting Finder Help, though.)

Now let's tackle the Control Panels folder. First, get rid of control panels that are inappropriate for your Mac. For example, if you have a black-and-white Mac, such as an SE, you don't need Color (12K). Next, if you're not sharing files, get rid of File Sharing Monitor (5K), Sharing Setup (5K), and Users & Groups (5K). Map (29K) is lame, so nuke it. Another file you can probably do without is Easy Access (12K), which lets you control the cursor from the keyboard and/or use a Mac one-handed. A complete description appears on page 354 of Macintosh Reference, the manual that comes with System 7 upgrade kits.

The Apple Menu Items folder contains the standard DAs. With the exception of the Chooser, you don't need any of the Apple-supplied DAs: Alarm Clock (12K), Calculator (8K), Key Caps (12K), Note Pad (9K), Puzzle (14K), or Scrapbook (11K). On the other hand, they're small and relatively useful (except for Puzzle), so you needn't toss them unless you're really hard-pressed for disk space.

Last but not least, take a look inside the

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One of System 7’s best features is its customizable Apple menu, and clever users have developed a variety of ways to organize its contents. Reader Susan Doyle, of Minneapolis, recently shared her approach with us:

"I created more than a dozen aliases of my most often used applications and files. When I put the aliases into the Apple Menu Items folder, however, I found that they were listed alphabetically among my DAs. Although DAs are treated just like applications under System 7, I’d prefer to find Calculator near the top of the list, where it’s always been—not mixed in with a bunch of other items in a long list.

"Then I remembered that I can rename DAs so that they appear in the order I want them. Instead of renaming my DAs, I renamed the aliases by making the apple character (Shift-Option-K) the first character in their names. Now my Apple menu has an alphabetical list of DAs, followed by a list of aliases, each of which is flagged with a little apple."

In a similar vein, if you want a file to appear at the top of the Apple menu, use one or more spaces as its first character(s). You can use this technique to group files and folders on the Apple menu. On my Apple menu, for example, aliases of folders begin with three spaces so they’re grouped together at the very top. Documents begin with two spaces, applications begin with one space, and DAs aren’t renamed at all. So when I pull down my Apple menu, I see (from the top): my folders in alphabetical order, followed by my documents in alphabetical order, followed by my applications in alphabetical order, followed by my DAs in alphabetical order. It’s a painless way to make your Apple menu more manageable.

Submit your favorite System 7 tips, either by mail or by modem, to ZiffNet/Mac’s MacUser Forum (please include your address too). If you submit the month’s best tip, you’ll not only receive notoriety and fame but you’ll also get a spiffy (and rare!) “I Beat the System” T-shirt.

System file itself (double-click on it). The Installer places about a megabyte of fonts and sounds inside the System file, but you don’t actually need most of them. If you’re really determined to whittle down your System Folder, get rid of your least-used fonts (3K to 68K each) and sounds (2K to 8K each).

Other Space Savers

For those who are intent on paring down the System Folder, the techniques I’ve outlined should restore at least a megabyte of disk space. But in the grand scheme of things, saving a megabyte (or even 2) isn’t good enough. For those whose hard disk is nearly full and who are not ready to buy a bigger drive, here are a couple more ways to maximize the existing space.

System 7’s aliases provide a unique way of archiving infrequently used files and freeing up space on your hard disk. First, get a few floppy disks and label them clearly (I call mine Archive1, Archive2, and so on). Next, go through your hard disk and copy to the floppy disks files you don’t often use. Finally, make aliases of the files on the floppies, and copy the aliases back onto your hard disk. Now, whenever you need one of these files, double-click on its alias on your hard disk. Your Mac will ask you to insert the proper floppy disk.

The other worthwhile option when disk space gets tight is to get your hands on a file-compression utility such as StuffIt Classic (shareware), Compact Pro (shareware), StuffIt Deluxe (from Aladdin Systems), or DiskDoubler (from Salient Software). Each of these programs can compress a file by as much as 90 percent, depending on the type of file.

The StuffIt products and Compact Pro are totally manual—you choose files and then compress them. You must also decompress files manually before you use them. DiskDoubler, on the other hand, is semiautomatic. Once a file has been compressed with DiskDoubler, the file automatically decompresses and launches the appropriate application when you double-click on the file and recompresses itself when you close or quit the application.

The latest generation of file-compression utilities — AutoDoubler (Salient), StuffIt SpaceSaver (Aladdin), and More Disk Space (Alysis Software) — works in a way that is entirely transparent to the user. Merely install them and set a couple of parameters, and your files will be compressed and decompressed automatically as you use them. Not only that, but the programs can crunch files in the background when the computer is idle.

Bob LeVitus is the author of Son of Stupid Mac Tricks and Dr. Macintosh, 2nd Edition and the proud owner of a new 536-megabyte hard drive.

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HyperCard 2.1’s foray into System 7-savvyness focuses primarily on Apple events. Put simply, Apple events is an underlying technology in System 7 that allows one Mac program to send a message to another Mac program. The two programs may be on the same Macintosh, or they may be on different machines linked via a network.

In practice, many Mac developers are still trying to establish a role for Apple events in their products. In a family of related products, program linking (as it’s called in System 7 parlance) can be a powerful ally — each program becomes a module within a larger application environment. For example, when a landscape architect plans a garden, a drawing program can tell a relational-database manager to add a new line item to an estimate document each time a tree is added to the plan; then the database manager can ask a project-management program to update a PERT chart for ordering and planting the various species.

The most challenging aspect of Apple events is the user interface. What tool do program designers provide for casual users to use in composing messages to other programs? Even experienced programmers must study Inside Macintosh, Volume VI, and the Apple Event Register to figure this stuff out.

Two Mechanisms

Fortunately, you don’t have to be a hacker to experiment with the power of Apple events. HyperCard 2.1 provides two Apple-event mechanisms, one of which lets you work entirely inside HyperCard. Importantly, the two mechanisms represent a distinction between HyperCard’s external and internal Apple-event capabilities.

In the external structure, HyperCard (without the help of Apple-event XCMDs) can send a handful of standard Apple events to any other program on the same Mac and only two messages to programs on another networked Mac. Most of these messages are Apple-event-aware incarnations of commands that have long been in the HyperTalk vocabulary: open <application>, open <document> with <application>, and print <document> with <application>. Behind the scenes, HyperCard translates these commands into the more complex Apple-event command syntax before sending them to the designated program.

The principal focus of this article, however, is on HyperCard’s internal Apple-event structure, in which a HyperCard stack running on machine A can send any HyperTalk message to a HyperCard stack running on machine B. More accurately, the messages go from program to program, not from stack to stack. This gives rise to an important limitation when designing projects around HyperCard’s internal Apple-event mechanism: The HyperCard program that is to receive the message — the target program — must already be running. HyperCard on machine A cannot launch HyperCard on machine B.
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<th>Price</th>
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</thead>
<tbody>
<tr>
<td>Mac II, IIX, IICx, IIXi, IICci, IIXf, SE/30 LC, Quadra 700 &amp; Quadra 900</td>
<td>8-bit system</td>
<td>$1999</td>
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<tr>
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Example 1: Command for Getting Address of Target Program

on mouseUp
  answer program "Choose a colleague’s Macintosh:"
  if it is not empty then put it into field "Target Address"
end mouseUp

Event Scenarios

Logistically, this limitation will probably affect your stack and network designs, so it helps to plan your projects around two typical scenarios: two users communicating directly with one another or multiple users sharing information stored in a common stack.

For the two-user scenario, the need for HyperCard to be running on both machines is not a problem, because both users are probably communicating in real time. The public-domain game Hyper-BattleShip!, crafted by members of the Claris HyperCard team, is an excellent example of this kind of interaction—and an outstanding source of HyperCard-to-HyperCard Apple-event scripting examples. Another use might be a direct person-to-person messaging system.

The multiuser scenario is more complex. If several users are to share a stack in a groupware environment, then one Mac on the network must always be running HyperCard. Fortunately, in System 7, HyperCard can merely perform its Apple-event tasks in the background, so one Mac with some spare memory can act as the HyperCard "server." Advanced file-server software such as AppleShare 3.0 allows your network to run HyperCard on a file server while keeping the server available for its other tasks.

There's one more catch to multiuser access. For you to transfer data to or from a shared stack, that stack must be both open and active. The good news is that your HyperCard stack can open or activate the shared stack under script control.

Setting up a shared stack in this manner begins to overcome the inherent multiuser-access limitation of HyperCard. In most network situations, only one user at a time can access an unlocked HyperCard stack. But Apple events allows multiple users to communicate with an already open stack. You're not actually going to the stack in the traditional HyperCard sense (this is not multiuser stack browsing) but merely sending a message to, or receiving a message from, an open stack. Moreover, messages are handled serially—one at a time and first come, first served. Therefore, you should avoid lengthy processes in these shared stacks, which might delay another user's access. Send messages or request data that can be processed quickly in the shared stack.

Event Ingredients

Sending an Apple event from one HyperCard program to another requires three ingredients: program-linking access, the address of the target program on the network, and the HyperTalk message.

Program linking is a System 7 feature that's far from intuitive. To set up one Mac's HyperCard to be shared by other users requires you to engage program linking in two places. First, open the Sharing Setup control panel and click on the Start button at the bottom of the window (if the button is labeled Stop, then program linking is already on). This is a global setting that makes your Mac visible on the network as a machine that may have linkable applications running.

Next, select the HyperCard program (not the stack) in the Finder and choose Sharing from the File menu. Check the Program Linking check box. This lets others on the network send Apple events to this copy of HyperCard.

You identify the target program by a three-part address consisting of the AppleTalk zone, the name of the Mac as it is known on the network, and the name of the program as it is known to the Finder. This assumes, of course, that all the network participants have named their Macs (in the Sharing Setup control panel) and that you have performed the program-linking steps listed above.

Acceptable HyperTalk syntax for the address is <zone>:<Mac name>:<program name>. If the network has only one zone, then the first parameter is replaced by an asterisk. If the target program is on the same Mac, then the second parameter too is an asterisk.
Example 2: Button Script for Sending Notes to Other Users

```
on mouseUp
  -- display program linking dialog, restricting program
  -- listing to HyperCard only.
  answer program "Choose a recipient:" of type "WILDepOl"

  -- if you selected all the right stuff, then put address
  -- into local variable and extract Macintosh name to
  -- put into user-friendly dialog box below.
  if it is not empty then
    put it into targetAddress -- store whole address
    -- new property in HyperCard 2.1
    set itemDelimiter to colon

    -- extract Mac name
    put item 2 of targetAddress into targetMac

    -- restore to default setting
    set itemDelimiter to comma

  -- display Ask dialog box for you to enter a note
  -- box on the target Macintosh. Arguments of Answer
  -- command must be between quotes; syntax here allows
  -- "it" to evaluate to actual note text and then slap
  -- quotes around the note.
  if it is not empty then
    send "answer" && quote & it & quote --
      to program targetAddress without reply
  -- if there is a problem sending the Apple event,
  if the result is not empty then
    display error message in an Answer dialog box on
    your Mac
    if the result is not empty then answer the result
  end if
  end if
end mouseUp
```

The easiest way to obtain the address of
the target program is to use the program­
linking dialog box, which you can trigger
with the answer program command, shown in Example 1. HyperCard must be
running on the target machine in order to
be listed in the dialog box. If the target
program and Mac are always the same,
you can store this address in a field of the
user's stack so that the user doesn't have
to go through this dialog box each time to
send a message.

The first time your stack sends a mes­sage to another user during a session (that
is, since startup), you see the standard
FileShare log-on dialog box. If the target
Mac has enabled guest access in the Users
& Groups control panel, then you can log
on as a guest without a password.

The final ingredient is the message
itself. Your stack can send two types of
message to another HyperCard program: a
command or a request for data.

**Sending Messages**

HyperTalk's syntax for sending a com­
mand is send <command> to pro­
gram <zone>::<Mac name>::<pro­
gram name> [without reply].

The optional parameter at the end simply
sends the message and frees your stack
from waiting for the target stack to finish
executing the command. By granting you
program-linking access, the target Mac
gives you virtually full control over what
happens in its copy of HyperCard. Ex­
ample 2 shows a script for sending a note
that appears on the target Mac as a Hyper­
Card Answer dialog box.

A command can also be a HyperTalk

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You don’t have to be a hacker to experiment with Apple events — HyperCard 2.1 provides two Apple-event mechanisms.

To extract information from a stack running on another machine, you can use the request command and pass along any expression the target stack can evaluate, including functions (either HyperCard’s built-in functions or custom functions in the stack) and object properties.

For example, to find out if a particular stack is the current stack on the target Mac, your stack issues the following command: request "short name of this stack" from program "*: Joe's Mac:HyperCard". The value comes back in HyperCard’s standard it variable. If it doesn’t contain the name you want, then send messages to the other program to go to the desired stack.

I’ve only scratched the surface of HyperCard Apple eventing. To demonstrate the internal Apple-event techniques, I’ve put together a simple stack called In-Out Board, a basic electronic pegboard that lets you track the whereabouts of others on a network. You can download the stack from ZiffNet/Mac (MacUser’s on-line service) — look for the filename INOUT.CPT in Library 6 (Stackroom) of the Download & Support Forum. Or send your request (include the article name) and a check ($5 in North America, $10 outside North America) to Concentrix Technology, 1875 S. Grant Street, Suite 760, San Mateo, CA 94402.

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Send your tip, together with your name, address, and phone number, to Tip Sheet, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

You can also contribute tips electronically via ZiffNet/Mac, the on-line service for MacUser. Send them to GregoryWasson at 72511,36. Be sure to include your full name and mailing address along with the text of the tip.

Compiled by
Gregory Wasson

System 7
In January's Beating the System, page 207, Bob LeVitus describes a way to change the Finder with ResEdit so that generic PICT and TEXT files are opened by your favorite applications. Here's a similar way to change the System file so that screen snapshots are created in your favorite drawing program's native format:

1. Launch ResEdit, and open a copy of the System file (never the active System file).
2. Open the FKEY resource.
3. Open FKEY resource ID 3. Click on OK when warned about saving your changes uncompressed.
4. Choose Find ASCII from the Find menu.
5. Type PICT into the first text field of the window, and click on the Find Next button.
6. Close the window, and examine the highlighted string in the FKEY ID = 3 window.
7. Click on the down arrow, and examine the four-letter creator type for TeachText (ttxt) directly under the boxed PICT string.
8. To find out the creator type of your drawing program, use ResEdit to open a document created by that application and choose Get File/Folder Info from the File menu. Copy the four-letter creator string in the window that appears, and close that window.
9. Select the ttxt string in the FKEY ID = 3 window, and paste.
10. Choose Save from the File menu, and quit ResEdit.
11. Move your old System file out of the System Folder, and replace it with the new one. Make sure you name the new file System.
12. Restart to activate your changes.

Now when you double-click on a document you've created by pressing Command-Shift-3, it's opened by the specified drawing program.

John Turpin
Lookout Mountain, GA

TeachText
Ever wonder how some of those little TeachText ReadMe files appear on the desktop as newspaper icons? It's really simple.

1. Launch ResEdit or a similar program that lets you alter the type/creator information of a file.
2. Choose Get File/Folder Info from the File menu (that's how it appears in ResEdit 2.1; your version may be different).
3. Choose the TeachText document file you number of times as you want duplicates of the card on the page.

To change the card, modify the original, double-click on the Publisher box around it (if your preferences indicate that the box should be visible), and click on the Send Edition Now button.

This is easier than editing one copy, deleting the others, replacing them with new copies, and then realigning them on the page, as you must do without publish-and-subscribe.

Wayne Folta
New Carrollton, MD

Tip of the Month
Canvas 3.0
With System 7, you don't have to publish an entire document; you can publish just a group of objects. This is useful in an unusual way: You can replicate a group of objects by publishing it and then subscribing to it in the same document. This is helpful, for instance, when you're laying out a bunch of business cards or tickets on a single page.

In Canvas 3.0, simply draw one card, select all the items in the card, and choose Create Publisher from the Edit menu. Then choose Subscribe from the Edit menu. Subscribe the same number of times as you want duplicates of the card on the page.

To change the card, modify the original, double-click on the Publisher box around it (if your preferences indicate that the box should be visible), and click on the Send Edition Now button.

This is easier than editing one copy, deleting the others, replacing them with new copies, and then realigning them on the page, as you must do without publish-and-subscribe.

Wayne Folta
New Carrollton, MD

Figure A: Publish-and-subscribe isn't just for workgroups. In Canvas 3.0, you can use this System 7 feature to instantly update changes to duplicates of a graphic on the same page.
The AppleShare Print Server should have been...

Print Central, the most flexible, complete network print server on the market today. Whether you share one laser printer or a series of PostScript devices, Print Central is the product for you. Print Central provides the means for defining up to eight Chooser selectable print queues. Queued jobs can quickly be prioritized or placed on hold, or sent to a different queue. Each queue can be sent to one or several printers on a first available basis. Print Central print queues are never busy, imagine never waiting for a printer again!

Just create a Menu/DA macro that selects Empty Trash from the Special menu in the Finder, and click on the Timer Options button to set the macro to be activated 0 seconds after your Macintosh starts.

If you have any applications in your Startup Items folder, you'll instead want to make a sequence in QuicKeys 2: First, set up a Menu/DA macro (look on the Define menu in the Sequences dialog box) that chooses the Finder from the Application menu in the upper right corner of the screen. Second, use the Menu/DA selection, on the Define menu, to choose Empty Trash from the Special menu. QuicKeys waits until everything in the Startup Items folder has been launched before it starts to execute any macros. (This QuicKeys macro is available in Library 5 of Scripts & Templates of the Zifnet/Mac Download & Support Forum; the filename is QTRASH.CPT. — Ed.)

Joseph Holmes
New York, NY

System 7 Finder

Sometimes when I'm copying lots of files onto various disks or into many folders, I find that I can't keep track of which of my files I've already copied and which remain. Here's an easier way to keep track of them.

Use the Labels control panel to create a new category — say, Copied — in a bright color. Then go to the folder with the files you want to copy, and pick out and highlight the ones you'll copy first, just as you would before dragging them to the target disk or folder. But before you drag them, go to the...
Labels feature, the Copied label can keep track of the files that have been backed up onto a floppy.

Joseph Holmes
New York, NY

Adobe Type Reunion
Adobe Type Reunion is a great utility for uncluttering Font menus, but it tends to slow down menus in many programs and some programs are

**Tips from the Experts**

**WordPerfect**

WordPerfect, the undisputed DOS word-processing champ, has been making waves recently on the Mac side too (it was the first word processor to support QuickTime). Here are a couple of hot tips from the WordPerfect team:

*Graphic Rulers.* WordPerfect’s drawing environment doesn’t provide a ruler, but there are a couple of easy workarounds. You can use a screen-capture utility such as Capture to grab the ruler in the main document window and paste it into the drawing window (see Figure B). Save the ruler in the Scrapbook for future use. The other option is to leave an unfiled document open with the ruler displayed. Open a second document and then open the drawing window. Move the document window down until the ruler in the first untitled document becomes visible.

*Quick Kerns.* Kerning is an option of the Layout menu’s Line command. It brings up a dialog box in which you can enter kerning values, but a quick kerning method is to use the F1 and F2 keys. Place the insertion point between the two letters you want to kern. Press Shift-F1 to move letters together 1 point or Shift-F2 to move them apart 1 point. You’ll see the change in your document immediately.

**Figure B:**

WordPerfect’s drawing window has no ruler, but you can add one by using a couple of tricks.

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**Small business accounting for those who don’t plan to stay that way.**

MultiLedger is the small business accounting package for those who think on a slightly grander scale. Yes, it contains all of the major accounting functions (General Ledger, A/R, A/P, and Inventory) plus many management reports in one integrated program. And as one major magazine wrote, “It’s the most elegant, usable, and Mac-like of all the packages.”

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even incompatible with it. You can hold down the Shift key upon launching a program to disable ATR temporarily for one session, but there is a way to permanently disable ATR for specific programs.

ATR checks a program’s resource fork to see if it has an ATR resource with ID -1 containing a single zero byte (00). If it finds such a resource, it disables itself for that program, as it would if you had held down the Shift key.

Just use ResEdit to install that resource in all programs and DAs that don’t need ATR, and you’ll find that their menus are much faster!

Adobe itself uses this trick in Adobe Illustrator (see Figure 1), so you can copy and paste the resource between Illustrator and other applications. As always when working with ResEdit, use only copies of your programs; you should never modify your master disks.

Jean-Claude Siegrist
Summit Park, UT

Figure 1: You can patch applications with ResEdit so that they ignore Adobe Type Reunion. Now you don’t have to remember to hold that Shift key down.

Telecommunications

While on-line, you may need to leave your computer for a period of time. But it’s time-consuming to log off and a hassle to log on again later. On the other hand, if you don’t log off, you’ll be billed for the time — no small matter on commercial services such as CompuServe.

But here’s a solution: Almost every on-line service has a free help center you can go to and browse in as long as you like without paying. So if you must leave your computer for a few minutes during an on-line session, just pop over to the help center.

You won’t be billed for the time that you spend there, and you won’t need to log on again later.

Daniel Max P. Drucker
Port Washington, NY

The Perfect Security Blanket...

Bundle-Up With NightWatch II & FolderBolt

NightWatch II and FolderBolt wrap your Macintosh in a blanket of protection. Alone, or in combination, they’re the strongest security in the industry.

New NightWatch II provides ironclad hard disk protection while you’re away, and hot spot screen security while you work. It includes unique user time-of-day or day-of-week restrictions, write-protection and much, much more. With NightWatch II’s three state-of-the-art protection options and master key capability, we’ve really left the competition feeling insecure.

FolderBolt is powerful folder level protection that’s fully integrated into the desktop. Simply double-click a folder and it prompts you for a password! Create completely locked, read-only (for application protection), or one-way drop folders. You can even lock the running System Folder.

Both NightWatch II and FolderBolt are System 7 savvy, and include activity logging and administrative override for forgotten passwords. Hierarchical signatures make them the perfect site license solution. So bundle-up in the perfect security blanket. With protection like this, you’ll sleep like a baby.

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May 1992
4 ways to tell the real thing from fool's gold.

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But see for yourself. Call (800) 541-1261, Dept. Z24, to order your own $9.95* working model. Then using that other project management program will be (whew!) optional.
Speeding Up System 7

Q. I have a 1c1 with 8 megabytes of RAM and an 80-megabyte hard disk. I recently upgraded to System 7 and find it quite a bit slower than System 6.0.5. Specifically, opening windows in the Finder seems to take longer than it used to. Is there anything I can do to speed up System 7’s performance without spending a ton of money?

Max Vizzsla
Austin, TX

Bob: Right as we go to press, Apple has released its System 7 Tune-Up. I haven’t had a chance to test it yet, but Apple says that using it will improve memory management, fix some minor bugs, and generally speed things up. It’s being distributed free, so it’s probably worth trying. In the meantime, here are some techniques I have tested.

First, make sure the Calculate Folder Sizes option in the Views control panel is turned off. Calculating Folder Sizes slows the Finder to a crawl.

Second, try increasing the size of your disk cache in the Memory control pane l in System 6. Chances are it’s set to 256K right now, which is the default for an 8-megabyte machine. Try increasing it to at least 384K, and then reboot. The speed improvement is subtle, so if you don’t notice that your Mac runs faster after a day or so, return to the control panel, increase the setting some more, and reboot. If you don’t notice a difference by the time you get to 768K or 1,024K, return to the default — there’s no sense in wasting perfectly good RAM on the cache if you don’t see any improvement.

Finally, you may have noticed that whenever you double-click on an icon in the Finder, you see animated zooming rectangles before it opens. These are called ZoomRects, and they slow the Finder down quite a bit. Luckily, if you’re handy with ResEdit, you can turn ZoomRects off. (Of course, the standard ResEdit disclaimer applies. In case you’ve forgotten, here it is again: ResEdit can do lots of really cool stuff, but it can also destroy your files. Never use ResEdit on a master or original file; always work on a copy.) Here’s how to turn ZoomRects off:

1. Open a copy of the Finder with ResEdit 2.1.
2. Open the CODE resource.
3. Open CODE ID 4 (you’ll need to decompress it).
4. Select Find Hex on the Find menu, and then look for 4E56 FFEO 48E7 1F38 (see Figure 1).
5. Select these bytes.
6. Replace them with 205F 700A DECO.

Figure 1: You can get rid of pesky ZoomRects (and speed up System 7) by using ResEdit.

Our society has a perverse fascination with complicated solutions, ignoring the advantages of simplicity. So send us a simple question. To protect your identity, we’ll inject some class into Help Folder by substituting the name of a Poet Laureate of England.

Q. I have a question regarding getting a PowerBook through airport security. After inspection, is it safe to just shut the power off so I can hustle onto my plane, or will I damage my new toy?

Colley Gibber, 1730 England

Andy: First, congratulations on your common sense. You simply shouldn’t trust your data to airport-security machines. Always ask for hard inspection of disks, hard drives, and laptops; the airport-security people will just have you power up the hardware to prove that it actually works and wave you on through.

Now then. Whether you’ve got a PowerBook, a Portable, or even an old Mac Plus, you should never turn off a Mac without doing a shutdown from the Finder first — individual files and even the integrity of the whole hard disk may become corrupted. At best, nothing will happen, but at worst, the data structures recording important details about the disk’s data will be completely hosed. You’ll be in deep yogurt.

So don’t just switch the thing off. If you don’t have time to shut down and power off properly before boarding, the next safest thing is to switch into Sleep mode. The Official Word from Cupertino is that it’s not safe to move a sleeping PowerBook, because you might crash the hard drive. In reality, it’s highly unlikely that you’ll do any damage to it unless you’re one of the Flying Karamazov Brothers.

By Bob LeVitus and Andy Ihnatko
7. Save the copy of the Finder, and close ResEdit.
8. Move the modified Finder into your System Folder, and re-boot. (You can boost from a floppy to perform this step.)

Andy: The best way to soup up System 7’s performance is to switch back to System 6.0.5. But if Balloon Help gives you a tingly sensation that you just can’t live without, consider leaving your Finder windows in Icon view. In all other modes, the Finder has to do a tediously long sort (By Name, By Size, By God When Will This End So I Can Get On with My Life).

Upgrade or Buy?
Q. I have a Mac Plus with 4 megabytes of RAM and a 45-megabyte hard disk. I’ve been considering upgrading it. I would like to know your thoughts on installing an accelerator versus selling the Plus and buying a faster Mac.

Don F. Amos
Billings, MT

Bob: I think it’s time to get rid of the Plus. The Plus is notorious for having a flaky power supply; installing an accelerator stresses it even further. Also, your Plus is several years old and probably has some other components that are getting old.

Another problem is that some applications, INTVs, and control panels that work fine on stock Macs may conflict with third-party accelerators.

Andy: I’ve said it before, and I’ll say it again: The Mac Plus’ power supply is fundamentally wonky, and having any kind of daughterboard installed is not a spiffy idea unless the soft real-estate market has caused you to look out on your unsold-but-heavily-insured beach house with vision unimpaired by moral compunction.

But just in case you’re sentimentally attached to your Macintosh Plus (I know I’d be heartbroken if I lost the Batman bumper stickers on mine) and are determined to go ahead with an upgrade, I recommend the Brainstorm Accelerator. Instead of making you stick in a daughterboard, Brainstorm replaces your motherboard’s 68000 CPU and timing chip with special souped-up versions that more than double system performance. It’s not as sexy as a 68030 upgrade, but the price — borderlining at 249 clams — can’t be beat. The upgrade puts some extra demands on the power supply, but it’s not nearly as taxing as a daughterboard upgrade. Brainstorm is at 1145 Terra Bella Avenue, Mountain View, CA 94043; (415) 964-2131.

Long ADB & Far Away
Q. I’d like to hear any advice you may have on how to make a long-distance (approximately 100 feet) connection between my Mac II and the keyboard and mouse. I use the Mac II in my home office and would like to be able to hook up the system so the kids can play games on the big-screen TV in my living room.

Ed Hoel
Chapel Hill, NC

Andy: At this point, I lean back and reflect on the genius of “I Love Lucy.” Whenever Lucy’s latest harebrained scheme went up in smoke, Ricky reeled off this long speech in rapid Spanish — “barrupatabuppardaruppata” and so forth — to no one in particular. But as I have neither the original text nor the English translation handy, you’ll have to be content with a simple “What, are you nuts?” Haven’t your kids ever heard of Super Nintendo?

But they don’t pay me to belittle the readers. Answer: You can extend your ADB (Apple Desktop Bus) chain by a truly absurd amount by using S-video cables instead of ADB cables. S-video cables, found in your better home-electronics stores, are typically used to hook up absurdly expensive laserdisc players and VCRs to even-more-expensive televisions, but the wiring and connectors are identical to those of ADB cables. I can personally vouch for a 25-foot cable working reliably and some machine in Zinfanet/ Mac has reported 40-foot cables working properly, but I doubt that you’re going to get anywhere near 100 feet with this or any other solution.

More food for thought: Apple designed ADB under the assumption that the length of the entire chain (cables, devices, the whole shebang) wouldn’t exceed five meters, and some devices (trackballs especially) are wonky enough on a short ADB chain, so don’t be surprised if at some point, this cabling system ceases to work. Oh, and cable capacitance shouldn’t exceed 100 picofarads per meter. I’m sure the guys at the video store will have all that information handy. … Not!!!

Cheap Speed
Q. I’m running a Mac Iici with a 13-inch color monitor, and I’m looking for an inexpensive way to tweak performance — when scrolling through complex WordPerfect 2.03 documents, for example. I’ve considered putting in a cache card, but I’ve also heard that putting RAM into the secondary RAM bank would increase the speed of scrolling through WordPerfect documents that contain graphics. Because more RAM would always be helpful (between the system and UltraPaint, I’m already using slow virtual memory), this seems like a tempting alternative. Which option would increase performance more?

Andy: Okay, this is a tough one, and it’s a bit of a double-header. It depends on what your “performance” means. Memorizing and reading the feeds for the top five clergypersons of the top five religions will tell you, happiness of any real magnitude involves either spending money or making a life-style change, and it is ever thus when seeking speed.

Beginning with stuff that costs money, then. For most Macs, the Iici particularly, a cache card gives you the most bang for the buck. For just a few hundred dollars, the real speed of your Iici can go up by about one third, on average. A cache card is a card with special, wicked-fast RAM on it — information can move through it about four times as fast as through the RAM on the motherboard — and the card uses this fast RAM to hold whatever information the CPU has just called up from memory. So, the next time the CPU asks for that same information, instead of reading it from the slow, poky 80-nanosecond RAM that makes up your regular system memory, it comes in at warp 9.2 from the 20-nanosecond RAM on the cache card. The more expensive the cache card, the more memory you get. In theory, more cache memory, but even slower chips are faster than virtual memory. Would awful, nasty things happen if I tried using slow RAM in my Iici?

Scott Patlin
Ithaca, NY

Andy: Putting in slow SIMMs won’t reduce your Iici to a puddle of bubbling plastic slag, but it will undoubtedly result in wheelbarrows full of system errors. But don’t rule out using SIMMs from an SE; since the Dark Ages of the mid-to-late ’80s, SIMMs have been so cheap that almost all memory is rated at 80 nanoseconds, so chances are excellent that those old SIMMs will work fine. If you see an 80 printed somewhere on one of the memory chips, you’re probably golden.

Now about speed. As clergypersons of the top five religions will tell you, happiness of any real magnitude involves either spending money or making a life-style change, and it is ever thus when seeking speed.

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Notice a significant improvement in speed with 8 megabytes of real RAM!

OK, what can you do, short of dropping a couple of thousand on an accelerator board (you said "inexpensive," remember)? Much as car enthusiasts pull their carbs or rail their hems or adjust whatever it is they diddle with to get their cars to run more efficiently, Mac owners can make small adjustments to their software to help eliminate some bottlenecks.

First, allocate more memory to important applications by changing the number in the application's Get Info box. The rule of thumb is that when you increase the memory allocated to an application by 15 percent more than the minimum, you begin to see a speed improvement — 25 percent gets you the best setting is good old Max Vizsla. Another rule of thumb is that when you increase the memory allocated to an application by 15 percent more than the minimum, you begin to see a speed improvement — 25 percent gets you the best setting is good old Max Vizsla.

Tweak the RAM cache, as Bob explained in his answer to Max Vizsla. Another rule of thumb: Start with a setting of 256K, and add another 32K for every megabyte of RAM you have over 2 megabytes. Again, a good way to figure out the best setting is good old trial and error, but this little formula has worked for me in practice.

You can also greatly enhance scrolling speed and even a lesser extent) system performance by dropping down to a less impressive video mode. If you do most of your work in 256-color mode (or, God help you, 24-bit mode), you'll see a vast improvement if you switch to simple black-and-white mode.
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MANY of the most important channel questions facing the PC industry will be discussed at PIP '92. The Seventh Annual Partners In Progress Conference sponsored by PC WEEK will be held this year at the luxurious LaCosta Resort in Carlsbad, California between May 3-5. "Will the heavy hitters ever be able to play ball again?"

At PIP '92 there will be no sales pitches. Just straight, relevant, off-the-record discussion of the key issues and questions that are affecting microcomputer channel business and profits. Over forty industry speakers — "Is the only choice consolidate or die?" like Ross Cooley from Compaq, Mort Rosenthal of Corporate Software, Cliff Jenks of Apple, Nathan Morton from CompUSA and Rick Inatome from InaCom, among many others — will tackle industry issues and field your toughest questions. "Excuse me, sir. How would you like a loofa salt glo?"

This has been a remarkable year in the PC industry and this year's PIP Conference will be an equally remarkable gathering. The cost is just $695. Register before April 15 and you'll get a $100 early bird discount. Call Kelly Hale at 800-451-1032, ext. 3757 for details.

PIP92

Sponsored by PC WEEK
This Month on ZiffNet/Mac

Expert Answers for Color Questions

MacUser Labs Director Rik Myslewski will be on line this month in the MacUser Forum to answer the 16.8-million-color question, What Color Is Your Desktop? Myslewski directed this month's look at color on the Mac. If he doesn't have the answer to your color question, he knows who does. Look in the MacUser Forum this month for the message thread entitled "Color & Macs," in message section 5 (Labs & Networkshop) of the MacUser Forum (GO MACUSER).

CIM: Don't Get Boxed In

When downloading multiple files with the CIM (CompuServe Information Manager), an annoying Save dialog box asks you for a name for each file you want to retrieve. An undocumented feature lets you avoid the Save dialog box when you want to download multiple files from a forum library. Hold down the Option key, and click in the check box in the file-list window. The first file will display the Save dialog box, but every other file will bypass the dialog box and use the given filename as a default.

About CIM: CIM is the graphical interface for ZiffNet/Mac. CIM automatically uses its proprietary Quick-B protocol — the fastest, most efficient transfer method available for CompuServe. If you don't have a copy of CIM, you can download a custom version from ZiffNet/Mac. Select About ZiffNet/Mac at the top level of the service, and choose item 6 (Download ZiffNet/Mac CIM).

Recent Uploads

QuickTime, Apple's new video standard, has sparked an enormous on-line interest in video. Here's a batch of new applications, information stacks, and QuickTime movies you can download from ZiffNet/Mac's Download & Support Forum (GO DOWTECH). The CompuServe filenames are in parentheses.

- Popcorn (POPCOR.CPT), from Aladdin Systems, lets you view and edit QuickTime movies.
- PanAStack (PANAST.CPT), from Panasonic, is a HyperCard guide for the use of video, VCRs, and still-image video with the Mac II family.
- VideoBeep (VIDEOB.CPT) is a System 7 extension that lets you display the QuickTime movie of your choice whenever your Macintosh beeps.
- Morning Star (STAR.CPT), from BMUG's public-domain CD-ROM disc called TV-ROM, is a QuickTime animation of a rotating spiked ball.
- Plane Fly By (FLYBY.CPT), from BMUG's public-domain TV-ROM disc, is a spiffy QuickTime animation of a twin-engine jet.
- Plane from Behind (PLANE.CPT), from BMUG's public-domain TV-ROM disc, is a QuickTime rear-view animation of a flying plane moving from side to side.
- Quadra start-up sound (QUADS.D), from BMUG's public-domain TV-ROM disc, provides the soothing Quadra and PowerBook startup sound in QuickTime format.
- Time Warp (WARP.CPT), from BMUG's public-domain TV-ROM disc, is a QuickTime movie of a clock being warped very quickly.

---

ZiffNet/Mac Survey

In a recent ZiffNet/Mac survey, we asked 500 ZiffNet/Mac users which computer they would buy if they were going to make their purchase today. Here are the results. Type GO ZMC: SURVEY to participate in the next ZiffNet/Mac survey.
For many of you, mail order is your primary means of purchasing Macintosh products and services. That's why MacUser has put together the following special section.

It's what you've been demanding—a convenient place to quickly find the products you need from the vendors you want to buy from. MacUser's Direct Line to products is just one more reason to turn to MacUser for relevant information aimed at the serious user.
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   - [ ] Spreadsheet
   - [ ] Project Management
   - [ ] Database Management
   - [ ] Graphics
   - [ ] Integrated Software
   - [ ] Communications
   - [ ] Utilities

   HARDWARE
   - [ ] Moderns
   - [ ] Scanners
   - [ ] Modems
   - [ ] Printers/Plotters
   - [ ] Monitors/Displays
   - [ ] Storage
   - [ ] User/Client
   - [ ] Networking

4. Which of the following products have you bought in the last 6 months? (check all that apply)

   SOFTWARE
   - [ ] Accounting
   - [ ] Spreadsheet
   - [ ] Project Management
   - [ ] Database Management
   - [ ] Graphics
   - [ ] Integrated Software
   - [ ] Communications
   - [ ] Utilities

   HARDWARE
   - [ ] Moderns
   - [ ] Scanners
   - [ ] Modems
   - [ ] Printers/Plotters
   - [ ] Monitors/Displays
   - [ ] Storage
   - [ ] User/Client
   - [ ] Networking

5. If so, what function do you serve in the buying process? (check all that apply)
   - [ ] Initialion/Determine Need
   - [ ] Selection of Brand and Model
   - [ ] Source Selection
   - [ ] Authorization
   - [ ] Other

6. Over the next 12 months, how much will your organization spend on computer products or services? (check one)
   - [ ] Under $5 million
   - [ ] $5 - 10 million
   - [ ] $10 - 50 million
   - [ ] $50 - 100 million
   - [ ] $100 - 500 million
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   [ ] Sales/Marketing

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)
   [ ] HARDWARE
     [ ] Modems
     [ ] Scanners
     [ ] Microcomputers
     [ ] Printers/Plotters
     [ ] Monitors/Displays
     [ ] Storage
     [ ] Modems/Networks

4. Which of the following products have you bought in the last 6 months? (check all that apply)
   [ ] SOFTWARE
     [ ] Accounting
     [ ] Spreadsheet
     [ ] Project Managers
     [ ] Word Processors
     [ ] Graphics
     [ ] Communications
     [ ] Utilities

5. Over the next 12 months, how much will your organization spend on computer products or services? (check one)
   [ ] $0 - $4,999 [ ] $5,000 - $9,999 [ ] $10,000 - $49,999 [ ] $50,000 - $99,999 [ ] $100,000 - $499,999

6. If so, what function do you serve in the buying process? (check all that apply)
   [ ] Initiation/Determination
   [ ] Selection of Sources
   [ ] Authorization/Accounting
   [ ] Other

7. How much do you spend on computer products or services during the next 12 months?
   [ ] $0 - $49,999 [ ] $50,000 - $99,999 [ ] $100,000 - $499,999

8. What is your primary job function? (check one)
   [ ] Printers/Planners
   [ ] Administrative/Support
   [ ] Engineering/R&D
   [ ] Finance/Accounting
   [ ] Marketing/Sales
   [ ] MIS/OP, Communications

9. Over the next 12 months, how much will your organization spend on computer products or services? (check one)
   [ ] $0 - $4,999 [ ] $5,000 - $9,999 [ ] $10,000 - $49,999 [ ] $50,000 - $99,999

10. If so, what function do you serve in the buying process? (check all that apply)
    [ ] Initiation/Determination
    [ ] Selection of Sources
    [ ] Authorization/Accounting
    [ ] Other

11. What is your primary job function? (check one)
    [ ] Printers/Planners
    [ ] Administrative/Support
    [ ] Engineering/R&D
    [ ] Finance/Accounting
    [ ] Marketing/Sales
    [ ] MIS/OP, Communications

12. Over the next 12 months, how much will your organization spend on computer products or services? (check one)
    [ ] $0 - $4,999 [ ] $5,000 - $9,999 [ ] $10,000 - $49,999 [ ] $50,000 - $99,999

13. If so, what function do you serve in the buying process? (check all that apply)
    [ ] Initiation/Determination
    [ ] Selection of Sources
    [ ] Authorization/Accounting
    [ ] Other

14. What is your primary job function? (check one)
    [ ] Printers/Planners
    [ ] Administrative/Support
    [ ] Engineering/R&D
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    [ ] Marketing/Sales
    [ ] MIS/OP, Communications

15. Over the next 12 months, how much will your organization spend on computer products or services? (check one)
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16. If so, what function do you serve in the buying process? (check all that apply)
    [ ] Initiation/Determination
    [ ] Selection of Sources
    [ ] Authorization/Accounting
    [ ] Other

17. What is your primary job function? (check one)
    [ ] Printers/Planners
    [ ] Administrative/Support
    [ ] Engineering/R&D
    [ ] Finance/Accounting
    [ ] Marketing/Sales
    [ ] MIS/OP, Communications

18. Over the next 12 months, how much will your organization spend on computer products or services? (check one)
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19. If so, what function do you serve in the buying process? (check all that apply)
    [ ] Initiation/Determination
    [ ] Selection of Sources
    [ ] Authorization/Accounting
    [ ] Other

20. What is your primary job function? (check one)
    [ ] Printers/Planners
    [ ] Administrative/Support
    [ ] Engineering/R&D
    [ ] Finance/Accounting
    [ ] Marketing/Sales
    [ ] MIS/OP, Communications

21. Over the next 12 months, how much will your organization spend on computer products or services? (check one)
    [ ] $0 - $4,999 [ ] $5,000 - $9,999 [ ] $10,000 - $49,999 [ ] $50,000 - $99,999

22. If so, what function do you serve in the buying process? (check all that apply)
    [ ] Initiation/Determination
    [ ] Selection of Sources
    [ ] Authorization/Accounting
    [ ] Other

23. What is your primary job function? (check one)
    [ ] Printers/Planners
    [ ] Administrative/Support
    [ ] Engineering/R&D
    [ ] Finance/Accounting
    [ ] Marketing/Sales
    [ ] MIS/OP, Communications

24. Over the next 12 months, how much will your organization spend on computer products or services? (check one)
    [ ] $0 - $4,999 [ ] $5,000 - $9,999 [ ] $10,000 - $49,999 [ ] $50,000 - $99,999

25. If so, what function do you serve in the buying process? (check all that apply)
    [ ] Initiation/Determination
    [ ] Selection of Sources
    [ ] Authorization/Accounting
    [ ] Other

26. What is your primary job function? (check one)
    [ ] Printers/Planners
    [ ] Administrative/Support
    [ ] Engineering/R&D
    [ ] Finance/Accounting
    [ ] Marketing/Sales
    [ ] MIS/OP, Communications

27. Over the next 12 months, how much will your organization spend on computer products or services? (check one)
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28. If so, what function do you serve in the buying process? (check all that apply)
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<td>$259</td>
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<td>9 ports: BUTC, 1 BNC</td>
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</tr>
<tr>
<td>Asante 10T Hub/12</td>
<td>$539</td>
</tr>
<tr>
<td>14 ports: 12 BUTC, 1 AUI, 1 BNC</td>
<td></td>
</tr>
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ETHERNET CARDS

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<th>Price</th>
</tr>
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<td>$229</td>
</tr>
<tr>
<td>For Mac IIc; thick, thin &amp; 10BaseT with 64K</td>
<td></td>
</tr>
<tr>
<td>MacCon3 for IIsi (&amp; se/30)</td>
<td>$249</td>
</tr>
<tr>
<td>Thick, thin &amp; 10BaseT with 64K</td>
<td></td>
</tr>
<tr>
<td>MacCon+ LC</td>
<td>$229</td>
</tr>
<tr>
<td>Thick, thin &amp; 10BaseT</td>
<td></td>
</tr>
</tbody>
</table>

ETHERNET SCSI DEVICE

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN/SC</td>
<td>$339</td>
</tr>
<tr>
<td>SCSI Ethernet for Classic &amp; Plus; thick, thin &amp; 10BaseT</td>
<td></td>
</tr>
<tr>
<td>EN/SCPB</td>
<td>$389</td>
</tr>
<tr>
<td>SCSI Ethernet for PowerBook; thick, thin &amp; 10BaseT</td>
<td></td>
</tr>
<tr>
<td>EN/SC10TPB</td>
<td>$319</td>
</tr>
<tr>
<td>SCSI Ethernet for PowerBook; 10BaseT</td>
<td></td>
</tr>
</tbody>
</table>

PERSONTOPERSON

<table>
<thead>
<tr>
<th>Pack Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twin Pack</td>
<td>$129</td>
</tr>
<tr>
<td>10-User Pack</td>
<td>$329</td>
</tr>
<tr>
<td>Zone Pack</td>
<td>$499</td>
</tr>
<tr>
<td>Personal messaging software with live network chatting, QuickSend mailbox, voice messaging, built-in calendar &amp; electronic Post-it note</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Storage Device</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLI Infinity 44 Removable</td>
<td>$619</td>
</tr>
<tr>
<td>with cartridge</td>
<td></td>
</tr>
<tr>
<td>PLI Infinity 88 Removable</td>
<td>$829</td>
</tr>
<tr>
<td>with cartridge &amp; all the features of 44MB</td>
<td></td>
</tr>
<tr>
<td>PLI Quick SCSI Infinity Optical 3.5&quot;</td>
<td>Call</td>
</tr>
</tbody>
</table>

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5 Year Warranty

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thick/Thin or Thick/10T</td>
<td>$169</td>
</tr>
<tr>
<td>Thick/Thin/10T, 64K</td>
<td>$229</td>
</tr>
<tr>
<td>Friendly Net/Thin or 10T</td>
<td>$229</td>
</tr>
<tr>
<td>10T 12 port hub</td>
<td>$229</td>
</tr>
<tr>
<td>10T 6 port hub</td>
<td>$259</td>
</tr>
<tr>
<td>Thick to 10T adapter</td>
<td>$98</td>
</tr>
<tr>
<td>SCSI Ethernet</td>
<td>$299</td>
</tr>
<tr>
<td>Dayna Etherprint</td>
<td>$353</td>
</tr>
<tr>
<td>Dayna Etherprint Plus</td>
<td>$695</td>
</tr>
<tr>
<td>16MHz 882 for LC Ethernet</td>
<td>$49</td>
</tr>
<tr>
<td>20MHz 882 for U2I Ethernet</td>
<td>$68</td>
</tr>
</tbody>
</table>

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**STORAGE SYSTEMS**
SyQuest, Optical, and DAT available internally for the Quadra 500!

**REMOVABLE MEDIA**

<table>
<thead>
<tr>
<th>Media</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>SyQuest 45 or 88 MB cartridge</td>
<td>88.00/115.00</td>
</tr>
<tr>
<td>DAT cassette 80 or 90 meter</td>
<td>17.00/29.00</td>
</tr>
<tr>
<td>Optical cartridge (32) 512 kb/sector</td>
<td>125.00</td>
</tr>
<tr>
<td>Optical cartridge (32) 1024 kb/sector</td>
<td>125.00</td>
</tr>
<tr>
<td>Optical cartridge for Tahiti</td>
<td>289.00</td>
</tr>
<tr>
<td>Optical cartridge 128 MB</td>
<td>59.00</td>
</tr>
</tbody>
</table>

A MacWorld Favorite!

**DISK DRIVES**

<table>
<thead>
<tr>
<th>Drive</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>OptiDisk 600</td>
<td>$285.00</td>
</tr>
<tr>
<td>OptiDisk 1000</td>
<td>$385.00</td>
</tr>
<tr>
<td>45 SR (SyQuest) w/cartridge</td>
<td>$475.00</td>
</tr>
<tr>
<td>88 SR (SyQuest) w/cartridge</td>
<td>$899.00</td>
</tr>
<tr>
<td>DATdrive 26B</td>
<td>$1395.00</td>
</tr>
<tr>
<td>DATdrive 56B</td>
<td>$1595.00</td>
</tr>
</tbody>
</table>

**MEDIA**

<table>
<thead>
<tr>
<th>Media</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 MB Tape for Teac</td>
<td>17.00</td>
</tr>
<tr>
<td>150 MB Tape for Teac</td>
<td>24.00</td>
</tr>
<tr>
<td>SyQuest 45 or 88 MB cartridge</td>
<td>88.00/115.00</td>
</tr>
<tr>
<td>DAT cassette 80 or 90 meter</td>
<td>17.00/29.00</td>
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</tr>
<tr>
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<td>289.00</td>
</tr>
<tr>
<td>Optical cartridge 128 MB</td>
<td>59.00</td>
</tr>
</tbody>
</table>

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600mb Optical : ............ $1998.001
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• Includes cartridge
• Available in ISO and non-ISO

Hitachi Drives

<table>
<thead>
<tr>
<th>Internal</th>
<th>External</th>
</tr>
</thead>
<tbody>
<tr>
<td>425 MB</td>
<td>3.5&quot; 5yr warranty 13ms 150,000 MTBF</td>
</tr>
<tr>
<td>1.6 Gig</td>
<td>5.25&quot; 5yr warranty 12ms 150,000 MTBF</td>
</tr>
</tbody>
</table>

Mean Time Between Failure is the average time expectancy of a drive.

DAT Tape Backup

SonyDat 2.1 Gig Capability .......... $1248
WangDat 2.1 Gig Capability .......... $1498
ArDat 2.1 Gig Capability .............. $1398

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• Rated four mice by MacUser (Dec '91)
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- Modem for software
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- Integrated modem cable
- 5 year warranty

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V.32bis (up to 14,400 bps)

![Features](#)

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- Maximum NO W LEDGE™
- Integrated modem cable
- 5 year warranty

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**Modems**

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  - Ultra Smartmodem 9600 V.42 V.30
  - Ultra Smartmodem 14400 V.32 V.42.96 V.42 bis
  - Smartmodem Optima 9600

- **Shiva**
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  - Net Modem: E 9600 V.21 MNP5

- **Telebit**
  - G Modem 9600 V.42 V.32 V.25bis

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**CD Drives**

- **Toshiba**
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  - 325ms
  - $649

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**MEDIA**

- **Verbatim**
  - Optical Media 128 mb
  - 3.5" Optical Media

- **Disks**
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  - Sony 5.25" 1.2MB (30)
  - Sony 3.5" 1.2MB (50)
  - Sony 5.25" 5.25MB (5)
  - Sony 3.5" 8MB (5)
  - Panasonic 3.5" 4.7MB (25)
  - Panasonic 3.5" 8MB (25)
  - Panasonic 3.5" 16MB (25)

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  - TEAC 1050MB (25)
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- Quadra V-RAM Index Gold™ ........ $69
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It’s a simple procedure to ensure that your next issue of MacUser will catch up with you as soon as you move. Please send your NEW address PLUS your current mailing label to:

MacUser
P.O. Box 56986
Boulder, Colorado
80322-6986
Please allow up to 60 days for change of address to take place.
### HARDWARE

#### Applied Engineering

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>TRANSWAP SE 25MHz</td>
<td>CALL</td>
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<tr>
<td>TRANSWAP LC 25MHz</td>
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<tr>
<td>DAYSTAR POWERCACHE 5M/Hz</td>
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<tr>
<td>POWERCACHE 5000</td>
<td>$505.00</td>
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<tr>
<td>FUSION DATA SYSTEMS</td>
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</tr>
<tr>
<td>TOLMAC 10G</td>
<td>$899.00</td>
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<tr>
<td>TOLMAC C10</td>
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<td>ROCKET 25</td>
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#### Generation Systems

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<td>Design Kit 24&quot; x 18&quot;</td>
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### SOFTWARE

#### Software

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<tr>
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<td>PAINTWRITER</td>
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### UTILITIES

<table>
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<td>CLARIS WORKS</td>
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<td>TILERMAKER</td>
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<td>MACWRITE II</td>
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<td>QUITTER</td>
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<tr>
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</tr>
<tr>
<td>PIL Power Meter</td>
<td>$597.00</td>
</tr>
</tbody>
</table>

### POWERBOOK

- **See the new items!**
  - Microtech 90mb Hard Drive: $899.00
  - Tenna Case/35G: $69.00
  - Never 4mb module: $299.00
  - Never 6mb module: $499.00
  - POWERPORT V-32: $399.00
  - PIL Power Meter: $299.00

## CORPORATE POLICY

- **Our 30-Day Money Back Guarantee (MBG) applies to all our products.**
- **No returns allowed on software.**
- **All returns must be postmarked within 30 days of purchase date.**
- **All returns are subject to a 10% restocking fee.**
- **Returns must be in original condition.**
- **All returns will be refunded in the original payment method only.**
- **No returns on software.**
- **90-Day exchange only for defective items.**
- **All returns must include the original packaging and documentation.**

## footer

Corporate, educational, and government purchase orders accepted.

Circle 53 on reader service card.
Note the compact size of this 240MB, 2.5" fully self-contained hard drive. It will operate for 3 hours on its own internal battery and recharge with any standard AC power cord in only 90 minutes. Now you can be completely free from the AC wall outlet with plenty of hard disk storage. An exciting feature of this 50MB - 200MB drive is that it will operate on a Mac or a PC compatible or BOTH...just as it is, NO CARDS. Just think about it... One drive for both Mac and IBM.

If you travel, transport data, or just want to save desk space, your options are pictured below:

- 60MB Hard Disk
- 90MB Bernoulli Cartridge
- 85MB Battery Power
- Floptical 20MB (Battery Option)
- 240MB Hard Disk (Battery Option)
- 1000MB Erasable Optical
- 400MB Solid State Drive
- 600MB Tape Drive
- 128MB Erasable Optical (Removable Cartridge)
- 88MB Syquest Cartridge
- Dual 90MB Bernoulli
- Watch out Megadisk!

**DIRECT DISKETTE CONNNECTION (4) Warehouse Locations Nationwide**

- **EAST**
  - 1-800-451-1849
  - 1-800-621-6221

- **MIDWEST**
  - 1-800-654-4058

- **WEST - HAWAII & ALASKA**
  - 1-800-339-6541

Minimum Order $20.00 NO SURCHARGE on VISA/MC. COD orders add $4.00. Shipping charges determined by items and delivery method requested by customer. Prices are subject to change without notice. FAX ORDER LINE (405) 495-4598.

**Yes, it's true!**

Japanese in an English Environment

**Sweet JAM 7.0**

Japanese Output/Input Front-End Processor

- Direct input and output of Japanese characters within conventional application software using an English Mac OS.
- Compatible with System 7.0 and true-type fonts for clean and attractive results.
- Smooth access within the application software in use without requiring any switching.
- Can be used with an ordinary keyboard and can be turned off when not in use.
- In addition to educational applications, its ease and efficiency of use also make it superior for rapidly growing business applications.
- Has supported users in Japan for the past 7 years and presently boasts more than 20,000 users.

**DISKETTE CONNECTION**

(MA) Japanese Language Service Co.
TEL: 617-338-2211 FAX: 617-338-4611

(CA) Qualitas Tradings Co.
TEL: 415-848-8080 FAX: 510-253-1047

AGA CO., LTD.
IMA Bldg., 4-10-14 Takadanobaba Shinjuku-ku, Tokyo 169, Japan
TEL: 81-3-3390-6541
FAX: 81-3-3360-6532

**CIRCLE 74 ON READER SERVICE CARD.**

**CIRCLE 122 ON READER SERVICE CARD.**

264 May 1992 MacUser
### Hard Drives

<table>
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<tr>
<th>MB's</th>
<th>Mechanism</th>
<th>Access Internal</th>
<th>External</th>
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<td>28ms $219</td>
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<td>52FS</td>
<td>Quantum</td>
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<td>80</td>
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<td>1346/4</td>
<td>Micropolis</td>
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### Removable

- SyQuest 44MB $449
  - Includes 44MB cartridge, Extra Cartridge
- SyQuest 88MB $599
  - Includes 88MB cartridge, Extra Cartridge

### Optical Storage

- CD-ROM $539
  - 350ms External, Uses Clifton mechanism

### Tape Backup

- 2.0Gig 4mm DAT $1495
  - Includes Retrospect software, 1 cartridge & cables
- 250MB SANKYO $549
  - External, includes tape & backup software

### Memory

- 1MB (1x8-60ns) $39
- 4MB (4x8-60ns) $159

### POWER PRICED
- New, Super Low Prices
- We buy quantity components in huge volume & pass the savings to you!

### POWER PACKED
- Choice of Brand Name Hard Drives
- Super Fast Access Time: 12ms-28ms
- 50,000+ hours MTBF
- Whisper Quiet fan
- 50-pin connectors to daisy-chain
- Steel Case for low heat & support

### POWERDrive
- From the experts at HDI, since '87
- Compatible with all Mac systems
- Toll-free Technical Support
- Step-by-Step Manual Included
- 30-Day “Worry-Free” Guarantee
- 1 & 2 Year Replacement Policies

---

**POWERDrive**

800-998-8024

Hard Drives International
602-350-1128 FAX: 602-350-1150
1912 W. 4th St., Tempe, AZ 85281

National Accounts
Purchase Orders- Gov’t/Educ./Corp.
800-755-3928 FAX: 602-350-1180

International Accounts
800-350-1144
FAX: 602-350-1188

Prices, availability subject to change without notice. All items are NEW. P.O.’s accepted from qualified buyers. NET 30, Add $13 shipping for APO/FPO orders. P.O.’s, 30-Day Guarantee & 1 Year Warranty may have some restrictions. Shipping is not refundable. All trademarks are the properties of their respective owners. PowerDrive is a trademark of Insight Distribution Network, Inc. *Manufacturer 2yr warranty.*

---

"...one of the fastest we tested." MacUser, 4/91

"Well-constructed, quiet and competitively priced." Computer Shopper, 8/1/91

"...some of the lowest prices ever advertised for the Macintosh..." MacWeek, 3/20/90

"For aggressive pricing, nobody we surveyed comes close to HDI." MacWorld, 11/90
MacCenter™ has the Best Prices for Mac Hardware!

**Item List**

- 1 MB SIMM (80ns)
- 4 MB SIMM (80ns)
- PLI Infinity Turbo
- E-Machines 16 Monitor
- SuperMac 20" SuperMatch
- Texas Instruments PSI 7
- DoveFax Desktop 24/96
- DayStar PowerCache 50MHz w/ FPU

**MacConnection**

- $39.50
- $137.25
- $699.00
- n/a
- $269.00
- $1,674.00

**MacWarehouse**

- $69.00
- $159.00
- $679.00
- n/a
- $269.00
- $1,799.00

**MacZone**

- $42.00
- $146.00
- $649.00
- $1,758.00
- $294.00
- $1,787.00

**MacCenter™**

- $36.00
- $119.00
- $599.00
- $1,395.00
- $249.00
- $1,549.00

**Prices verified as of 3/2/92**

MacCenter™ not only sells it for less, but our salespeople are more knowledgeable.

**DoveFax**

- $169

- 2400 Baud Data
- 9600 Baud Fax
- Full Background Send & Receive
- Auto Receive & Retry
- Customizable Cover Pages
- On Screen Display of Faxes
- Sequential Display of Faxes
- Scheduled & Group Send
- One Year Warranty

MacCenter™ not only sells it for less, but our salespeople are more knowledgeable.

**Win a MACINTOSH AND A TURBO! CALL FOR DETAILS.**

**IN STOCK & SHIPPING!**

**FREE ADOBE TYPE MANAGER AND ADOBE GARAMOND WITH EVERY TURBO! $346 VALUE**

**GOLDEN TECHNOLOGIES**

- PLP1, PLP1S
- BLPI, BLPI4, BLP Elite
- WriteImpact, WriteMove
- Cal! Cal! Cal!

**NEC**

- Silentwriter-2 Model 90 $1,499
- Silentwriter-2 Model 95 Cal! Cal! Cal!
- Silentwriter-2 Model 990 $2,895
- PS 410 $1,599
- PS 815MR $3,895
- PS 825MR Cal!

**We Stock All Accessories & Supplies for Our Printers**

**Other Printers**

**microLaser PLUS**

- microLaser Plus PS17 $1265
- microLaser Plus PS35 $1565
- microLaser XL PS17 $2425
- microLaser XL PS35 $2725

- 9ppm & 16ppm, with 17 or 35 Fonts
- 1.5 meg RAM Standard
- Upgradable to 4.5 meg RAM
- Mac & PC Compatible with 3 Interface Ports
- Upgradable to Turbo — Call For Pricing!

**microLaser TURBO**

- microLaser Turbo $1995
- microLaser Turbo XL $3125

- 9ppm & 16ppm, Weink RISC & 68000 Processors
- 2.5 meg RAM Standard, Upgradable to 10.5 meg
- PostScript Level 2, with 35 Fonts
- Mac & PC Compatible with 3 Interface Ports
- Automatic Port and Emulation Switching
- 6 Times Faster Than Other PostScript Printers

**DoveFax**

- PS 410 $1,599
- PS 815MR $3,895
- PS 825MR Cal!

**We Shop All Accessories & Supplies for Our Printers**

**Prices verified as of 3/2/92**

**HARD DRIVES**

**Five-Year Warranty!**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Int</th>
<th>Ext</th>
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<tbody>
<tr>
<td>385 MB</td>
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<tr>
<td>765 MB</td>
<td>4.6 ms</td>
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<td>1.2 Gig</td>
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<tr>
<td>1.5 Gig</td>
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<td>1.6 Gig</td>
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<tr>
<td>2 Gig</td>
<td>3.9 ms</td>
<td>$3399</td>
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**Thirty-Day Money Back Guarantee!**

**Special!**

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<th>Capacity</th>
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<tbody>
<tr>
<td>105 MB</td>
<td>23ms</td>
<td>$299</td>
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</tbody>
</table>

**HARD DRIVES**

- Our drives include and are formatted by DiskMaker™
- Five-Year Warranty: includes breaks or metal cases, universal power supplies, cables and 15 MB of shareware
- MacCenter™ also carries fine drives from FW11, Fujitsu, Quantum, HardiskPack, Miranda, and Seagate.

**Limited Quantities!**
Why Buy a Quadra?!

PowerCards Are:
• 100% Compatible With All Standard Software
• Available for Mac II, IIx, and IIcx
• Available with 68882 Math Coprocessor
• System 7 & A/UX Compatible
• Upgradable to PowerCache

SALE!

40 MHz PowerCard 030
306% Faster than a Macintosh II!
$649

50 MHz PowerCard 030
370% Faster than a Macintosh II!
$999

Limited Supply!

We will meet or beat any of our mail order competitor's deliverable prices for in-stock items.

SuperMatch 20" $1699

SuperMac

Call!

E-MACHINES

Futura EX, SX/8, SX, & MX

We Will Not Be Undersold!

NEC
MultiSync 3FGx, 4FG, 5FG

Call!

RasterOps
RasterOps Color Systems

Call!

Seiko CM-144S 14" with E-Machines 8 bit accelerated
$589
with RasterOps 24S
$979

Sony 1604 17"
$999

VideoSpigot
In Stock!

Limited Supply!

SIMMs

4 Meg 80ns $99
(with trade in)

1 Meg 80ns $36

1 Meg 120ns $29

Call for 16 Meg SIMMs & PowerBook Memory

Lifetime Warranty

MacINTOSH SYSTEMS

Inside every canned configuration is your Mac,
trying to get out! At MacCenter, we'll tailor a
setup for you which will best suit your needs, not fill it
with extras you either don't need or don't care about.
Your Mac is in stock! Call us today for your quote.

PowerBook 140 4.40
$2895

PowerBook 170 4.40
$3795

6 MB Upgrade
$399

Our other prices are even better! Call now!

©MacCenter 1992
NEW! Quark XPress 3.1 $511
Ask about our wide selection of Quark XTensions.

**QMS PS-410 $1495**
300 DPI Prepress • Auto PC-Mac Switching
45 Resident Fonts • 2MB RAM • With Tower Cart
QMS 2MB Upgrade $175
QMS 4MB Upgrade $295

**DGR 128MB Removable 3.5" Erasable Optical $1399**
Erasable Optical Drive with 35ms access.
3.5" 128MB cartridges only $59

### SYSTEMS

**SYSTEM LEASING NOW AVAILABLE**

<table>
<thead>
<tr>
<th>System</th>
<th>Price</th>
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<tbody>
<tr>
<td>Macintosh Classic 10</td>
<td>825</td>
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<tr>
<td>Macintosh LC 4/40</td>
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<td>Macintosh II 4/4</td>
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<td>Macintosh II</td>
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<td>Macintosh IIx</td>
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<td>Macintosh Classic Model II 240</td>
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<td>Macintosh Classic Model I 480</td>
<td>1948</td>
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<td>Macintosh Quadra 700</td>
<td>4237</td>
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<tr>
<td>Macintosh Quadra 800</td>
<td>5235</td>
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<tr>
<td>Macintosh PowerBook 100/200</td>
<td>1849</td>
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<tr>
<td>PowerBook 100/200 w/ Floppy</td>
<td>2025</td>
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<tr>
<td>Macintosh PowerBook 120/210</td>
<td>2258</td>
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<td>Macintosh PowerBook 140/440</td>
<td>2544</td>
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<tr>
<td>Macintosh PowerBook 170</td>
<td>3734</td>
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Now Included with All Macintosh Systems - F/WB Microisk ToolKit Lite!

### NETWORKING

<table>
<thead>
<tr>
<th>Product</th>
<th>Price</th>
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<tbody>
<tr>
<td>AppleTalk Hub</td>
<td>610</td>
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<tr>
<td>AppleTalk/AppleTalk Car/Atari CPU</td>
<td>229/255</td>
</tr>
<tr>
<td>Colortrac Cat/Print</td>
<td>244/249</td>
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<tr>
<td>AppleTalk/AppleTalk Print</td>
<td>225/239</td>
</tr>
<tr>
<td>Farallon Star Controller</td>
<td>799/1199</td>
</tr>
<tr>
<td>QuickDraw 10 User</td>
<td>385</td>
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<tr>
<td>Shiva Ethernet/FastPath</td>
<td>1250/1500</td>
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<tr>
<td>Shiva NetBridge/Teledesic</td>
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### INPUT/OUTPUT

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<td>Apple Extended Keyboard</td>
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<td>Daisywheel Keyboard 101E</td>
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<tr>
<td>ENC Diskettes</td>
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<td>AppleTalk/AppleTalk Print</td>
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<tr>
<td>Farallon Star Controller</td>
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<td>Shiva NetBridge/Teledesic</td>
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### MODEMS & FAXES

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<td>Global Village Fax/Scan &amp; Receive</td>
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<td>Practical Peripherals 2400</td>
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<td>Practical Peripherals Mac/PC</td>
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### PRINTERS

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<td>Apple LaserWriter 35/VG (CPD)</td>
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<td>Apple Personal Laserwriter</td>
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<td>Hewlett Packard LaserJet</td>
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### NETWORKING

<table>
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<tr>
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<td>1250/1500</td>
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<tr>
<td>Shiva NetBridge/Teledesic</td>
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### INPUT/OUTPUT

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<td>Apple Extended Keyboard</td>
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<td>Daisywheel Keyboard 101E</td>
<td>115</td>
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<tr>
<td>ENC Diskettes</td>
<td>70</td>
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<tr>
<td>AppleTalk/AppleTalk Print</td>
<td>225/239</td>
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<td>Farallon Star Controller</td>
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<tr>
<td>QuickDraw 10 User</td>
<td>385</td>
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<td>Shiva Ethernet/FastPath</td>
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### MODEMS & FAXES

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<td>Global Village Elephant ABB Data Fax</td>
<td>175</td>
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<td>Global Village Fax/Scan &amp; Receive</td>
<td>215</td>
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<td>Practical Peripherals 2400</td>
<td>164</td>
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<td>Practical Peripherals Mac/PC</td>
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<td>US Robotics Courier 9600 V-32</td>
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<td>Zoom 2400/2400 Modem/Scan</td>
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### PRINTERS

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<td>Apple LaserWriter 35</td>
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<td>Apple LaserWriter 35/VG (CPD)</td>
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<td>3033</td>
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<td>Apple Personal Laserwriter</td>
<td>915/1750</td>
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<tr>
<td>Hewlett Packard LaserJet</td>
<td>939</td>
</tr>
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</table>

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ETC 676 Ms WREN-4, 15.5 Msce
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ETC 676 Ms WREN-Runner, 12-22 Msce
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ETC 125 Ms SuperDrive, 12 Msce
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ETC 125 Ms Maxtor Panther, 13 Msce
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ETC 120 Ms Quantum LPS, 11Msce
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ETC 213 Ms Maxtor LTP, 15 Msce
$689.00
ETC 240 Ms Quantum LPS, 11Msce
$929.00
ETC 340 Ms Maxtor LTP, 13Msce
$1079.00
ETC 425 Ms Quantum PRO, 9 Msce
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<tr>
<th>Size</th>
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<td>$709</td>
</tr>
<tr>
<td>425MB</td>
<td>$1199</td>
<td>$1299</td>
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4MB QMS-PS® 410 memory ..................... $299

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14" Color
$429
Two-Year Warranty

Sony
14" Trinitron
$639

QMS-PS® 410
NEC Model 95

$1,549
$1,549

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MacLand, Inc. 4685 S. Ash Ave., Tempe, AZ 85282 (602) 820-5802
24 Hr. Fax: (602) 345-2217
CIRCLE 150 ON READER SERVICE CARD.
### Quantum

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Internal</th>
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<tr>
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<tr>
<td>80mb</td>
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<td>105mb</td>
<td>$335</td>
<td>$395</td>
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<td>120mb</td>
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<tr>
<td>240mb</td>
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</tr>
<tr>
<td>425mb</td>
<td>$1139</td>
<td>$1199</td>
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</table>

Quantum drives carry a TWO year warranty. 3.5" Half Height drives are the PRO series. 3.5" Low Profile drives are the LPS series. *3.5" Low Profile drives for the Mac Classic, LC and Ll. **Perfect for Powerbooks!! Dealer installation recommended. All Internals drives include a mounting kit. Externals manufactured by ClubMac. Quadra 900 bracket add $10

### Seagate

<table>
<thead>
<tr>
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<td>11.9ms</td>
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<td>15.5ms</td>
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<tr>
<td>1.0GIG</td>
<td>15ms</td>
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<td>$1919</td>
</tr>
<tr>
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<td>15ms</td>
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<td>$3099</td>
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Seagate drives carry a ONE year warranty that can be extended up to a total of FIVE years. All Internals include mounting kits. Quadra 900 bracket add $10

### Fujitsu

<table>
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<td>11.5ms</td>
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<td>$1999</td>
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Fujitsu drives carry a FIVE year warranty. All Internals include a mounting kit. Quadra 900 bracket add $10

### SyQuest

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<tr>
<td>44mb/88mbCombo</td>
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<td>$999</td>
<td>$999</td>
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</table>

Two Year Warranty on drive. One Year Warranty on cartridges.

44mb Cartridge $65
88mb Cartridge $99

### Maxtor

<table>
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<th>Capacity</th>
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<tr>
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<tr>
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<td>13ms</td>
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<tr>
<td>1.4GIG+</td>
<td>13ms</td>
<td>$2429</td>
<td>$2529</td>
</tr>
</tbody>
</table>

Maxtor drives carry a ONE or TWO year warranty depending on model.

ClubMac

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Visa & MC Accepted, No Surcharge • All Prices, specifications, features and system requirements subject to change without notice • Not responsible for typographical errors • All Hard drives carry 30 day money back guarantee • Prices do not include freight • All specs are from the manufacture.
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Macworld, March 1990

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Pack it in your pocket, purse or briefcase. La Cie’s new 40MB and 80MB power-packed PocketDrives offer ounces of convenience, not pounds. Using Quantum’s new 2½” drive, the PocketDrive offers 19ms seek time, whisper-quiet operation and La Cie’s exclusive switchable termination and SCSI ID.

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La Cie’s PocketDrive eliminates the hassle of fumbling with cables at the back of your Macintosh every time you connect or disconnect the drive. Instead, the PocketDrive comes with a unique PocketDock™ desktop docking cable that lets you plug in the PocketDrive in seconds. With a second PocketDock (only $99), you can have fast and easy connection at work and at home. There’s even a miniature T-connector (only $59) for connecting to other Macintosh systems.

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MacWeek

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La Cie offers customers a complete line of hard disk drives featuring state-of-the-art components, whisper-quiet half-speed fans, access times as low as 15ms, wide-range power supplies and La Cie’s exclusive switchable termination and SCSI ID.

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• 50MB-400MB Cirrus

• 50MB-400MB Tsunami
• 50MB & 100MB Bacster™
• 40MB & 80MB PocketDrive

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We love all our drives, but take a look at our newest arrival. La Cie’s new ExpressDrive™ Perfect for sensitive installations, the ExpressDrive is empowered with the performance of a Quantum fixed drive and the security and convenience of a removable drive, yet none of the risks of open-air media.

ExpressDrive from $Call

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- 3 1/2" & 5 1/4" magneto optics
- ExpressDrive
- CD ROM

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Bobker's Dozen Best, MacUser, December, 1990

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La Cie Cirrus Optical Drive
La Cie Pocket Drive
La Cie ZFP Drive
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Do you want good shadow detail? Then compare the black and white scans. The Silverscanner can give you production quality gray-scale scans for magazines, newspapers and brochures.

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When comparing line art, the Silverscanner really shines! At 1200 dpi you get what amounts to an electronic stat. The comparison is incomplete, however, because some scanners don’t have hi-res capability (too bad). But even if you compare at 400 or 600 dpi, it’s clear how much better the Silverscanner is, especially bundled with Color It!

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of our image.

Software to die for!
We're proud of our image when it comes to quality software, too. La Cie has always had a reputation for powerful, well-written software. La Cie's exclusive plug-in modules for Photoshop, ColorStudio, Digital Darkroom, Enhance, ImageStudio and RagTime have been hailed as some of the best software ever written for flat-bed scanners. Enjoy features like fast dynamic color previews, independent color/brightness controls, nine scan modes, savable scan settings, color dropout, magnified previews, proof scans, 25% to 400% scaling in 1% steps, and 25 dpi to 1200 dpi in 1 dpi steps. Silverscanner is OCR and Apple System 7 compatible and can be purchased with full versions of Adobe Photoshop and Letraset's ColorStudio—a $2139 value for only $1899!

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Macworld, June 1991

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50MB Quantum $299*

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100MB.......................................... $429 Int.
120MB.......................................... $529 Int.
240MB.......................................... $729 Int.
400MB.......................................... $1399 Int.
1.2GB.......................................... $2009 Int.
80MB PocketDrive.......................... $649

155MB Tape Drive......................... $649
600MB Tape Drive......................... $999
1.2-2.0GB DAT Drive....................... $1499
128MB CirrusOptical...................... $1699
ExpressDrive............................... $Call
Silverscanner.............................. $1399
Silverlining................................. $149

Call for products not listed.

You'll be delighted at La Cie's competitive prices. Especially when you consider what you get absolutely free. Like our acclaimed Silverlining software. Five megabytes of public domain software. A 2-Year Limited Warranty on Quantum mechanisms (extendible to 5 years). 72-hour turn-around on warranty service. Prompt, courteous, competent service.

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SyQuest revolutionized hard disk storage with portability and speed. Now, DGR Technologies ups the ante: 128 megabytes of removable, erasable optical storage on fast, ultra-reliable 3.5" disks. The 128REM™ represents substantial media savings over SyQuest 45MB and 88MB technology – do the math. The real savings, though, is peace of mind. Optical storage spells reliability: No more head crashes and no more magnetic data corruption. Above all, the 128REM™ is built to perform. 9 millisecond short seek time and a built-in 128K buffer translate into significant improvements over current removable standards – giving you the capacity and performance you've been waiting for. The 128REM™ is built with the future in mind, conforming to both ANSI and ISO standards, ensuring future compatibility.


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Go•Drives are lightweight—only 8 ounces in a 2.5 inch form factor.

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They are faster, more reliable, and have a higher capacity than internal drives shipped in the PowerBooks.

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GO•Drives include Quantum’s proprietary DisCache® and WriteCache™ firmware.
All external drives available in your choice, Zero-Footprint or Compact Portable case.

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<td>699</td>
<td>789</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Just ask away. When you phone, you have a right to expect courtesy, logic and a helpful attitude. Many people ask us questions about hard drives, SCSI addresses, termination, etc. We may not know all the answers, but we'll try to find any we don't have. If you decide to place an order, that's nice too.*

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  - 2.88gb Compression DAT

### Toshiba
**CD ROM $579**

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  - Mono w/Lapis card for SE, SE/30, and NuBus Mac IIs

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  - Quadra built-in video

- **TriAm Full Page 799**
  - 256 grays w/Lapis card for
  - SE/30, LC, and Mac IIs

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- Quantum, Maxtor, Syquest and ARDAT Drives carry a two-year "parts & labor" disk-for-disk replacement warranty. WREN, Tasc, WangDAT Drives and Syquest Cartridges carry a one-year "parts & labor" disk-for-disk replacement warranty.

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- All Hard Drives include brackets, cables, cords and LED's required for operation in the specified Macintosh. All Hard Drives are preformatted with Apple's latest stable all-platform System software, 13mb of compacted shareware, and the "ALLIANCE POWER TOOLS" SCSI formatter/hard partitioner.

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- Toll-Free Technical Support, 9:30am to 7pm Monday thru Friday, Central Time. As often or as long as you need.

- Prices and Specifications subject to change without notice

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<table>
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<th>GOV, UNIV, PO's, NO SURCHARGE</th>
<th>VISA/MC, DISCOVER NO SURCHARGE</th>
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$79

$128 ea

$184

$248/14

$358

$198

$84/168

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Beagle Brothers

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Deneba

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### Business Offers

- JAG
- Ray Dream
- Nicky's World
- Streamline 2.0
- Words, Word Munchers
- Autofill
- Bluebeard II
- Spector
- Advanced Graphics
- Lattin
- VAR
- ASCII
- Microsoft
- Apple
- Commodore
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- ProDOS
- Teleware
- Acrosoft
- JAG
- Ray Dream
- Nicky's World
- Streamline 2.0
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### Miscellaneous

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### Ad Sales Information

One Park Avenue, New York, NY 10016
(212) 503-5115 or (800) 825-4ADS

### Account Representatives

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<tr>
<th>Name</th>
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<tr>
<td>Sherrie M. Graddic</td>
<td>(212) 503-5152</td>
</tr>
<tr>
<td>Thomas P. Koletas</td>
<td>(212) 503-5136</td>
</tr>
<tr>
<td>CT, DC, DE, FL, GA, MA, MD, ME, NC, NH, NJ, NY, PA, RI, SC, VA, VT, WI</td>
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<tr>
<td>Dennis M. Leavey</td>
<td>(212) 503-5111</td>
</tr>
<tr>
<td>AK, CA (209, 408, 415, 510, 707, 800, 835, 916), HI, ID, IN, IA, MI, MO, MS, NE, OH, OK, SD, WA, WY</td>
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<tr>
<td>Laura A. Salerno</td>
<td>(212) 503-5140</td>
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<tr>
<td>AZ, CA (213, 310, 619, 714, 818), CO, NH, UT</td>
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### Classified Advertising Staff

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<tr>
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<tr>
<td>Paul Stafford</td>
<td>(212) 503-5138</td>
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<tr>
<td>Vice President, Class.</td>
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<tr>
<td>Anne R. Brockinton</td>
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<td>Production Director</td>
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<td>Chris Meyer</td>
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<td>Vickie Pirsky</td>
<td>(212) 503-5152</td>
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<td>Classified Ad. Dir.</td>
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<tr>
<td>Paul A. Fuoco</td>
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<td>Sales Manager</td>
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<td>Nerepil Foster</td>
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TEAC

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- 30 Day Money Back Performance Guarantee

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TURBOCHARGE your Macintosh with DayStar 100% compatible accelerators! 3 Year Warranty!

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- Get Classic II performance for only $295.95!
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CIRCLE 256 ON READER SERVICE CARD

CIRCLE 257 ON READER SERVICE CARD

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Extra Storage at an Extra Low Price!

QuicKor 40

• Genuine Apple Mechanism
• 40 MB Low Power Mechanism, 1/3 Height
• HD Set Up and Backup Software
• Zero Footprint
• Cables

WOW! new low price

$248
JUST COMPLETED

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MACBARCODA
for Bar Codes that don't fail

LABEL DESIGNER
The ultimate in label printing

Two great time and cost savers. Both technically outstanding and easy to use.

MacBARCODA
• Eliminates film masters
• More precise adjustment than fonts
• Easier to use than fonts
• Producing bar codes in EPSF
• Supports UPC, Code 39, ITF, ISBN, ISSN and EAN
• Compatible with popular page design packages
• Also available with color
• A suite of DA's.
• Prices from $349.

LABEL DESIGNER
• Used daily to produce all types of labels on a PostScript® printer.
• For $345 look what you get
• Total flexibility - any label size or sheet layout
• Text, lines, PICT & EPSF graphics and bar codes
• Incrementing bar codes and numbers
• Imports data easily from your word processor or database via ASCII text files.
• Ideal for mailing labels, BRC's, purchase/caration labels, asset/file tracking labels.

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MacUser May 1992 307
**PLANMaker: Powerful Business Plan Software**

- Self-contained Business Plan software for the Mac
- Expert Narrative describes your business at its best
- Sophisticated Financial Forecasts build credibility
- Create your Business Plan and earn excellent profits creating Business Plans for other entrepreneurs as a Business Plan Consultant

**MAC System 6.0.5 or later, 2MB RAM, no hard Drive.**

**Call/write for Brochure or order 1-800 955 3337**

**BUSINESS-CD-ROM**

**Blueprint: Professional CAD**

**Self supporting, requires no other software**

$129 + $3 sh (U.S.)

**Call today and ask for the Blueprint Special:**

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- For 10 to 10,000 employees
- Top selling HR system, Mac & PC
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**AbraTrak for Applicants**

- Find the right candidate - Fast
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**Do your Electronic Design on a Macintosh Computer!**

**Douglas CARGAM** is a family of programs for design and manufacturing of printed circuit boards. Running on the Apple Macintosh, the suite's key is quick and easy to use. The software together with the high resolution and speed of the Macintosh provides a perfect environment for this very affordable and easy to use.

**DesignWorks**: is used for schematic entry, netlisting word and parts for use, creating and editing custom parts and displays of digital design features. DesignWorks is fully integrated into the professional system.

**Professional Layout**: for board design and prototyping. The software includes the features of DesignWorks, plus the new Draft/Detailing system, Powersegment, and the Blueprint Special: a tool for professional CAD layout.

**Autohunter**: is used with DesignWorks and Professional Layout, allowing full use of the Professional System for comprehensive prototyping. The Professional System includes DesignWorks, Powersegment, Blueprint, and the new Draft/Detailing system. Autohunter provides the necessary information for routing.

**The Professional System**: consists of three programs: DesignWorks, Professional Layout, and Autohunter. The system runs full length of the Macintosh in addition to multiple PC and CRT capabilities. A full-featured, powerful environment required, the Professional System will take you from the initial schematic to the final printed circuit board.

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- Over 1000 classic recipes
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MacUser’s brilliant, four-color Premier section—packed with sales power and panache—is the ideal way to show 375,000 Macintosh business buyers that your cutting-edge company has truly arrived. Make your promotional launch to the “big time” with a Premier ad that’s not only a beautiful showcase for your capabilities, but a truly affordable marketing enhancement.

Call today for details!

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**DISCOUNT IMAGERS**

**QUALITY SLIDES!**

4k slides from any Macintosh program!

Don't be misled by other ads: we never charge a per-minute imaging fee!

**24-hour turnaround:**

<table>
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<th>Price</th>
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<td>PICT</td>
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Other services available:

- Postscript
- 4k slides from any Macintosh program
- 24-hour turnaround

**Slides From Your MAC**

We want your business, and we'll prove it! We offer the best service available with experts in Persuasion, PowerPoint and others, waiting to take your call. Free Fed Ex shipping and phone support. And if you should make a mistake, we'll reimage your slides, free.

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**MARKETPLACE**

**MacUser**

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**Completewith steel wand - $399**

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**Also available**

Industrial quality, heavy-duty units

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Take the Money and Run

After watching Apple over the past decade, I think it’s apparent that the company is never going to have a broad line of machines. You have to marvel at how much money Apple has managed to make by selling not much more than a variety of Macintoshes and a few different Apple II machines. Sure, it sells scanners, printers, CD-ROM drives, and other peripherals, but still . . . In its heyday, IBM sold an enormous variety of things. I still have an old IBM clock. The IBM meat scale and meat slicer are real collector’s items.

Japanese companies are amazing when it comes to producing a variety of products. Panasonic makes a VCR in one division, a microwave oven in another division, and an electric massage chair in another division. It’s obvious that American companies do not like to stretch themselves the way Japanese companies do. With Apple, this conservative approach is taken to an extreme. You have to wonder, What can Apple do to expand its business if it’s not going to make an Apple Walkman? And you can be sure an Apple Walkman is not on the drawing board.

I have one suggestion for the company: Because Apple won’t produce more products, the least it can do is expand the nature of its business. Apple needs to make a run-time Mac.

The Run-Time Mac

Software vendors have done this for more than a decade. They make a version of their software on top of which other people can build an application. The designer then sells the application with the underlying software engine running it. For example, a developer can design an application that uses a particular database engine. The person who buys the product doesn’t get anything more than an application locked into a database engine that runs the application only. The underlying database manager remains completely transparent to the user.

Programming languages are the progenitor of this notion. When you buy a program written in Pascal, say, you get the generated code but not a Pascal compiler. You can’t reconfigure the code for your spreadsheet so that it’ll work as a word processor. So why can’t a specialty hardware company such as Apple bring out a Macintosh system based on exactly the same principle?

A run-time Mac would consist of special ROMs and an architecture designed specifically to do run-only operations. Perhaps the source code of the software would also be in ROM. As a service, Apple could even burn the ROMs and help the developers debug their prototypes before the special machines went into production.

A good way to use a run-time Mac would be, say, as an automobile-tune-up station and emissions-control tester. The Mac is perfect for this kind of application, but why should a developer be forced to buy an entire Mac system to design such an apparatus? An inexpensive dedicated run-time Mac would be ideal. I’ve always believed that a Mac-based home tune-up system would be successful. It would come with the usual wires to the spark plug and timing light, plus an exhaust probe. A few digital-to-analog converters and some special software, and you’d have a tune-up station like no other. Again, if this was packaged with a run-time Mac, the cost would be within everyone’s reach. Non-computer users would see it as a tool, not as a computer. Fewer people would be frightened off.

The appearance of run-time Macs would also further publicize the Mac’s interface and its look and feel.

The only drawback to a run-time Mac, as far as Apple is concerned, is that someone might figure out how to turn a run-time OEM unit into a real Macintosh and sell the thing as some sort of clone. Careful recording of the ROM and a good licensing agreement to OEM vendors of run-time products would prevent this.

Macs in Control

Early computer systems were based on the notion that you used a computer to create some sort of product such as a traffic-light-control system. You used an inexpensive version of the development system when you began to manufacture the control system. The final product was a run-time computer. You can still do this with many of the Intel chips, and many such systems are built around inexpensive PC clones. The Mac has no such outlet. It functions only as a raw computer—usually in a business or graphic-arts department. Its interface is perfect for many other applications. Of course, many of the applications are practical only if there is an inexpensive run-time unit.

Let’s hope that Apple will consider the possibilities.
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Choose Farallon and you can choose any Ethernet media—thick, thin or 10BASE-T. That’s friendly greetings indeed.

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So call 1-800-995-7760 for details. Because for those special Ethernet occasions, there’s only one place to shop. Farallon.

New lower Ethernet prices.

<table>
<thead>
<tr>
<th>Model</th>
<th>Features</th>
<th>Price</th>
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<tbody>
<tr>
<td>Mac II Family (NuBus)</td>
<td>Thick + Thin + 16K</td>
<td>$249</td>
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<td></td>
<td>Thick + 10BASE-T + 16K</td>
<td>$249</td>
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<td></td>
<td>Thick + 3-way + 64K</td>
<td>$329</td>
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<tr>
<td>LC</td>
<td>Thin + FPU socket</td>
<td>$249</td>
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<td></td>
<td>Thin + FPU</td>
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<td></td>
<td>10BASE-T + FPU socket</td>
<td>$249</td>
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<td></td>
<td>10BASE-T + FPU</td>
<td>$399</td>
</tr>
<tr>
<td></td>
<td>Thin + 10BASE-T + FPU socket</td>
<td>$329</td>
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<td></td>
<td>Thin + 10BASE-T + FPU</td>
<td>$379</td>
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<tr>
<td>SE/30 &amp; IIci</td>
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<td></td>
<td>Thick + Thin + 16K + FPU</td>
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<td></td>
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Farallon

*Prices are suggested retail and are subject to change. 3000 Powell Street, Suite 600, Emeryville, CA, USA 94608. For customer service, call (510) 596-9000. Fax (510) 596-9023. Or contact us on America Onlineâ® or MCI Mail® ID: Farallon. CompuServe® ID: 75140.7202. Internet ID: farallon@farallon.com. ©1992 Farallon Computing, Inc. All rights reserved. The Farallon logo design is a registered trademark and EtherMac is a trademark of Farallon Computing, Inc. Hallmark is a registered trademark of Hallmark Cards, Inc. Farallon Computing, Inc. is not affiliated with Hallmark Cards, Inc. All other products are trademarks of their respective holders.

CIRCLE 175 ON READER SERVICE CARD.
Impressing the members of a Mac user group is never easy, and if that group happens to be from Missouri, the task is all the more difficult. So we were particularly pleased to have the members of Missouri's largest user group tell us they were impressed by Mirror Macintosh peripherals.

It's easy to see why Tim Garcia thinks the new Mirror 16-inch Color Display is so exciting. Never before could you get the productivity and convenience of a 16-inch display and Mirror quality at such an attractive price. At only $899*, the Mirror 16-inch Color Display is perfect for publishing, illustration and scanning. Plug it right into the video port on a Quadra or add one of our high performance video boards (available in 8-, 16-, or 24-bit models) and you've got a hard working system that won't break your budget.

Another addition to the Mirror product line that's bound to build a strong following is the Mirror 128 MB Optical Drive. It gives you 128 MB of fast, reliable storage on a rugged removable cartridge that fits in your pocket. Priced at only $1,449, the 128 MB Optical drive is perfect for storing large graphics, database files or backups. Additional cartridges are just $59.

Mirror has a full line of products designed to please Mac user group members (even from Missouri) and tough customers like you. We engineer our products from the ground up to give you the best performance and features; then we cut out the dealer mark-up so you save a bundle. Every Mirror product includes lifetime technical support and our 30-day, “Love It or Return It” guarantee.

Call now to order. And don't forget to ask for our free catalog; it's packed with great Mirror products and useful information.
**COLOR DISPLAYS**

<table>
<thead>
<tr>
<th>Display Type</th>
<th>Price</th>
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<tbody>
<tr>
<td>14-inch Color Display</td>
<td>$399*</td>
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<tr>
<td>16-inch Color Display</td>
<td>$899*</td>
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<tr>
<td>16-inch Color Display</td>
<td>$1,299</td>
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<tr>
<td>16-bit video card</td>
<td>$1,499</td>
</tr>
<tr>
<td>24-bit video card</td>
<td>$1,699</td>
</tr>
<tr>
<td>16-inch Trinitron® Display</td>
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</tr>
<tr>
<td>8-bit video card</td>
<td>$1,599</td>
</tr>
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<tr>
<td>24-bit video card</td>
<td>$1,999</td>
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<tr>
<td>20-inch ProView V</td>
<td>$1,799</td>
</tr>
<tr>
<td>8-bit video card</td>
<td>$2,299</td>
</tr>
<tr>
<td>20-inch ProView (Trinitron)</td>
<td>$2,499</td>
</tr>
<tr>
<td>8-bit video card</td>
<td>$2,999</td>
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**MONOCROME DISPLAYS**

<table>
<thead>
<tr>
<th>Display Type</th>
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<tbody>
<tr>
<td>15-inch Analog Portrait Display</td>
<td>$449*</td>
</tr>
<tr>
<td>w/ monochrome video card</td>
<td>$599</td>
</tr>
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<td>$799</td>
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<tr>
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<td>$799*</td>
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<tr>
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<td>$999</td>
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<tr>
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**COLOR SCANNER**

Mirror's top-rated 600 Color Scanner offers true 600 dpi scanning resolution, 24-bit color and a great price. Comes complete with Adobe Photoshop 2.0. $1,299 **

- Transparency Adapter for scanning slides and transparencies up to 5" x 7". $899
- Automatic Document Feeder for scanning multiple pages automatically. $599

**HARD DRIVES**

All Mirror hard drives are built with the same attention to detail that earned the Mirror 210 MB Drive MacWorld's Editors' Choice award.

<table>
<thead>
<tr>
<th>Capacity</th>
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<th>External</th>
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<tr>
<td>45 MB</td>
<td>$269</td>
<td>$329</td>
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<td>50 MB (Q)</td>
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<td>105 MB (Q)</td>
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<td>$739</td>
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<tr>
<td>595 MB</td>
<td>N/A</td>
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<td>1 GB</td>
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<td>N/A</td>
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**REMOVABLE DRIVES**

All Mirror removable drives feature rugged steel enclosures, high-grade power supplies, external push-button SCSI address switch and switched convenience outlets.

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“Tim Says, If There’s A Better Value In Peripherals Than Mirror’s New 16-inch Color Display, Show Me..."

Mirror 16-inch Color Display $899 for built-in video, with 8-bit $1299, 16-bit $1499, 24-bit $1699.

Tim Garzia, President
Gateway Area Macintosh Users Group
St. Louis, Missouri