

JUNE 1995 / \$3.95

Mac User

ZD ZIFF-DAVIS PUBLISHING COMPANY

SNEAK PREVIEW

NEW ALL-IN-ONE MAC

Apple's New
Low-Cost
Multimedia
Power Mac!

PLUS

Buyer's Guide to
Superfast V.34 Modems

Think Gig: We Rate 42
Humongous Hard Drives

**COMPLETE CLONE TEST RESULTS!
HOW FAST? HOW COMPATIBLE?**



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LETTERS

Exchanging Words

THANK YOU for Andy Ihnatko's great column in the March '95 issue ("As The Word Turns," page 21). Andy's article was straight to the point and reflects my feelings about the new Microsoft Word perfectly.

I have used Macs since they came out, and Word is the one and only word-processing program that has ever graced my hard disk. I can only describe as pure shock my reaction when I saw the Word 6.0 interface. Word 6.0 now sits in its box on my shelf, where it will remain forever. I'm seriously considering WordPerfect. It just goes to show you that bigger isn't always better.

Lisa Towler
via the Internet

ANDY HIT THE NAIL on the head: Microsoft made a choice to force its philosophy of Windows Everywhere, Even On Your Mac on the Mac community, and like a group of white blood cells fighting an infection, Mac users are rejecting this version of Word as if it were a foreign body. Microsoft is too intent on forcing the Windows way, and WordPerfect will prosper.

Michael Guzzo
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ANDY DID A WONDERFUL job of capturing the way many of us feel about being forced to abandon Word after years of use. It

Write to Letters

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is also significant that Word 6.0 did not even make the list of finalists for your Editors' Choice Awards in the Word-Processing Tool category. Good-bye, Word!

Mike Saunders
mike_saunders@nafo.stortek.com

I AGREE WITH most of what Andy Ihnatko says, but I think he's missing the big picture. What Microsoft is doing is brilliant for anyone in the business world. Yes, Word looks identical to its Windows counterpart, but that's a great accomplishment. Many of us in the business world are forced to use DOS/Windows at work but prefer to use Macs at home.

When I take work home, I can open up my Word and Excel documents on my Mac. Everything is identical. I can do my work and save the files back to a DOS floppy. No hassles, no conversion programs to run.

Joe Davis
Marlton, NJ

I COULDN'T AGREE MORE with Andy Ihnatko's assessment of Microsoft Word 6.0: It's a disgrace. But in the same issue as Andy's column, *MacUser* defended its four-mouse rating of Word 6 by calling it a "forward-looking application." If Word 6 represents the future of applications on the Mac, we all might as well be running Windows.

Mike Basham
bash@universe.digex.net

I HAVE THE SAME response to Word 6.0 that I've seen from many other Mac users: If I had wanted a Windows program, I would have purchased an Intel-based PC.

Charles Reeves, Jr.
via the Internet

I CAN'T AGREE that Word is forward-looking. Writing inefficient, ported code and burdening a program with superfluous features is not forward-looking. Ignoring Apple's interface guidelines is not forward-looking.

If Microsoft ever decides to write an application for the Mac and follow Apple's



OPEN FOLDER

Snide remarks and humorous asides seem to be Open Folder's *raison d'être*, but we can't fool you. Following our March '95 column, readers of all ages wrote to show us the error of our ways.

Those crazy kids were up in arms when we gently razzed a boastful young Mac expert. "I *do* know the most about Macs in this entire town, and the teachers adore me," wrote Jacqui Cheng, of Schaumburg, Illinois, and who are we to doubt her? "Teachers pull me out of my classes to help with computer questions. We'll be running the world when *you're* in nursing homes or six feet under!" added Jason Kehrer via the Internet. Jeez. Just because you're mentioned in Open Folder doesn't necessarily mean we're making fun of you! In this case, however, it does.

We'll cop to the fact that we're not on top of the model-railroad beat. "If you were a bit more savvy, you'd know that the National Railroad Association approved digital command control standards in 1994," wrote Jeff Wilson via the Internet. Jeff pointed out a shareware program called FastClock+DCC, which lets you control trains via your Mac's serial port. Sounds like a program Amtrak should look into.

Young and old alike can enjoy model trains, but some of our readers yearn for their youth. "Why can't my Mac find its mommy?" wrote Greg Wilson via ZiffNet/Mac. "How many years old will Macs have to be before they can find their mommies? You might wonder why I'm ending my paragraph here. It seemed like this paragraph looked long enough." We couldn't agree more.

Not by the hairs of our chinny-chin-chins did we expect to receive a fairy tale in the mail, but Irina Polon, of Worcester, Massachusetts, surprised us with a five-page story about three little pigs who learn the dangers of software piracy. In lieu of the traditional wolf, this cybertale features an alligator bearing a striking resemblance to Bill Gates. Wait, let us guess the ending: Instead of huffing and puffing and blowing the pigs' house down, the Gates gator just *buys* it. After all, every fairy tale *does* have its roots in reality.

ASK DR. POWER MAC

I AM AT THE CROSSROADS on whether to buy a Pentium-based PC or a Power Mac. I've read that a 100-MHz Pentium-based PC is as fast as a Power Mac. So why should I buy a Mac? On the other hand, I believe that RISC is the future. Will there be a PC that will run Power Mac software in the future? I love Macs, because they're easy to use, but will a PC system with Windows 95 work just as well?

Kirby Hom
the Internet

/ Power Macs are faster than analogous Pentium machines, thanks to their superior floating-point speed. Most graphics applications and 3-D applications in particular are simply faster on a Power Mac than on a comparable Pentium machine. PCs are unable to run Mac software, but Power Macs can run PC software (including games, thanks to the built-in SoundBlaster support), via Apple's 486-based PC-compatibility card. Windows 95 will give Windows users several features currently available on the Mac, such as plug-and-play for interface cards, but true PC plug-and-play won't happen until PC cards have been updated to take advantage of the new standard.

YOU'VE GOT ME a little scared. I have just purchased a Power Mac 8100/100AV to use for graphic design. Now you're talking about the PowerPC 604 chip! Did I just buy the last of a dying breed? Is it going to be possible to upgrade if need be? Or did I really spend my life's savings on some sort of proof-of-concept prototype?

Edward A. Kirschner
via the Internet

/ The 8100/100 is an extremely fast machine, but technology does march on. Apple, IBM, and Motorola are committed to bringing out even faster PowerPC processors in 1995. Machines based on the PowerPC 604 will be faster than the current 601-based Power Macs. Apple hasn't announced any upgrade products, but third parties will probably offer an upgrade to the 604. If your 8100/100 is not as fast as you would like for certain tasks, you can always wring out more speed by adding peripherals such as a Photoshop accelerator, faster video card, or faster SCSI interface.

LAST AUGUST I bought a Power Mac 6100. I wanted the AV option, but my budget wouldn't allow it. Will there be an option to upgrade with the AV card in the future?

Carlos A. Camacho
Yawatahama, Japan

/ When we checked with one dealer, an AV upgrade card for the 6100 was selling for \$499. This card gives you video output to an NTSC or PAL TV and 24-bit color on displays as large as 17 inches or 16-bit color on displays as large as 21 inches.

interface, as most other software companies do, I'll consider going back to Word.

Greg Dunn
gregdunn@indy.net

THE MAC COMMUNITY whines about Word 6.0 while faithfully adding to Microsoft's already overflowing coffers. Why isn't anybody voting with their pocketbooks?

I'd bet half of all Word users would be more than happy with WriteNow, MacWrite, or even ClarisWorks. For more horsepower, there's Nisus Writer or WordPerfect. And those who feel they absolutely need Word's features should be using PageMaker or QuarkXPress.

Robert Winebrenner
APO, AE

LIVING IN A small community in Iceland whose only major industry is fishing, I know that a cunning fisherman is the one who lets the fish swallow the bait before slowly reeling it in. By offering Mac users constantly poorer versions of its software compared to the Windows version, Microsoft is trying to pull veteran Microsoft software users into its own OS. But this practice won't make users ditch the Mac — they'll ditch programs such as Word 6.0 instead.

Hordur Helgi Helgason
via the Internet

Off the Charts

AFTER READING "Top of the Charts" (March '95, page 98), I was befuddled to find that you completely omitted Abelbeck Software's Kaleidagraph. Kaleidagraph is a much more thorough tool for anyone in need of data manipulation. It features great data importation and a plethora of charting options and is quite user-friendly. I have used Microsoft Excel and Computer Associates' CA-Cricket Graph in the past and feel that they have been slowly incorporating the features Kaleidagraph has had for the past five years. It's too bad you overlooked such a widely used and well-known charting program.

Chris E. Jones
cejones@wave.st.usm.edu

Envoy, Ahoy

I WISH I HAD READ your review of WordPerfect Envoy (March '95, page 54) prior to purchasing the program. It has some nice

points, but the cons far outweigh the pros. WordPerfect dropped the ball regarding Envoy — it's obviously not ready for sale.

It seems software companies have ceased quality inspection of their products. In a rush to beat the competition, they market software before it's free of problems and before its features are completed. The consumer is left to pay for beta-testing it for them.

John Paul Burke
StoryWrtr@aol.com

Net Loss

I AM APPALLED by "Shop Around," March '95, page 127, which tells your readers to get someone else — for example, a Scout troop — to pay for their Internet time. The question is, Who will pay for my subscription to your magazine when I refuse to renew it due to your advocacy of this type of moral bankruptcy?

John Fipphen
JFIP@aol.com

I WAS HORRIFIED to see using Telecooperation Office's Mosaic-like client deemed one of the ways to cut access costs. I've followed that group's work closely, because our firm produces a Web browser for the Newton. I would have a difficult time saying that either of our solutions is either smart or a cost cutter in the eyes of the average consumer. The TCO approach involves running a filter on a DEC Alpha, which is not exactly common household equipment.

A better path would be to mention the growing number of Internet-savvy Newton applications, such as LunaTech's LunaMail, which allows Internet POP e-mail access to Newtons, Digital's text-only Web browser, Pharos' SearchLight AppleSearch package, and AllPen's NetHopper browser.

Ray Rischpater, AllPen Software
via the Internet

DisplayMaker

I WAS NOT SURE whether to laugh or cry as I read your review of the LaserMaster DisplayMaker Professional (March '95, page 46) — either laugh at your definition of *innovative* or cry because of all the people who will now buy the product as a result of your review.

In our service bureau, we have four large-format color printers, all Encad plotters,

one driven by a LaserMaster engine. It is the least innovative of the four. LaserMaster's customer service is nonexistent.

To call LaserMaster DisplayMaker Professional an innovative product in today's market is laughable. There are a lot of large ink-delivery systems, newer plotters (even from Encad, the maker of LaserMaster's plotter), and faster RIPs. Today, innovative means using the best technology to run the newest equipment at lower prices. Any readers of your review interested in buying the LaserMaster DisplayMaker Professional at \$29,995 should save themselves \$15,000 and buy direct from Encad. An Encad Novajet III with a Photoscript 24 NuBus card and Mark IV Ink system RIPs faster, prints faster, and produces images of the same quality.

Jeff Turner
tsaprez@aol.com

/The DisplayMaker Professional is an attractive, innovative all-in-one package. The system you recommend does indeed cost thousands less but requires buying components from several companies and doesn't include the DisplayMaker's sophisticated color-management software and hardware. We did clearly point out that printing a 36-x-48-inch image can take more than an hour, and our research revealed adequate technical support from LaserMaster. / CB & TB

Server Error

IN "ROLL YOUR OWN Internet Server," (March '95, page 117), you seem to imply that the only viable solution for turning a Mac into an Internet server is to install MachTen, a version of UNIX, and run a UNIX-based server. But there are excellent Internet-server utilities available, most of them shareware or freeware, that can give you all the capabilities of a UNIX server at a fraction of the cost while completely avoiding the hassle of configuring and installing UNIX. Peter Lewis has written excellent shareware ftp server software called FTPd. Chuck Shotton's MacHTTP gives you a fully functional World Wide Web server. Glenn Anderson's MailShare provides a POP Internet e-mail server.

One certainly should consider the possibility of using the Mac OS as an alternative to UNIX when setting up a small-company network.

Scott Atwood
atwood@cs.stanford.edu

/ Good point. Our story focused on MachTen as a way to reclaim an old Mac for use as an Internet server and as a way to perform several tasks (some of which can't currently be done by any Mac OS-based server) with a single piece of software. Unfortunately, we didn't have the space to adequately discuss servers such as BIAP Systems' MacHTTP and the others you mentioned. You can find a plethora of information about MacHTTP by pointing your World Wide Web browser to <http://www.biap.com/> or by e-mailing BIAP at info@biap.com. / JR

Misplaced Delivery

I FOUND THE REVIEW of Special Delivery 2.0 (March '95, page 64) somewhat misleading. In testing Special Delivery 2.0, I saw some rough edges too. Yet the program does have a lot of merit. Using Special Delivery, an inexperienced user can produce a sophisticated multimedia presentation in a very short period of time. I have seen novices (even an 11-year-old) quickly assemble an admirable presentation.

We also experienced fewer problems with file import, jump-redraw, and file ballooning with Special Delivery than with Astound. We saw very little difference in performance when we ran Special Delivery on an LC II with 4 MB of RAM and on a Quadra with 32 MB of RAM. Astound couldn't even run on the LC.

Yes, Special Delivery needs work, but it does not deserve the 2.5-mouse rating.

Fred Showker
showker@eworld.com

Positive Advertising

JOHN C. DVORAK continues to write things such as "Did Apple take advantage of [the Pentium fiasco]?" (March '95, page 190). Of course not. Every manufacturer knows that denigrating or belittling a competitor's product may well backfire some time in the future and therefore is a very stupid thing to do. When was the last time you saw Ford or Chrysler publicly knock GM trucks?

Carl Brandauer
brandy1016@eworld.com

CORRECTION

The phone-number information we listed for Psygnosis (New on the Menu, February '95, page 31) was incomplete. Psygnosis is in the United Kingdom, and its phone number there is 051-709-5755.



Support, Support, Support

APPLE WANTS THE WORLD TO KNOW: “We’re number one!” Number one in what? you might well ask. Certainly not overall

market share. Not low price. Not product availability. The answer is *multimedia*.

According to a recent Dataquest study, Apple’s in the multimedia lead worldwide, with 2.4 million CD-ROM-based units sold in 1994. Naysayers contend that Apple is overhyping this news, but I disagree — I think it’s a very big deal. Multimedia is currently the hottest ticket in town with Mac as well as PC buyers. What’s more, most of these multimedia machines are going into the home, right alongside the TV and the stereo system. Personally, I have a theory about who’s buying and a major concern about what this rapid increase in home computers could mean for users.

First the buying theory. I think at least half the buyers use Macs or PCs at the office and have decided that the aging machine they bought in the ’80s to do work at home just doesn’t cut it anymore. Today’s cool CD-ROMs either don’t run on your old Mac or they run so slowly that you’ll be running to the nearest superstore for a Power Mac 6100. Fortunately, many of you have already grown savvy enough to solve whatever technical problems you face at home — especially since multimedia on a Mac is comparatively user-friendly.

But what about the other half of the home-computer buying crowd? These are people who have little experience with computers but have courageously decided to plunge headlong into the information age with only a tech-support line to fall back on. In most cases, that tech-support line makes a shabby little lifeboat.

The personal-computer companies that sell machines to these inexperienced users are like frenzied gold-rush prospectors, rushing to lay claim to a share of the home

market — and for good reason. The home market accounts for about 40 percent of all personal computers sold in the U.S. today, a percentage that’s heading north in a hurry. But here’s the catch: The home market will fulfill its potential *only* if consumers enjoy the home-computing explosion as much as the vendors do. And for many customers, that enjoyment is going to require at least a little hand-holding. Don’t *tell* us you’re customer-focused, folks. *Show* us.

BusinessWeek has called the entry-level multimedia computer an “all-purpose appliance for the Information Age,” and consumers are being encouraged to think of it that way. Massive amounts of money are being spent on ads to convince Buford and Bertha Consumer that a personal computer will be just as at home in their pine-paneled den as the Parcheesi board and the family dog . . . and just as friendly too.

However, here’s where things start to get sticky. Buford and Bertha go to Electric Empire to buy appliances such as a digital iron or a programmable coffeemaker — both of which are loaded with features that make them friendlier than a presidential aspirant in the New Hampshire primary. These appliances are smart and *simple* — not because their owners are dumb but because users might want to focus on things other than figuring out how to make the programming on the coffeemaker work.

When Buford and Bertha’s television is acting up, a few whacks on the top of the set

tend to deal with whatever’s loose inside. Needless to say, this approach will not work for the computing appliance they just bought. So, what happens when they dial the tech-support number? Depending on the developer, they might end up in an automated messaging system that consists of an infinite loop of frequently asked questions that don’t address the problem they’re having. Or they might languish in voice-mail queues for 45 minutes and accrue hefty charges for the pleasure of hearing a reedlike voice tell them the problem is the manufacturer’s and not the application’s. You get the picture, and it’s not a Cézanne. The advent of Macintosh clones has prompted Apple to improve its tech-

support response time suddenly and substantially, and as a consumer advocate, I give Apple higher marks than many companies. However, its tech support should be so good that people don’t mind paying a little extra for its brand name.

It’s not easy to simultaneously improve ease of use, enhance performance, and adequately support a low-cost personal computer. But satisfied, successful customers drive market demand, and without that, even the greatest home-computing technology will lie fallow. Personal-computer companies might take a cue from the consumer-electronics companies that have elevated customer service to an art form, with well-staffed toll-free lines, unconditional replacement policies, and a lot of energy devoted to getting it right the first time. It *might* be out of the goodness of their hearts . . . but it’s *definitely* good for business. ☒

Personal-computer companies are like frenzied gold-rush prospectors, rushing to lay claim to a share of the home market.



Dear Andy

[*Editor's Note: Regular columnist Andy Ihnatko is on vacation this month. Of course, in this case, I'm using "on vacation" as a euphemism for "curled up in the fetal position under his desk, rocking himself and humming the Star Trek theme almost inaudibly." It is our opinion that the big two-hour series premiere of Star Trek: Voyager somehow failed to live up to his expectations. Anyway, it looks like he's going to be under there for a while, so subbing for him this month is a nationally syndicated advice columnist.*]

[*Editor's Note: The nationally syndicated advice columnist is on vacation this week. We are substituting instead a selection from her favorite columns of past years.*]

[*Editor's Note: Hi, this is Andy's editor again. After reading the lame column the nationally syndicated advice columnist faxed over, I pointed out to her editor that for the dough we were paying, she could bloody well do better than that. Her editor reminded me — in a tone I really didn't appreciate — that she was indeed Nationally Syndicated and further informed me that if we thought she actually needed our piffling money, then we were very much mistaken. "Get bent," I told her editor and took another whack at bringing Andy around. After reminding him that he didn't even like Next Generation until its second or third season and that it'd be a shame to drop out of society now that Babylon 5 was really starting to heat up, he agreed to come out long enough to write this month's column. We apologize for the inconvenience.*]

DEAR ANDY: I've got a tip for all of your readers who can't keep their cats off their laser printers. I had this problem with my feline companion, Mr. Whiskers, and after months of frustrating failure (I even tried saying "NO!" to Mr. Whiskers in a stern voice, if you can believe that!), I hit upon a simple solution: I went to my local Apple dealer and bought Mr. Whiskers a LaserWriter of his very own! It's PostScript, of course, because Mr. Whiskers can sense a

QuickDraw printer a mile away.

To make sure Mr. Whiskers would jump only on his LaserWriter, I had to pay someone to make mine run at a much lower temperature. My printer now doesn't really print very well, actually, but I'm thrilled to report that Mr. Whiskers is now a happy, happy feline companion!

Purr-fect in Little Neck

DEAR PURR-FECT: I ran your suggestion by Dr. Sylvia Macpherson, a feline psychologist, who suggests that you may be denying your cat the mental stimulation it seeks. "Cats are smarter than dogs, no question," she explained. "But whereas Fido lives in a fool's paradise, so to speak, Felix is just barely smart enough to realize exactly how little he actually knows. His acute senses tell him that a wheelbarrow of information and ideas are being fed to that box in the corner, and since Being Fed is one of the few concepts a cat can readily understand, it hops right up on the printer, hoping to pick up any scraps of intelligence that might fall to the ground. As far as we can tell, none ever do.

"Which is probably just as well," Macpherson continued, "because, I mean, cats wouldn't know what to do with all that data even if you hardwired an AppleTalk port right into their skulls. Oh, damn." At that point, we were disconnected.

DEAR ANDY: Please settle a bet for me. A friend insists the reason *Coke* is in the Newton's built-in dictionary but *Pepsi* isn't is that originally Apple was positioning the MessagePad for vertical-market applications in the American heavy-steel industry. I say it was an homage to Sir Edward Coke of the Court of Common Pleas, who ruled in 1612 that the authority of Common Law superseded even the Crown's.

Flummoxed in Farquhar

DEAR FLUMMOXED: You're both wrong. *Pepsi* was omitted as a deliberate attempt to deny added publicity to soul/pop diva Cheryl Pepsii Riley. At that stage in the Newton's

development, Riley's rock/soul orientation was being marketed as a challenge to the rock/folk stylings of Michelle Shocked, one of the development team's favorite artists.

And today Shocked has justly earned Springsteen-esque permanence in the American musical firmament, while Riley's career stalled hopelessly after the 1991 release of her *Chapters* album. So now you know where all of Apple's marketing genius is being expended.

DEAR ANDY: I'm torn as to what to do about the upcoming wedding of my cousin "Cousin" and "Stanislau," neighborhood sweethearts since childhood. I have been asked to prepare the programs for the church service. Unfortunately, there's some tension between the couple's families; 20 years ago, my uncle (a banker) foreclosed on Stanislau's parents' home, just to ensure that there'd be plenty of street parking available for his big Christmas party.

So you can probably guess the quandary I'm wrestling with: Should I use CMYK or spot color for the church programs?

Perplexed in Pawtucket

DEAR PERPLEXED: Honey, I'm sure I'm not telling you anything that you, deep down in your heart, haven't realized already: The four-week lead time that a CMYK print job requires is plenty of time for the wedding to completely fall apart, leaving you stuck with the bill. Do you *really* want to make a mistake you'll be living with for the rest of your life?

DEAR ANDY: My dad carried this column in his wallet for 40 years before joining the Air Force. Actually, it was on the back of a photo of Agnes Moorehead in a bathing suit, but it's a nice sentiment anyway and I'm sure your readers would enjoy seeing it again.

Dirty in Deerfield

DEAR DIRTY: With pleasure . . . then as now, it's a timely message for the young middle managers of America:

Please, God, I'm Only 16 Minutes from Deadline

What's wrong? Why is everything so black? I remember cajoling my boss into letting me handle the annual report this year. How envious the other fellows at the office would be. He didn't want to give it to me at first, but I finally managed to persuade him.

How proud I was when I collected documents from all the departments and ran the scanner and the printer, all within the confines of the user manuals, at least at first. I felt so mature, so adult, as if I knew everything and nothing could ever harm me.

So when a "friend" goaded me into expense-reporting a video-accelerator board for speeding up Photoshop, I didn't care about the risk... I thought only about speed. And sure, the MIS manager warned me about installing new system software and third-party extensions. She read off all the statistics on how many young managers like me crash and burn by taking too many chances during an important project. But what did she know? I saw only the MacBench performance needle twitching higher, higher,

higher. I'm a young executive; I'm invincible. The company's annual report was finished. Finally, I was a winner.

What's happening now? Everything's dark. The Chooser can't see the zone where Accounting's servers are. None of the charts and spreadsheets I've linked to the main report are showing up in print. Now, everything's printing in Courier. Suddenly, my hard disk won't mount at all. What's that noise? All I can hear is the sound of my boss sobbing, gasping, "Why? Why?" The vice presidents who were sure the report would be duplicated and bound in time for the board meeting are walking around like zombies. No, no, now my Power Mac just makes crackling noises and won't boot up at all. No!


Please, God, I'm only 16 minutes from deadline.

DEAR ANDY: Boy, did you blow it in your last column. For the record, there is no *g* in Apple; Michael Spindler was *not* the author of *The Weekly World News*' "Ed Anger's America" column; jamming an Extended Keyboard under the rear wheels of your car

may get you out of a snowbank but *will* void its warranty; Arsenic Tadpole Club was never a code name for the Newton MessagePad; Apple *did* once employ a man named Barney; the castaways eventually managed to get off the island and moreover *never* resorted to ritual cannibalism; the proper microwave setting for making a PowerBook 520 Windows-compatible is "Defrost/Hamburger"; Joe Besser was *never* a member of The Three Stooges; there are nude pictures of nine historical figures hidden within the ROMs of every Power Mac, but Harry Truman is *not* one of them; and you're not imagining it— those voices you hear really *are* those of the rest of Humanity conspiring revenge for the multitudes of evil you've wrought in this lifetime.

Smug in Seattle

DEAR SMUG: Indeed I did have my head lodged in a major body cavity. Fifty lashes with a curly ADB cable! Slowly.

Teens — Confused about relationships and dating in the '90s? Send for Andy's informative illustrated pamphlet by e-mailing andyi@world.std.com. 

NEW ON THE MENU

NEW CPUS /

First PowerPC 603 Mac Debuts New multimedia LC for educators sports excellent ergonomics.

FINALLY: A POWER MAC almost anyone can afford. Apple's new Power Macintosh 5200/75 LC — the first machine built on the low-cost PowerPC 603 chip — boasts an all-new design and excellent ergonomics. Apple has also updated this system's 68040-based companion, as the new LC 580. Like the Quadra 630, both machines offer multimedia features such as built-in sound and video capture in a single box. Initially only educators will reap the benefits, but mass-market versions are expected to follow shortly.

Power Mac 5200/75 LC. The first thing you notice about the 5200 is the design, which is reminiscent of Apple's AudioVision monitor. Apple designed the entire system to fit into a box only slightly larger than a typical 15-inch monitor and put it on a tilt and swivel base. Its 15-inch display supports resolutions of 640 x 480 pixels at 16-bit color and 832 x 624 pixels at 8-bit color. Below the display sit the floppy-disk-drive slot, CD-ROM drive, monitor controls, a headphone jack, and an infrared remote sensor for the included remote control. Two small speakers fit neatly around these controls, pointing directly at the user.

Around back, the 5200 looks very similar to the computers in the 630 series, with the standard complement of ports (ADB, printer, modem, SCSI, and sound in/out) and specialty slots. Multimedia options such as the video-input card, communications card, and television tuner that are compatible with the 630 are available for the 5200 as well. In fact, Apple uses the LC PDS in this Power Macintosh, thus promising compatibility with 99 percent of the cards

that are available for the LC slot.

Inside, the system has two SIMM slots, which can hold as much as 64 MB of DRAM (70 nanoseconds or faster) total. The unit



Boasting a spiffy new all-in-one design, the Power Macintosh 5200/75 LC is a complete multimedia machine that features an infrared remote control, a built-in microphone, and forward-facing speakers.

ships with 8 MB of RAM, and because this Power Mac uses a 32-bit memory bus, you can add SIMMs one at a time instead of in pairs. There's also a 256K second-level cache that helps boost performance to 6100/60 levels, even though the 75-MHz 603 chip runs slower than the 60-MHz 601. The 5200 has a 500-MB IDE hard drive, giving users more capacity than the 340-MB drive shipped in the 6100.

The experience of computing with this machine is a big improvement over using machines in the LC/Performa 5xx series. Sitting in front of the 5200, you notice how much difference the tilt and swivel base makes in finding the right setup. The

speakers sound better too, because they point directly at you.

Educators will be able to purchase the Power Mac 5200/75 LC from Apple for \$1,699. There's likely to be a Performa model come summer that will be several hundred dollars more but will have bundled software — even so, it will still be less expensive than the current Performa 6100/60.

LC 580. Apple has updated the most recent all-in-one model as the LC 580. It resembles the computers in the LC/Performa 5xx series but offers the same multimedia features as the 5200- and 630-series computers, including video input and so on. The main differences between this model and its predecessors are the multimedia slots, the 500-MB IDE hard drive, and the video-out port for connecting an external monitor. This model will be available direct to educators for \$1,199.

LC 630 DOS Compatible. Apple has integrated the DOS Compatibility Card for the 6100 into

a new configuration of the 630, available now as the LC 630 DOS Compatible. All the features from the DOS Compatibility Card are here, including the 66-MHz 486DX2 chip, DOS 6.2 and Windows 3.1 software, SoundBlaster 16 support, and networking connectivity. The only hardware difference is that this DOS Compatibility Card lacks an external video connector, plugging instead directly in to the 630's video system — you switch to the DOS/Windows environment by using a hot key. The LC 630 DOS Compatible is available for \$1,899 to educators; a mass-market Performa model will follow at a slightly higher price. 800-776-2333 or 408-996-1010. / Sean J. Safreed

DIGITAL CAMERAS /

Point, Shoot, Click

Apple, Kodak digital cameras aim for mainstream.

THE NEXT GENERATION of low-cost digital cameras aimed squarely at the consumer market is here, with the introduction of the Apple QuickTake 150 and Kodak Digital Camera 40. Like Apple's earlier QuickTake 100, both 24-bit cameras are based on the

or 100 images with flash and downloading. A limitation of the earlier model was its inability to shoot close-ups. The QuickTake 150 ships with a snap-on close-up lens for taking pictures from 8 to 14 inches away.

The QuickTake 150 comes with the QuickTake Image Access control panel, for downloading images to the Mac, and Apple PhotoFlash 2.0 image-editing software, which includes scripts for lightening or darkening images. 800-776-2333 or 408-996-1010.

Kodak Digital Camera 40. Kodak's first consumer digital camera costs more than Apple's, but it offers more

too. The top resolution of the \$995 DC 40 is 756 x 504 pixels, almost 20 percent higher than the QuickTake 150's. In 4 MB of RAM, it stores 99 "snapshot" images at 378 x 256 pixels or 48 high-quality images. Its battery life is longer too: Shoot as many as 500 snapshots with four AA lithium batteries. The DC 40's case has a more substantial feel, with rugged plastic and rubberized finger grips.

Unlike the QuickTake 150, the DC 40 accepts a variety of lenses, such as the wide-angle, telephoto, and close-up lenses found on video cameras — they screw into an existing lens mount and are sold separately, from vendors such as Tiffen. Built-in exposure compensation (one f-stop) lets you adjust for badly lit situations. The DC 40 ships with PictureWorks' PhotoEnhancer image-editing software. 800-235-6325 or 716-724-4000. / Pamela Pfiffner

same core Kodak technology designed to mimic today's point-and-shoot cameras, with a focus range of 4 feet or greater (roughly equivalent to a 50mm lens), an aperture range from f2.8 to f16, shutter speeds of 1/30 second to 1/175, and a flash that operates from 4 to 8 feet. The difference is in the details.

Apple QuickTake 150. Apple's new camera boasts several improvements over the QuickTake 100, although the price remains the same, at \$749. The resolution of the new QuickTake's standard-quality images has doubled to 640 x 480 pixels, the same as that of the new camera's high-quality images. The QuickTake 150 can also store twice as many images in its 1-MB flash RAM — 16 high-quality or 32 standard images. Battery life has doubled too: With a set of three AA lithium batteries, you can take 200 images,



UTILITIES /

Conflict Kibosh

ALL THOSE EXTENSIONS and control panels make your Mac unique, but keeping them in check is nearly impossible. Enter Casady & Greene's Conflict Catcher 3, a new version of the venerable extension manager that puts you in charge of your System Folder.

Startup Skinny. Conflict Catcher can display the name and icon of every startup item as it loads, so you can monitor what's happening during launch. In the Conflict Catcher window, clicking on any startup item shows you how much RAM it uses. For some extensions (including all of Apple's system-software extensions), Conflict Catcher also tells you what purpose it serves, so you can determine if you really need a given extension.

Control Freak. Conflict Catcher doesn't limit itself to controlling startup items. You can customize the utility to enable or disable fonts, Apple Menu items, or any other types. In addition, it lets you distinguish file types by assigning them unique colors so you can always tell them apart.

Conflict Catcher 3 also has new list-sorting features; the ability to scan for damaged startup files; and an "intuition" feature, which speeds the isolation of conflicts between extensions by allowing you to suggest what the most likely culprits are. \$100. 408-484-9228. / Jason Snell



MACUSER/ZMAC UTILITY OF THE MONTH



Grab a Graphic

EVERYONE LOVES SCREEN SHOTS, but the Mac's traditional screen-capture feature is a minimalist affair. This month's utility, ZMac's PIXs, is a snazzy control panel that makes it a snap to grab just the portion of the screen you want and store it in any way you like. You can save screen shots to disk, place them on the Clipboard or in the Scrapbook, or print them out; hide the cursor; take pictures with a time delay; grab only the frontmost window; or manually select the area of interest. Best of all, you can adjust all these settings on the fly. PIXs' Options dialog box pops up at the press of a hot key.

Created by Steve Kiene and Rod Magnuson, ZMac's PIXs is available exclusively from the ZiffNet/Mac service on CompuServe (GO ZMC:MACUSER), ZiffNet Selections on AppleLink, and ZiffNet/Mac services on eWorld (Shortcut: MacUser). / Mark Simmons

INTERNET /

Safe Surfing

THE INTERNET APPEALS to kids and adults alike, but sexually explicit material on the Net might make parents and schools wary about letting kids surf by themselves. WatchDog Software's tentatively named SurfWatch (\$50) is a password-protected control panel that eases adults' minds by blocking access to newsgroups and Web, ftp, and gopher sites containing adult material. A \$6-per-month subscription ensures that the list of offending sites is automatically kept up-to-date. 415-851-3366. / JS

PHOTOGRAPHY / GIAMPIERO BENVENUTI

POWER MAC UPDATE

PowerPC 603e Slated for New PowerBooks

Apple chooses revised chip for mobile Macs.

DO YOU LOVE the speed of your Power Mac but long to take it on the road? Apple has been patiently waiting for a redesign of the PowerPC 603 chip, called the 603e, to use in PowerPC-based PowerBooks. The company may deliver these systems soon after the 603e ships, near the end of summer.

With a smaller size and lower power consumption than the 601, the 603 chip is designed for mobile applications and low-power systems such as the new Power Mac

and more efficient, growing from 16K on the 603 to 32K on the 603e. It's also designed to run at 100 MHz, versus the 80-MHz speed of the original 603. These changes mean that the 603e outruns a 601 with the same clock speed — the 603e is about 14 percent faster. Estimated SPECint92 for the 603e is 120 versus the 601 at 105. Excellent processor speed means that when Apple's PowerPC PowerBooks do arrive, you won't have to compromise speed to achieve mobility.

Apple, IBM, and Motorola have also come up with a new variant of the PowerPC chip called the 602. Aimed at the PDA and game markets and initially destined for use in game machines from 3DO, the 602 offers fast integer multiplication and better handling

of logarithms, two types of operations commonly in need of acceleration in PDAs and game systems. Overall, the 66-MHz 602 provides about half the speed of the 66-MHz 601. IBM, 708-296-9332; Motorola, 512-343-8940. / Sean J. Safreed

Highway Patrol / PowerPC chips to break current speed limits

Processor	Current SPECint 92	Current SPECfp 92	Expected SPECint 92	Expected SPECfp 92
PowerPC 601	105	125	125	150
PowerPC 602	40	not available	50	not available
PowerPC 603e	120	105	160	140
PowerPC 604	160	165	225	250
PowerPC 620	225	300	330	410

The table shows the current and expected SPECmark and promised ratings of relative speed for the PowerPC line of processors. In most cases, the number is an estimated SPECmark rating of integer- and floating-point-processor speed, for comparison only.

5200/75 LC. However, these traits can hinder speed. Reportedly, Apple's 68040 emulator runs slowly on the 603.

The 603e eliminates the speed limitations of the 603, through several enhancements. The Level 1 cache is double the size

IBM and Motorola Promise Faster PowerPC Chips

NOT WANTING TO FALL BEHIND in the race for the fastest chips, IBM and Motorola have announced performance targets for the entire line of PowerPC processors. These speed-bumped chips will either be sampling or in production by the end of 1995. The bottom line is that you will be able to buy even faster PowerPC machines early in 1996.

The 601 will be 20 percent faster, most likely due to a 120-MHz clock speed. The recently announced 602 will also get a 20-percent speed bump.

The midline processors will really start to cook, with much faster clock speeds. The 604 will likely get a 50-percent speed improvement from a boost in clock speed, currently at 100 MHz, to 150 MHz. The 603e will get a 33-percent boost by the end of 1995.

At the top of the line, IBM and Motorola are determined to make the 620 more competitive with other high-end RISC processors and are thus promising a 50-percent speed boost, although since the chip is only at the sampling stage now, the faster version is not likely to appear until well into 1996. IBM, 708-296-9332; Motorola, 512-343-8940. / SJS

SYSTEM SOFTWARE /

Coralling Copland

DRAMATIC CHANGES are coming to the Mac OS in Apple's next OS version, code-named Copland. Sweeping changes will happen both under the hood — with a new microkernel-based system — and through user-interface changes that will offer more-productive ways to work and a more personal environment.

To deliver dramatically better speed, Apple is rearchitecting the system. First, Copland will be 95 percent PowerPC-native code. Features such as memory protection, a microkernel architecture, preemptive multitasking will finally make their way into the Mac OS. Because of these enhancements and a multithreaded Finder, users will be able to copy files to multiple destinations and launch multiple applications all at the same time. A new file system will allow volumes to be as large as 256 terabytes (256,000 gigabytes!) and files to be as large as 2 GB. Multimedia developers and graphics professionals can finally count on system software that doesn't impose limitations.

Apple isn't just souping up the system software — it wants it to be more useful for novices and power users alike. Copland promises to have Finder enhancements that offer better ways to manage files than using the traditional files-and-folders metaphor. AppleScript can help you automate some tasks, but Copland promises to take task automation a step further by providing active assistance. For instance, if you always switch printers when printing from Photoshop, the system can just do it for you, eliminating tedious mouse clicks and thus saving you time.

Not only will the system be more intelligent but it will also be more personal. A new feature will allow you to customize the appearance of many items, such as buttons, windows, and desktop backgrounds.

All these changes will result in some conflicts with current software. Major business applications such as Microsoft Office and Adobe PageMaker should work fine, but architectural changes mean that extensions and drivers must be updated to work under Copland. Thankfully, a new component called the Patch Manager will manage extensions, virtually eliminating the conflicts that are all too frequent in System 7 and making the Mac OS much more stable.

Unfortunately, all these changes take time. Copland will probably go into beta testing by fall and will ship around mid-1996. / SJS



PRINTERS /

It's Black and White and Read All Over

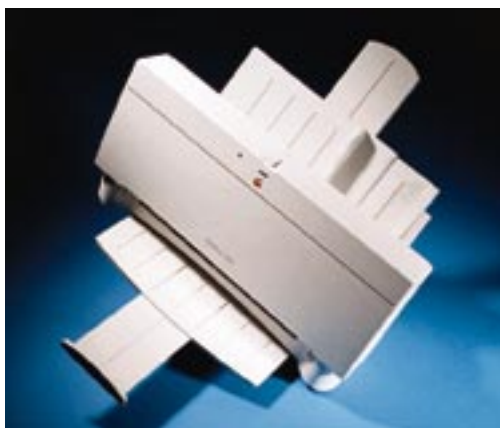
Apple's new StyleWriter fills the laser gap.

NOT EVERYONE NEEDS COLOR, especially if the bulk of their work tends to be text. For those who can't afford to purchase a laser printer, Apple, with its new StyleWriter 1200, thinks inkjet technology can fill the quality gap.

Priced at about \$249, the StyleWriter 1200, which replaces the StyleWriter II, provides printing with a resolution of up to 720 x 360 dpi. This high-quality mode smoothes black edges for crisper printing of text and line art. The StyleWriter 1200 is faster than its predecessor too, clocking 3 ppm for normal resolution and 1.5 ppm in high-quality mode. (With its PowerPC-native driver, processing times can be up to three times as fast on Power Macs.) In its normal 360-x-360-dpi mode, it can also print gray-scale images with scatter halftoning. It accepts up to 100 sheets of paper or 15 envelopes at a time.

Because the StyleWriter 1200 targets small-office and home users, Apple focused on ease-of-use enhancements. For instance, there's no power switch. The printer

automatically senses when a job is being sent and powers on accordingly, subsequently shutting down after a five-minute period of inactivity. The printer ships with Apple's new PrintMonitor, which incorporates drag-and-drop printing on the desktop, a productivity-enhancing feature that's



found in QuickDraw GX (QuickDraw GX additionally ships with the printer). The StyleWriter 1200's driver lets you print two or four thumbnails per page and print watermarks with eight options. The unit ships with 64 TrueType fonts. 800-776-2333 or 408-996-1010. / Pamela Pffiffer

QMS Lowers the Boom on Color Lasers

SEEKING TO UNDERCUT the competition in an increasingly heated market, QMS is selling a pared-down version of its color laser printer for \$5,000, several thousand dollars less than rival products.

Like QMS' earlier magicolor models, the magicolor LX offers color printing at resolutions of up to 600 x 600 dpi. Out of the box with 12 MB of RAM, the unit achieves 300-x-300-dpi color and 600-x-600-dpi monochrome print output. A 24-MB configuration that is able to print color at full



resolution costs \$5,699. The Hitachi engine is rated to produce monochrome pages at 12 ppm, spot-color pages at 6 ppm, and four-color pages at 3 ppm — all at 600 dpi.

To achieve a low price point, QMS decreased the number of fonts to 39 from 64, trimmed manufacturing costs of the logic board, and made other cost reductions. LocalTalk and parallel ports are standard; QMS' CrownNet cards provide Ethernet and token-ring connections (\$995 each).

Later this year, QMS will ship a hardware option for the printer (\$1,500) that lets the printer double as a short-run copier. 334-633-4300. / PP

Apple's New Spin on CD-ROMs

TWICE AS FAST for the same price as the old model: That's how Apple describes its new quad-speed CD-ROM drive. The AppleCD 600e (\$349) is available as an external unit as of May. More important, this speedy drive is the model that will be built in to new CD-ready Macs and Power Macs, starting this summer.



The AppleCD 600e, which is based on a mechanism from Matsushita, offers a short access time of 167.5 milliseconds as well as data-transfer rates of 5.1 MB per second, thanks to its 256K cache and SCSI-2 interface.

The external case is the same as that of the drive's predecessor. The front panel sports a headphone jack, volume control, disc indicator, and eject button. Like the earlier double-speed player it replaces, the 600e is front-tray loading, so it doesn't use a disc caddy. RCA jacks let you hook up audio speakers as well.

In addition to shipping with the appropriate drivers, the player comes with the latest version of QuickTime, which includes the VR extension. 800-776-2333 or 408-996-1010. / PP

CD-ROMS /

Teen Dreams

AH, YOUTH. Whether you're today's teenager steering your way through life or yesterday's flower child blowing in the wind, you'll want to check out these CD-ROMs.

Choosing Success. Teens today have it tough. This 16-CD educational program uses MTV-style presentation to portray real-life situations played out by a multicultural cast of young people. Acting as reporters for the fictional TV20, students investigate options available to characters and offer solutions to a myriad of problems that include drug addiction, sexual pressures, parental abuse, and HIV. Computer Curriculum. Institutional sales only. 800-227-8324 or 408-541-3722.

License to Drive. If you need to practice your freeway-merge technique but don't want to subject yourself to the indignity of a Student Driver sign atop your car, take heart: This CD-ROM features animated driving scenes, true-to-life sound effects, and game playing to help neophytes (and veterans) become better drivers. Give *this* to your cabbie instead of a fiver. Janus Interactive. \$90. 800-766-0835 or 503-629-0587.

MULTIMEDIA /

Behavior Modification

New mFactory authoring tool is fast, flexible.

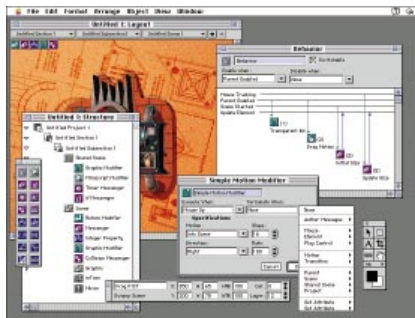
OBJECT-ORIENTED multimedia authoring systems are a reality this year: The long-awaited ScriptX finally shipped, and now mTropolis, a new professional package from startup company mFactory, promises to steal some of its thunder.

mTropolis, the first in what mFactory says will be a line of multimedia products, provides a flexible programming interface with compact data structures. The program is based on a technology called mFusion, in which objects placed in frames are given modifiers, or behaviors, such as motion. Behaviors can be copied or moved from one object to another, via drag-and-drop. Multiple modifiers can be assigned to an object

for more-sophisticated behavior. Objects can also send messages to each other to create a series of interactions. Once a modifier has been assigned, developers can instantly preview projects in progress.

Because mTropolis is component-based, title developers can share prebuilt objects and behaviors, by placing them on a central server, for example. The architecture is extensible, so other developers can plug in components.

The mTropolis editing environment is available for Macs and Power Macs at present. Developers can distribute Mac,



Power Mac, and Windows 3.1 players free of charge with mTropolis projects. \$4,995. 415-548-0600. / Pamela Pfiffner

Groove Thing. Gotta dance? Get the effect of a real rave without leaving your house, with Groove Thing, from Big Top Productions. Choose your tunes (Nature? Zen Riff? High Pulse?), line weight, kaleidoscope vision, and color palette to see a sound-and-light show evolve right on your Mac. Don't forget to plug in the lava lamp. \$45. 800-900-7529 or 415-978-5363.

Bob Dylan: Highway 61 Interactive. If today's tunes leave you cold, set aside a few dozen hours to traverse Highway 61 with Bob Dylan. Amble up a Greenwich Village street, and check out the coffeehouse where Dylan got his start. Enter Columbia Studios circa 1965 to hear Dylan record "Like a Rolling Stone." Go backstage at his 30th Anniversary



Tribute concert to listen to anecdotes about the legendary singer/songwriter from Eric Clapton and others. Lots of tunes, lyrics, photos, and album covers. The times they are a-changin'. Graphix Zone. \$60. 800-828-3838 or 714-833-3838. / Kristin Balleisen

PRESENTATIONS /

Build Your Own Photo CD Discs

PHOTO CD TECHNOLOGY has found its niche in the publishing market, but Eastman Kodak has bigger plans for this CD-ROM-based strategy for storing and distributing photographs — interactive presentations, for example. With the release of Kodak's Build-It software for the Macintosh, using Photo CD may become the preferred method for boardroom sales pitches.

Previously available only for UNIX systems, Build-It brings Photo CD authoring to the Mac. Instead of relying on a photo shop to write Photo CD images to disc, Mac users can create their own Photo CD discs by writing presentations to disc in the Photo CD Portfolio format, which supports text, sound, and branching as well as graphics. Linear presentations can be created with Kodak's Create-It software or third-party packages and exported into Build-It as PICT files. Interactive branching can be added with Kodak's Arrange-It multimedia authoring software.

Build-It writes data as Photo CD Image Pacs, from which users select one of five resolutions.



INPUT DEVICES /

Fingertip Control

TRACKPADS AREN'T ONLY for PowerBook 500-series owners anymore. Now any Mac user can use a mouse that works if you simply drag your finger over a flat surface. MicroQue's QuePoint Desktop is a trackpad sized for desktop Macs — with its 3-x-2-inch surface, it's just right for users who have a lot of screen real estate to cover.



The QuePoint Desktop also sports five programmable buttons, including the trackpad surface itself. Button clicks and pad taps can be assigned equivalents such as double-click, click-and-drag, cut, paste, and even triple-click. And at \$99, it's priced to compete directly with its more common mouse and trackball cousins. 801-263-1883. / Nancy Peterson

BUSINESS TOOLS /

Cutting Card Clutter

THE GREAT VOID of your desk drawer doesn't have to be the place where business cards go to die. Biz Card Manager (\$350), a package featuring an 8-bit card scanner, OCR software, and a database, gives you direct access to all those cards without tedious data entry.

Scan a card, and the data is automatically loaded into Biz Card Manager's database, where you can make tweaks as needed or even export the new information directly to your PIM (the software supports a variety of popular formats). A batch-processing feature lets you scan bunches of cards and edit them later, and the scanning software autostraightens any cards entered sideways or at an angle. Because each card is stored as an image file, you can quickly refer to the original if the database doesn't have all the information you need. Electronic Document Technology. 408-992-0503. / Patty Ames

The software supports the ISO 9660 standard. Presentations can be written to disc with a Photo CD-compatible recorder or saved as an Image Pac to a hard disk. Build-It is also suitable for graphic artists for image archiving on CD-ROM.

The Mac 68040 version is available now for \$995; Power Mac and Windows NT versions are due in May. Kodak sells a special bundle that includes Build-It and Arrange-It software and the Kodak PCD Writer 225 CD-ROM recorder, SCSI card, and cables for \$4,995. 800-235-6325 or 716-724-4000. / PP

NEW & NOTABLE

HARDWARE /

Sony GWM-3000. ▶

Sporting an aspect ratio of 16:9 — more like that of a movie screen or a high-definition TV than that of a traditional monitor — this Trinitron monitor is targeted at graphic artists, designers, digital-video producers, and anyone else needing a wide horizontal view. It offers a screen area of 23.6 inches wide by 13.3 inches high, with a noninterlaced resolution of 1,920 x 1,080 pixels. \$21,900. 800-352-7669.



Tamron Fotovix IIIs-D. A versatile image-input device, the Fotovix IIIs-D can capture images in 24-bit color at resolutions up to 640 x 480 pixels. Primarily a slide and film scanner, its camera can also scan flat art and small objects. Video-input ports make the Fotovix IIIs-D capable of capturing video images from VCRs and video cameras. \$2,300. 516-484-8880.

Silicon Valley Bus Co. MultiPort. Add-ons such as Connectix's QuickCam and Visioneer's PaperPort vie with modems and LocalTalk connectors for your Mac's two serial ports, but this box allows numerous devices to coexist. The MultiPort plugs in to your Mac's serial ports and ADB and allows you to connect as many as six serial devices and five ADB devices. An AppleScriptable application lets you choose which devices you want to use. \$229. 800-775-0555 or 408-623-2300.

GCC Elite XL608 and XL808. Printing edge-to-edge on paper sizes up to 11 x 17 inches, these monochrome printers employ Phoenix-PagePostScript Level 2 emulation. The Elite XL608 (\$2,599) ships with 6 MB of RAM and prints at 600 x 600 dpi; the Elite XL808 (\$3,799) ships with 12 MB of RAM and GCC's AccuGray enhancement technology and features a top resolution of 800 x 800 dpi. LocalTalk, serial, and parallel ports are standard; an Ethernet card (\$329) is optional. 617-275-5800.

Sampo AlphaScan SV KM-400. This low-cost 14-inch monitor (with an active display area of 13.3 inches) offers resolutions up to 832 x 624 pixels. \$269. 404-449-6220.

Datadesk TrackBoard. The TrackBoard combines an extended keyboard with a three-button built-in trackball, all in a compact, color-coded design. The keyboard (which doesn't include a numeric keypad, although one will be offered separately) is topped by 15 rounded function keys. \$180. 206-842-5480.

SOFTWARE /

OptiMem RAM Charger. Compatible with Connectix's RAM Doubler, this memory-management utility frees up RAM by allocating it to applications as they need it rather than allocating a fixed amount on launch. New features include automatic configuration for popular applications, fine-tuning controls for power users, and a window with up-to-date information about your Mac's memory status. \$60.

Jump Development. 412-681-2692.

TransJammer. A collection of plug-ins for Adobe Premiere, TransJammer offers 100 sophisticated transitional effects for digital-video creators. \$150. Elastic Reality. 608-273-6585.

CRUSH. Leveraging off the knowledge of marketer Regis McKenna, this multimedia CD-ROM is designed to provide feedback and competitive analysis to marketing and sales professionals. Charting tools let you analyze your field and generate strategic plans — all with the advice of a virtual Regis (but no Kathie Lee). \$500. Hands-On Technology. 415-579-7755.

Where in the World is Carmen Sandiego? Junior Detective Edition. The popular series of educational games targets a younger audience (ages 5 to 8) with this Junior Detective Edition CD-ROM. The disc puts an emphasis on pictures and sound cues, so that kids who can't read or are just learning to will be able to track archvillain Carmen Sandiego while learning about world geography and culture. \$40. Brøderbund. 415-382-4400.



◀ Underware 2.0. Version 2.0 of this set of screensavers, which lets you run animations on your desktop, is PowerPC-native. The package offers four-channel sound, a randomizer feature, and ten new modules ranging from the cute to the gross. \$30 (upgrade, \$20). Bit Jugglers. 415-968-3908.

Warner Bros. Screen Saver. Thufferin' Thuccotash! All your old favorites — from Bugs Bunny to Marvin the Martian — appear in 12 modules inspired by classic Looney Tunes cartoons. \$30. Berkeley Systems. 510-540-5535.

Inside the SAT. By running students through the paces of practice Scholastic Aptitude Tests, this package analyzes their skills and then provides information about how to attain the best possible score on the SAT. The program teaches students how to work every problem type they might see and also focuses on improving their test-taking technique. \$54. The Princeton Review. 212-874-8282.

MACINTOSH PRICE INDEX

THE UNITED COMPUTER EXCHANGE index reflects average selling prices of new and used Macs as of March 6, 1995. Prices (except those for compact models, Performas, and LCs) do not include a monitor or a keyboard. The United Computer Exchange is a national clearinghouse of used microcomputer equipment.

Mac Model	New	Used
SE/30 (5/40)		• \$550
Classic II (4/40)		• \$475
Color Classic (4/80)		• \$700
LC III (4/80)		• \$700
Performa 475 (4/160)	\$1,099	\$900
Performa 550 CD (5/160)	\$1,199	\$1,000
Performa 575 CD (5/250)	\$1,529	\$1,275
IIsi (5/40)		• \$400
IIci (5/80)		• \$650
IIfx (8/160)		• \$850
Quadra 605 (4/80)		• \$575
Quadra 610 (8/160)		• \$850
Quadra 630 (4/250)	\$1,029	\$875
Quadra 650 (8/230)		• \$1,700
Quadra 660Av CD (8/230)		• \$1,200
Quadra 700 (8/230)		• \$1,275
Quadra 800 (8/230)		• \$2,000
Quadra 840Av CD (8/230)		• \$2,400
Quadra 900 (8/230)		• \$1,700
Quadra 950 (8/230)		• \$2,400
Power Mac 6100/60 (8/250)		• \$1,000
Power Mac 6100/66 CD (8/350)	\$1,949	\$1,600
Power Mac 7100/66 (8/250)		• \$1,750
Power Mac 7100/80 CD (8/700)	\$3,149	\$2,800
Power Mac 8100/80 (8/250)		• \$2,700
Power Mac 8100/100 CD (16/1GB)	\$4,399	\$4,100
Power Mac 8100/110 CD (16/2GB)	\$6,299	\$5,800
PowerBook 145B (4/80)		• \$850
PowerBook 150 (4/120)	\$1,449	\$1,200
PowerBook 165 (4/80)		• \$1,350
PowerBook 165c (4/80)		• \$1,400
PowerBook 170 (4/40)		• \$1,250
PowerBook 180 (4/80)		• \$1,600
PowerBook 180c (4/80)		• \$1,900
PowerBook 520 (4/160)	\$1,899	\$1,675
PowerBook 520c (4/160)	\$2,399	\$2,150
PowerBook 540 (4/240)		• \$2,600
PowerBook 540c (4/320)	\$3,899	\$3,600
Duo 250 (4/200)		• \$1,475
Duo 270c (4/240)		• \$1,900
Duo 280 (12/240)		• \$2,750
Duo 280c (4/320)	\$3,599	\$2,900

• = discontinued model

For more pricing information on these and other models, call 800-755-3033 or 404-955-0569, or find it on ZiffNet/Mac, in Library 1 (Special Reports) of the MacUser Forum (GO ZMC:MACUSER). On AppleLink, look for it in ZiffNet Selections:MacUser Software:Reference. On eWorld, go to shortcut MACUSER, in MacUser Software Library:MacUser Special Files.

REVIEWS & Quick Clicks



VivaPress Professional / Page-layout challenger hindered by awkward interface and rough-edged tools.

THERE'S BEEN NO DRAMA on the page-layout-software scene for a while now, but a recently introduced program from Germany piqued our interest. For years, DTP titans PageMaker and QuarkXPress have been chewing up and spitting out any rival program that dared step into the limelight, so when Interpress Technologies debuted VivaPress Professional, we held our breath. Although we found that the program boasts several noteworthy features, it's seriously marred by an ill-conceived interface and several poorly implemented tools.

The Big Picture

VivaPress Pro takes the same frame-based approach to layout as QuarkXPress. You draw frames, called objects in VivaPress-speak, when you want to enter or import graphics and text (imports are courtesy of Claris' XTND technology). Unlike QuarkXPress, however, which makes you switch between separate tools for text and graphic frames, VivaPress Pro uses a single tool.

Once you've created an object frame, you assign it text, graphic, or picture attributes. The program is flexible in that it lets you change an object's attribute at any time. That's the good news. The bad news is that there's no easy way to access VivaPress Pro's object-creation tool — a key command or a toggle on the text palette that switched you to object mode would be a helpful addition.

VivaPress Pro's most powerful feature is the ability to create alias objects, which are great time-savers if you want to use recurring elements independent of master pages.

Similar to a Finder alias, an alias object serves as a pointer to an original text or graphic object. When you make a change to the original object, all the aliases change accordingly. Alias objects really shine when you use them with the program's spiffy Split command, which chops objects up into user-defined pieces. Each piece can be designated as an alias and linked to the current text chain.

We weren't as impressed with alias pages, VivaPress Pro's answer to master pages. A bug prevents you from deleting objects created on alias pages — to get rid of an object, you must first delete it from a document page and then remove it from the alias page.

One of the whizzier features in VivaPress Pro is the ability to add Bézier curves to irregularly shaped objects by holding down the Option key when you click on a selection point — a useful feature for creating custom text blocks, picture shapes, and simple graphic elements. You can also edit Adobe Illustrator and Macromedia FreeHand objects from within VivaPress Pro, although we found this feature buggy and slow, even when running the program native on a Power Mac.

VivaPress Pro's style sheets outclass the competitions' in several ways. The program lets you create style sheets for graphics as well as for text, and you can apply text style sheets to individual characters. Style sheets are only as good as a program's formatting features, however, and because VivaPress Pro's formatting suffers from several shortcomings, including the inability to apply rules to paragraphs, the style sheets suffer accordingly.

On the surface, VivaPress Pro's typographic controls seem robust, but closer scrutiny shows some limitations. The program has several typographic controls built in that PageMaker and QuarkXPress offer only through plug-in modules. For example, you can define tracking and kerning settings as document preferences. The tracking controls are much like PageMaker's, although you can specify only one track per font at five sizes whereas PageMaker lets you assign five tracks per font at

Reviews Rating Key

- ★★★★ Outstanding
- ★★★★ Very Good
- ★★★ Acceptable
- ★★ Poor
- ★ Seriously Flawed
- ★ Dangerous

any size. You can control kerning for individual letters, predefined pairs, or your own letter pairs. Kerning information is stored as preferences, however, so its usefulness is limited to VivaPress Pro documents. Oddly, VivaPress Pro lacks Manual kerning controls altogether.

The tab controls are infuriating, when they work. The tab ruler is blank — it has no numbers to help you set tabs. And although you can assign any number of tabs to a paragraph and edit them from a pop-up menu, there's no Apply button for previewing the effect. Moreover, some tabs simply disappeared when we edited a paragraph.

Compared with PageMaker's and QuarkXPress' jam-packed control palettes, VivaPress Pro's text control palette is too limited to serve as the command center for text operations. You use it to control font, size, style, alignment, color, and shade — all of which are governed by pop-up menus — as well as leading, space between paragraphs, horizontal scaling (no vertical), manual tracking (really range kerning), and left and right (no first line) paragraph indents.

One text feature we did like is VivaPress Pro's Drop Caps. Like its counterpart in QuarkXPress, VivaPress Pro's Drop Caps feature lets you specify a drop-cap depth in number of lines, but it adds the ability to specify how far the main-body text is to be offset from the drop cap — a nice touch.

Graphics Gripes

VivaPress Pro's graphics tools aren't as full-featured as its typographic tools. The program makes a distinction between graphic objects you create within VivaPress Pro and picture objects you import from other programs, although this distinction isn't documented. Picture objects can be TIFF, PICT, or EPS files, and the program links the original files to the layout. Importing files is cumbersome: You first create an object frame, identify it as being for a picture object, and select the object frame to make it active. The program then superimposes an annoying gray screen over the object-frame area.

Text wraps to the shape of the object frame, and as with PageMaker, irregular objects require a hand-tuned bounding box. Once you've imported a graphic as a picture object, the program automatically scales it to fit the object frame.



Style sheets that apply to both text and graphics are one of VivaPress Pro's strengths.



The Split command divides a VivaPress Pro object frame vertically and horizontally — each piece can be an alias linked to the current "text chain."

VivaPress Pro strives to position itself as a prepress tool. It supports the HSB, RGB, and CMYK color models as well as the HKS German printing standard. It also prints color separations and lets you specify trapping values for each color. Trapping options include Automatic, which relies on a preset algorithm; Manual, which calls up user-defined values; and Overprint, which prints one color on top of another.

Although VivaPress Pro has several impressive features, its inattention to detail is ultimately its Achilles' heel. For starters, the developers overlooked several interface-

design basics. When you create a document, for example, you can set global margins, columns, and gutters, but only if you opt to create an automatic text box, which automates text flow but constrains text placement. Without it, you get a completely blank page — no guides whatsoever. Rulers set to display both point and pica measurements display only points — and points are measured in 10-point increments, not in 12-point increments, which would at least hint at a pica rule. Moreover, any measurement entered in points strangely reverts to inches, and there's no movable 0 point, so you're left squinting at the screen, mentally calculating to position objects.

We also found the process of creating object frames clunky and time-consuming — too many steps are involved in creating an object frame, specifying its type, and clicking on it to make it active. Also, if you zoom in to a text block to make changes, the program will move you to another area in the text when the screen redraws, so you have to move back to your original edit point.

Finally, the VivaPress Pro manual is skimpy and riddled with errors. To learn more about alias pages, for instance, the Reference Manual points you to a nonexistent chapter in the User Manual. Menu names and keyboard shortcuts are inconsistent, and some passages are poorly translated from German.

The Bottom Line

VivaPress Pro not only has the feel of an unfinished product but in its attempt to surpass PageMaker and QuarkXPress, the program has ended up outfoxing itself by trying too hard to be different. Although there's a lot to like in VivaPress Pro, especially its alias-objects feature, the program desperately needs polish. We'll wait for the next version. / Pamela Pfiffner

VivaPress Professional 1.5

Rating:

Price: \$895 (list).

Pros: Alias objects provide a flexible way to update recurring elements.

Cons: Awkward interface and buggy features impede productivity.

Company: Interpress Technologies, New York, NY; 212-245-2700.

Reader Service: Circle #401.

Tektronix Phaser 340 / Tektronix breaks new ground in business color printing.

A NEW BREED of solid-ink printer, the Tektronix Phaser 340 outclasses rival print technologies in more ways than one. Fully configured and network-ready, the Phaser 340 costs thousands of dollars less than most desktop color laser printers while delivering comparable color-output quality for business charts and presentations. In addition, the Phaser 340 prints on plain paper and is faster at printing color documents than are color laser printers. And best of all, Tektronix's new printer is a breeze to set up and maintain, a big advantage over its color laser rivals.

Hot Wax

The Adobe PostScript Level 2 Phaser 340 is similar to its solid-ink cousin, the Phaser 300i, in that it uses sticks of colored wax for ink. Each stick (one each for cyan, magenta, yellow, and black) is rated for about 1,000 prints, according to the company. To print an image, the Phaser 340, which has a fixed print head, melts the wax and sprays the resulting ink onto a heated drum, which transfers the image to the page. The Phaser 300i, on the other hand, has a moving print head that applies ink directly to the page.

The Energy Star-compliant Phaser 340 can be configured in a variety of ways — we tested a fully loaded model priced at \$6,795 that supports 600-x-300-dpi printing and comes with 24 MB of RAM, 69 fonts, a parallel interface, and job pipelining (simultaneous processing and printing). We used Tektronix's optional \$595 Ethernet Phaser-Share card to connect the printer to our network.

We were impressed with how easy the Phaser 340 is to set up. You have only two

items to install — the wax sticks and a maintenance tray that collects drum oil and excess wax. A warm-up period of 15 minutes is required after the printer is turned on. One caveat: The warm-up uses ink, so it's wise to avoid turning the printer on and off frequently.

The Phaser 340 does a great job of printing on plain-old office copier paper; however, it's limited to printing on a single side of letter-sized paper. The printer comes standard with a 200-sheet paper tray; a \$95 175-sheet transparency tray and a \$495 500-sheet lower paper tray are optional. It also has a manual-feed tray that folds out from the side of the printer, but using it can be tricky. Printing transparencies with the manual tray caused the front panel to signal a paper jam, even though the printer in fact never jammed. If you plan to print lots of transparencies, we highly recommend that you get the optional transparency tray.

Another advantage of Tektronix's new printer is its relatively compact size. Measuring about 13 inches high, 16 inches wide, and 20 inches deep, the Phaser 340 is not nearly as bulky as the current crop of color laser and thermal-wax printers.

We were pleased with the printer's output quality and speed. Best suited for business graphics and presentations, the Phaser 340's output is characterized by vivid glossy color. Tektronix includes its proprietary Tekcolor color-correction software for matching colors to your display or to SWOP, commercial, and Euroscale press

standards. A halftoning algorithm ensures smooth blends between colors and allows the printer to do an acceptable job of printing scanned photographic images.

Although text printed at 300 dpi is somewhat jagged, you can easily improve the quality by printing at 600 x 300 dpi. The text isn't as sharp as that of the Phaser 540 (Tektronix's color laser printer), but it's adequate for business documents. Ink



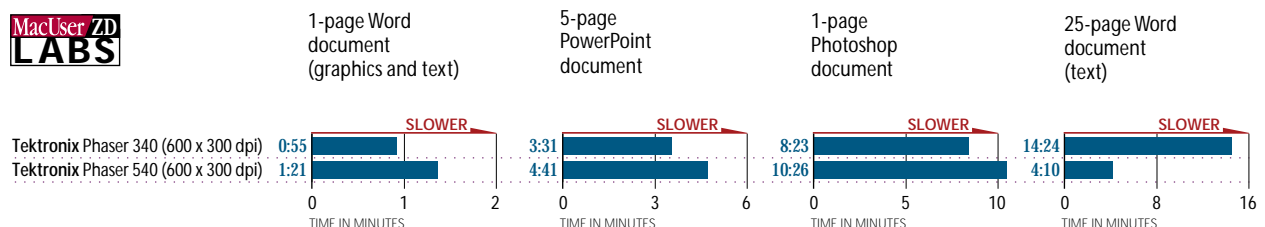
Faster and cheaper than its color-laser-printer rivals, the Tektronix Phaser 340 is a new kind of solid-ink printer that produces vivid color output for business documents.

durability is also acceptable, although it is possible to scratch and mar the Phaser 340's waxy output.

In our speed tests comparing the Phaser 340 with the Phaser 540 color laser printer (the fastest color laser printer we've tested), the Phaser 340's speedy engine and RIP enabled it to come out ahead of the color laser printer in all tests except one.

Overall, we rated the Phaser 340's 600-x-300-dpi color-printing speed at about 2 pages per minute. Printing a 1-page Microsoft Word document that combined text, a color pie chart, and a company logo, the Phaser 340 at 600 x 300 dpi breezed by the

Kinder, Faster Color Printing / solid-ink newcomer beats color laser printer



PHOTOGRAPHY / LEON

color laser printer, printing the document in 55 seconds, compared with 81 seconds for the laser printer. Printing ten copies of the same document closed the gap somewhat, but the Phaser 340 still beat the laser printer, taking about 20 seconds less.

The results of printing our 5-page PowerPoint test document, which incorporated color blends and a variety of colors, showed the Phaser 340 to be faster by a wide margin — it printed the document in about 3.5 minutes, compared to more than 4.5 minutes for the laser printer. Printing our 16-MB Photoshop document, the Phaser 340 at 600 x 300 dpi again bested the laser printer, taking 2 full minutes less.

To test each printer's engine speed, we printed a 25-page text document. Our results show clearly that if you intend to print lots of pages of black text, the Phaser 340 is probably not the best choice. At 300 dpi, the 12-ppm color laser printer completed its print job in a little more than 2 minutes, whereas the Phaser 340, rated at 4 ppm at 300 dpi, took more than 7 minutes. At 600 x 300 dpi, the Phaser 340 took more than 14 minutes, compared with about 4 minutes for the Phaser 540!

The Bottom Line

The Tektronix Phaser 340 dispels once and for all the idea that a high-end color printer has to be a nightmare to set up and maintain. Although it does have a few limitations — it prints on a single side of letter-sized paper only — it produces vivid color for charts and presentations and comes as close to the ideal all-purpose office printer as anything else we've seen so far (you'll still want to hang on to your monochrome laser printer for text-only documents, though).

/ Tony A. Bojorquez

Tektronix Phaser 340

Rating: **★★★★**

Price: \$6,795 (list).

Pros: Faster than printers using competing color technologies. Vibrant color output. Prints on plain paper. Simple to set up and maintain.

Cons: Single-side printing of letter-sized paper only. Slow at printing text-only documents.

Company: Tektronix, Wilsonville, OR; 800-835-6100 or 503-682-7377.

Reader Service: Circle #402.

EA Research EAsycolor 24/1360 and Radius Thunder IV GX•1360 / Graphics cards for pros.

DTP PROFESSIONALS looking for a way to run applications faster and at higher resolutions than with their Mac's built-in video would do well to consider getting the Radius Thunder IV GX•1360 or the EA Research EAsycolor 24/1360 graphics card. Our tests showed that the Thunder IV card delivered lots more bang for the buck in terms of performance and productivity-enhancing utilities than the EAsycolor card, although at \$2,999, it costs more than \$1,000 more.

Accelerated Graphics

The EAsycolor and the Thunder IV are VRAM-based 7-inch NuBus cards compact enough to fit into any NuBus Mac. Each card accelerates 24-bit graphics on a range of monitor sizes, from 13 to 21 inches. The Thunder IV (with 6 MB of VRAM on the card) supports a higher maximum resolution than the EAsycolor (with 8 MB of VRAM) but at a lower bit depth — 1,600 x 1,200 pixels in 8-bit mode for the Thunder IV and 1,380 x 1,040 pixels in 24-bit mode for the EAsycolor.

Although the cards accelerate QuickDraw graphics in general — which means applications such as Adobe Illustrator and

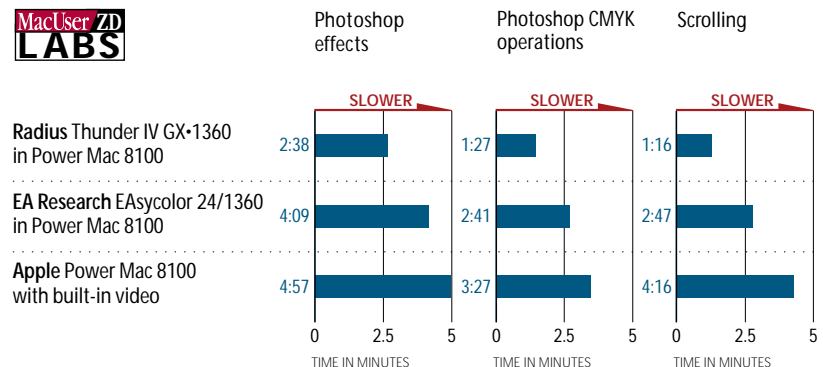
QuarkXPress run faster — each card additionally comes with Adobe Photoshop-specific accelerators.

The Thunder IV uses a Radius PhotoEngine daughterboard containing four DSPs to accelerate 22 Photoshop functions and 2 Photoshop mode conversions (CMYK and Lab). The EAsycolor is driven by a RISC processor and accelerates 9 Photoshop functions and 1 Photoshop mode conversion (CMYK). Each card is Power Mac-compatible, although our tests showed that the Thunder IV accelerates Photoshop mode conversions for 680x0-based Macs only. Check before you buy, to make sure the card you pick accelerates the Photoshop functions you use most often.

An advantage of the Thunder IV card is the utilities you get with it: Dynamic-Desktop provides user-changeable hot keys for switching resolutions and bit depths on the fly as well as for panning and zooming; ColorComposer software helps you match colors of images on-screen to those of your printer output. The EAsycolor card comes with two simple utilities: a control panel for on-the-fly resolution and bit-depth switching and a gamma-correction control via the Monitors control panel.

Pedal to the Metal / new cards accelerate 24-bit graphics

Production environments that use Adobe Photoshop can save time and money with a speed-boosting graphics card. In our tests, with the cards installed in a Power Mac 8100/80, the Radius Thunder IV GX•1360 provided a far greater speed boost than the EA Research EAsycolor 24/1360.



Off to the Races


To test the speed boost the cards provide, we installed them in a Power Mac 8100/80 and ran two sets of tests, using Adobe Photoshop 3.0.1. For one set, we ran a series of effects (Unsharp Mask, Gaussian Blur, and Resize), and for the other, we performed CMYK operations (RGB-to-CMYK conversion and a CMYK scroll). We also tested scrolling speed with Photoshop and Microsoft Word 5.1. We compared the results of using each card at 1,152 x 870 pixels in 24-bit mode to those we obtained with the Power Mac 8100's video card (with the same resolution and bit depth).

Our tests showed that the Thunder IV card slashed the amount of time the system required for Photoshop effects by about one-half; the results were even more impressive for CMYK and scrolling operations. The EAsycolor card provided a much less significant speed boost: It reduced the time required for our test operations by about one-fifth to one-third, depending on the operation.

The Bottom Line

The Thunder IV graphics card may be pricey, but if you do production-level work in Photoshop, the investment will quickly pay for itself in time saved. If the Radius card is too much for your budget, you can still enhance productivity by getting the EA Research EAsycolor card. / Alex Ho

EA Research EAsycolor 24/1360

Rating: 

Price: \$1,699 (list).

Pros: Low cost.

Cons: Lackluster speed gains. Accelerates fewer Photoshop functions than the Thunder IV.

Company: EA Research, San Ramon, CA; 800-681-6566 or 510-867-0967.

Reader Service: Circle #404.

Radius Thunder IV GX-1360

Rating: 

Price: \$2,999 (list).

Pros: Provides excellent speed boost. Superb software utilities.

Cons: Pricey. Photoshop RGB-to-CMYK-mode conversions not accelerated on Power Macs.

Company: Radius, Sunnyvale, CA; 800-227-2795 or 408-541-6100.

Reader Service: Circle #403.

PhonePro 1.5 / Let your Mac answer the phone, forward voice-mail, and fulfill orders.

WITH A HIGH-END voice/data/fax modem and a Mac II or better, you can create your own voice-mail system, using Cypress Research's PhonePro 1.5, whether what you need is a simple answering machine, a fax-on-demand system, or a complex auto-attendant voice-mail system with e-mail integration.

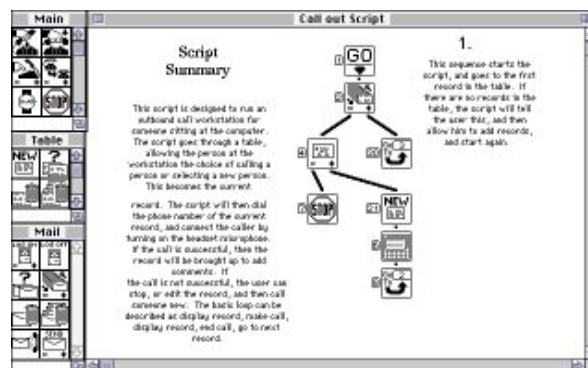
No Programming Required

Unlike the disappointing 1992 debut version of PhonePro, which required a working knowledge of the BASIC programming language, this version comes with several scripts, including ones that turn your Mac and modem into either a digital answering service, an electronic bulletin board, or a call-forwarding service. If you buy Cypress Research's optional FaxPro II software, you can use a script for a fax-back system that gives callers a choice of topics from a touch-tone menu and sends them a fax on that topic to the fax number they've specified.

Additionally, this version is no longer bundled with an expensive modem. It works with almost any voice/data/fax modem such as the Intertex IX33-EV or the Supra SupraFAXModem v.32bis. If you want better audio quality than a voice modem can give you, you can opt for PhonePro DS, a bundle that combines the PhonePro software with Pleiades Research's Digital Storefront phone-line-interface hardware. In addition to providing better audio quality, the Digital Storefront also gives you multiuser voice-mail and call forwarding if you have a basic three-way-calling phone service or an analog connection to a local PBX. On the Power Mac 7100/66AV and 8100/80AV, PhonePro 1.5 worked well with all the hardware with which we tested it, although the Intertex modem, which was a prototype, required us to fiddle with the setup.

To create your own voice-mail system with the PhonePro software, you simply create a flowchart in a scripting window, using icons (most of which are self-explanatory, such as Pick Up Phone and Transfer Call). It can take some time to

master PhonePro's graphical scripting language, but you can easily cannibalize the prewritten scripts, such as the easy-to-comprehend ones for turning your Mac into a digital answering machine, automated voice-mail system, or electronic bulletin-board system. Each script comes with gen-



Customize PhonePro's well-annotated sample scripts to create your own automated voice-mail system, using your Mac and a modem.

erous annotations to help you understand it and customize it for your needs, and the well-indexed manual identifies each icon and avoids overly technical terminology.

Unlimited Calling

You can create almost any imaginable phone application with PhonePro—and we used quite a bit of imagination in an attempt to push the program to its limits. PhonePro takes advantage of almost any telephony technology your phone company can offer you. For instance, the Detect Rings icon can wait for Caller ID to identify the source of a call—if you use PhonePro with an invoicing program or a customer-service database, this can let you simplify order entry and streamline customer service.

PhonePro stores sound, text, and data in a fast multiformat database, from which you can easily import and export information to other Macs or to PCs. In fact, icons such as Log On Mail Server and Send Mail Message let you integrate PhonePro with Microsoft Mail, CE Software's QuickMail, and AppleMail, which you can use as well as PhonePro's own mail system to forward

messages to anyone with e-mail access.

Because this version of PhonePro is better integrated with the Mac's operating system, it can use Apple events, which is great for incorporating PhonePro into other applications. For instance, you might create a PhonePro script that takes orders over the phone from established customers. PhonePro can drop these orders into a FileMaker Pro database. As the orders mount up, FileMaker Pro can use PhonePro to send a message to your supplier. Some applications have too many quirks with Apple events to

make using it worthwhile, but PhonePro worked seamlessly with it during our tests. If you're up to using AppleScript, you can create some powerful automated sales, order-fulfillment, inventory-control, and customer-service voice-mail systems.

The Bottom Line

PhonePro does away with the need for expensive PBX or dedicated phone-switch hardware and takes advantage of the hardware you already have. But if you just need an answering machine or an answering service for home or office use, you should buy one. You don't want to mess around with programming PhonePro scripts, nor will you want to tie your phone to your Macintosh. However, if you own a company that's small enough to need a receptionist but not large enough to afford one, PhonePro will help you discover new ways to extend your business. / Don Crabb

PhonePro 1.5

Rating: 

Price: 349; with Pleiades Research's Digital Storefront phone-line-interface hardware, \$849 (list).

Pros: Includes good scripts. Easy to set up and use. Apple events-savvy.

Cons: May require additional software and hardware. Sophisticated PhonePro applications require AppleScript, Macintosh Telephone Manager, and PowerTalk expertise.

Company: Cypress Research, Sunnyvale, CA; 408-752-2700.

Reader Service: Circle #421.

AppleSearch / The latest version of Apple's information-retrieval tool makes a great Internet clipping service.

PROVIDING ACCESS TO Internet databases is the latest feather in its cap for AppleSearch, Apple's document-archiving and -retrieval software. AppleSearch stands out for its ease of setup and use, and it can be an indispensable tool if your organization requires fast and frequent access to reams of internal electronic documents — forms, policies, procedures, and the like. The new Internet connection extends the

recommends that you have 2.5 times the disk space of the documents you're indexing). Index creation is a rather slow process and can severely affect users trying to access the server. Fortunately, you can schedule indexing to occur in off-hours. We'd like to see AppleSearch gain the ability to update indexes automatically as new documents are added to the server.

Users will find the AppleSearch client software as easy to use as administrators find the administrator program. You begin by selecting one or more Info Sources on the server and creating a reporter (Apple's moniker for a search agent) that contains the keywords that define the search. AppleSearch supports Boolean logic (use of AND and OR parameters) for its searches.

Reporters initiate searches on the server, which matches search words against the textual content of the Info Source documents. Results are presented to users as a list of document titles ranked in order of relevance, determined by how well each document answers a search request. Users can then choose to view an entire document or have it copied to their hard disk.

A particularly nice feature is the ability to save a reporter you use frequently and schedule it to initiate searches that retrieve only new or modified documents. The results are delivered to your Macintosh automatically, at a time and date you specify, as an Update document.

WAIS and Means

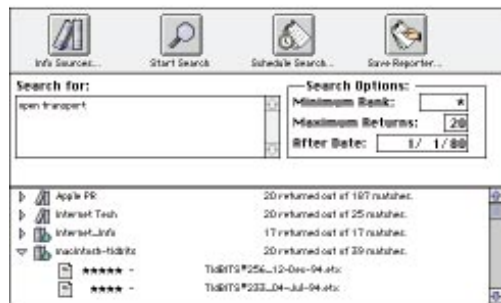
With an IP address and access to the Internet, an AppleSearch server can also be used for searching Wide Area Information Server (WAIS) databases, which store documents on a dizzying variety of topics (federal legislation, Mac news, literary works, and so on). To set up access to a WAIS database, an administrator uses AppleSearch to scan the Internet for servers and retrieves an alphabetical list. To give access to the WAIS databases to users on the

network, the administrator makes the databases available as AppleSearch Info Sources. The one drawback is that administrators can't search or print the long list of databases. To find the ones they want, they must scroll through the list or know the title of a specific database in order to locate it quickly.

For users who already have Internet access, AppleSearch isn't the best tool for searching out WAIS databases (we recommend WAIS client software such as EInet's MacWAIS, which handles multilayered searches with ease). Many WAIS servers actually point to other servers, rather than directly to WAIS information, so users can't search the servers unless administrators make them available over the network. However, AppleSearch is a good choice if many of the users on your network don't have Internet access and you're an administrator who wants to keep the number of available WAIS databases manageable.

The Bottom Line

AppleSearch may not be the best software for you if you need to search very large documents that must be transferred over a network before you can work with them. It's also not a good choice for those who want to perform dynamic WAIS searches. But AppleSearch does a good job of integrating local and WAIS-based document searches for network users who don't have access to the Internet. Its ability to perform user-scheduled searches for new or modified documents makes it an especially good tool for organizations maintaining document databases that change frequently. Last but not far from least, AppleSearch's well-designed client interface and simple administration make the software a pleasure to use. / Shelly Brisbin



Deceptively simple, AppleSearch's interface provides powerful tools for searching document databases.

powerful search capabilities of AppleSearch to external information resources.

The Search Is On

AppleSearch consists of server and client software. The server software can run under AppleShare or file sharing and requires a 68040 Mac or Power Mac (the software is not PowerPC-native). For network administrators, configuring an AppleSearch server is a no-brainer. Once you've loaded folders of documents onto the server and designated them as shared volumes (called Info Sources), AppleSearch creates indexes for each Info Source and uses them to retrieve documents based on user-specified search criteria.

Using Claris XTND and DataViz translators, AppleSearch works with a variety of document formats. If it finds a document for which there is no XTND translator on the server, it won't index the document and it will make a note in the server's log.

Indexes contain every significant word in an Info Source, which makes for speedy full-text searches but which also requires lots of free disk space for the indexes (Apple

AppleSearch 1.5

Rating:

Price: Server software and unlimited number of clients, \$1,799 (list).

Pros: Simple to use and administer. Supports a variety of document formats.

Cons: Locating specific WAIS databases is difficult. Initial indexing is slow. Not PowerPC-native.

Company: Apple Computer, Cupertino, CA; 800-862-3385 or 408-996-1010.

Reader Service: Circle #405.

mPower / Simple-to-use button-driven software for creating multimedia presentations.

FULL-FEATURED MULTIMEDIA presentation software requires a substantial investment in learning time and money. So how do you harness the multimedia power of your AV Mac without exhausting both your wallet and your schedule? If you're willing to forgo the menu bar for rows of buttons, Multimedia Design's \$295 mPower will let you create simple interactive presentations easily and quickly. And you can capture sound and video from directly within mPower as well as control external video sources.

Buttoned-up Presentation

To take advantage of mPower's many features, you have to put up with its nonstandard button-driven interface. mPower has no menu bar, much less pull-down menus. The program's interface relies entirely on big buttons that cover most of your Mac's screen. You can choose a function only from the limited number of buttons available to you at any time, so most tasks require repetitive wading through changing lists of buttons. Since you can't scroll along a menu bar and get a quick overview of the program's functions, it's also easy to get lost if you don't remember what functions belong to which list of buttons.

mPower uses a slide-based metaphor for creating presentations. You can select a default background and transition for each slide in your presentation and override these choices on a slide-by-slide basis. mPower ships with 64 predefined backgrounds and a few basic transitions you can use between slides. You can import graphics, QuickTime clips, sound in AIFF and snd formats, and PICS animations. There are also tools for creating charts and text within mPower and for capturing audio and video. You can control when and how elements appear and disappear, but your choices are limited to having objects move in from the slide's edges or corners and to basic fade-ins and -outs. The nice thing is that mPower doesn't use confusing timelines. You simply click and drag actions up and down a sequence-of-events

list and choose time and transition effects from a short pop-up menu.

You can make your presentations interactive by placing hot buttons on a slide.



Clicking on such a button can take you to another slide, play a clip, launch a document, and the like. You can create and print speaker's notes for any slide. For finishing touches, there's an electronic chalk feature that lets you use your mouse to circle, underline, or otherwise draw attention to parts of your presentation as it's playing. And when you're done creating your presentation, you can distribute it with the free mPower player or save it to videotape.

Peripheral mPowerment

Perhaps the most appealing feature of mPower is the painless way it lets you capture audio and video from just about any device you can connect to your Mac, including a VCR, laserdisc, audio-CD player, or microphone. mPower works as well with fancy high-end AV boards, such as the Radius VideoVision, as it does with the low-end video built in to AV Macs.

It takes only a few minutes to set up mPower to work with audio and video. The program presents you with buttons that represent the devices connected to your Macintosh. Just click on the one you want to use, and you're ready to go. mPower can play video clips directly from any device

connected to your serial port, so you don't have to store digitized video on your hard disk. However, mPower can't do the same trick with audio, so if you want to use a clip from your favorite audio CD, you'll have to digitize it with mPower first. (Version 2.1, due out by the time you read this, should support analog CD audio.)

mPower can run on any color-capable Mac with 4 MB of free RAM and 10 MB of

Straightforward in its simplicity but somewhat frustrating for experienced Mac users, mPower's nonstandard interface is driven by buttons rather than pull-down menus.

hard-disk space, but it's happiest on at least a 68040 machine with System 7 and 8 MB of RAM — and it doesn't hurt if you have a Power Mac to run the native version. As with most multimedia applications, a big, fast hard drive helps.

The Bottom Line

For those who aren't professional multimedia developers, mPower is a program worth considering. You can't create exotic presentations with it, but you can make simple ones quickly. The main drawback for experienced Mac users is the somewhat cumbersome button-driven interface, although Mac newcomers not expecting interface consistency with other programs may find it appealing. / Eric Taub

mPower 2.0.1

Rating: ★★★★★

Price: \$295 (list).

Pros: Combines audio/video capture and control with basic presentation tools.

Cons: Button-intensive interface can be frustrating.

Company: Multimedia Design, Charlotte, NC; 800-921-9493 or 704-523-9493.

Reader Service: Circle #406.

Kodak XLS 8600PS / Dye-sub printer produces picture-perfect prints that won't fade or stain.

WITH DIGITAL CAMERAS becoming all the rage, new dye-sublimation printers capable of producing photographic-quality prints are following close behind. The new \$9,995 Kodak XLS 8600PS not only takes much less time than other dye-sub printers to produce a print but the print is also designed to last a lot longer than conventional dye-sub prints. That's because Kodak has developed special paper that is coated with a laminate during the printing process, producing a print that won't fade, be affected by fingerprints, or stain.

XtraLife

The Adobe PostScript Level 2 Kodak XLS 8600PS can produce 8.5-x-10-inch prints on Kodak's special photographic-quality paper (called XtraLife), using the accompanying XtraLife three-color ribbon. You can also print images as large as 8.5 x 12 inches, but at that size, you're limited to either monochrome prints on XtraLife paper (using a black XtraLife ribbon) or color prints on standard dye-sub paper (using a non-XtraLife three-color ribbon). Kodak says that it's currently evaluating user demand for color 8.5-x-12-inch XtraLife prints.

The XLS 8600PS contains a speedy 33-MHz MIPS RISC chip and comes standard with LocalTalk, Centronics parallel, and SCSI ports. An optional Ethernet interface is also available, for \$995.

For \$1,000 less, you can buy a non-PostScript raster version of the printer, the XLS 8600. This version comes with a single Photoshop-export plug-in driver, which limits you to printing from Photoshop- and Photoshop plug-in-compatible programs. However, the beauty of the driver is that it gives you a very fast way to get photo-realistic output from Photoshop. Using the printer's SCSI connection, it takes only about two minutes to print a color 8.5-x-10-inch image! You can also share the printer over a network, using the Ethernet connection, which is slightly slower than the SCSI connection — an 8.5-x-10-inch print takes less than four minutes.

The PostScript version of the printer lets

you switch between raster and PostScript mode via the printer's front panel, so it, too, can take advantage of the raster mode's blazing speed. But the PostScript printer also lets you print from any application, using Kodak's Chooser-level PostScript



A digital darkroom in a box, the Kodak XLS 8600PS excels at producing output very similar to conventional photographic prints.

driver. Also worth mentioning is the printer's robust paper-handling mechanism — we didn't run into a single paper or ribbon jam while cranking out hundreds of images.

Prepress Limitations

Although the XLS 8600PS' PostScript support might seem to position it in the growing prepress/preproofing market, several factors make it less than ideal for this task. First, the maximum image area, 8.5 x 12 inches, allows for bleeds on only two of the four margins of a letter-sized page. Second, the XLS 8600PS is strictly a three-color printer — no CMYK ribbons are available. We doubt that many prepress professionals will trust a CMY printer as a preproofer. Third, and probably most important, the package doesn't include any color-management software, a somewhat surprising oversight, given Kodak's technological prowess in that field.

However, in addition to producing photographic prints, the XLS 8600PS excels at creating comps and overhead transparencies. Registration of the three-color passes is very tight, so type is crisp and sharp and the printer is able to produce rich, saturated

colors on transparency materials. In fact, the color quality comes very close to that of the XL 7720, the XLS 8600PS' larger and more expensive sibling.

The Bottom Line

Output from the XLS 8600 more closely resembles conventional photographic prints than does output from any other dye-sub printer we've seen, with the possible exception of the much more expensive Kodak XL 7700 series. Although the paper the XLS

8600 printers use is slightly lighter than that used by the XL 7700, it's much heavier than paper used by other dye-sub printers.

Moreover, despite the lack of color-management software, we were able to obtain very close matches between the XLS 8600PS' output and our monitor. This clearly won't do for prepress work, but it should satisfy the needs of digital photographers and artists, as should the rugged quality of Kodak's special paper.

All in all, the new Kodak printers serve as affordable digital darkrooms, making them perfect companions for midrange digital cameras. They also work well as output devices for Photo CD work and for medical and scientific imaging. / Bruce Fraser

Kodak XLS 8600PS

Rating: 

Price: \$9,995; XLS 8600, \$8,995 (list).

Pros: Fast output of photographic-quality prints. Special paper resists fading, fingerprints, and spills.

Cons: Lacks color-management software.

Company: Eastman Kodak, Digital and Applied Imaging, Rochester, NY; 800-235-6325 or 716-726-7260.

Reader Service: Circle #407.

Strata StudioPro 1.5 / 3-D modeler.

NEW ADVANCED MODELING features in Strata StudioPro 1.5 are like a delightful candy coating on an already impressively versatile program, which retains its interface and core set of capabilities — and many of the same shortcomings.

Boolean modeling, the ability to use one object to subtract from or add to another object, is an important tool for creating complicated shapes. Strata's way of presenting Boolean modeling is straightforward. You select a pair of objects in a dialog box and choose one of three operations: Union, to weld the objects together; Subtraction, to carve out one object with the other; or Intersection, to create a new object from just the intersection of the two objects.

One of the nice aspects of StudioPro's new PathExtrude extension is that you can specify different sizes for the beginning and ending shapes, perfect for creating a tubular shape that has one width at one end

and a different width at the other, such as a saxophone. Unfortunately, the interface for creating an extrusion path is less than optimum: You need to switch among several dialog boxes and the modeling window.

Perhaps the most esoteric new addition, yet one with a lot of potential, is the Metaballs effect, which was introduced in Japanese 3-D modelers. Creating objects with the Metaballs effect is like having spheres of magnetic putty move into one another and melt to form new shapes. You can create wildly complicated organic shapes easily with this unique modeling method. You can also animate the Metaballs effect. But when compared to a fully realized Metaballs modeler, such as Palmsoft's MetaModeler (currently shipping in Japan), StudioPro is sorely lacking. For instance, you can't control the degree to which one ball pulls on another.


Other additions to StudioPro are the Particle Morphing and True Morphing mod-

ules, which were previously available as add-ons. These extensions provide a reasonably workable set of morphing, twisting, tapering, and bending effects — with a slightly awkward interface.

The Bottom Line

Although the new features in StudioPro are welcome ones, some basic problems, such as the animation timeline, are still crying out for correction. We hope the next version of StudioPro will include more-fundamental changes. / David Biedny and Nathan Moody

Strata StudioPro 1.5

Rating: 

Price: \$1,495; upgrade, \$149 (list).

Pros: New well-designed 3-D Boolean modeler, path extrusion, and the Metaballs effect. Modeler now PowerPC-native.

Cons: Fundamental problems, such as the awkward animation timeline, haven't been corrected.

Company: Strata, St. George, UT; 800-678-7282 or 801-628-5218.

Reader Service: Circle #408.

Lexmark Optra Lxi / Versatile 1,200-dpi printer excels at line art but falls short for top-quality gray-scale output.

THE ELEGANTLY STYLED, versatile \$3,699 Lexmark Optra Lxi churns out charts, reports, and newsletters at 300, 600, and 1,200 dpi. The Lxi costs much less than the \$7,050 Eddy Award-winning Xanté Accel-a-Writer 8200, which supports 1,200-dpi tabloid-sized output, but what you save in dollars, you pay for in speed. And although the quality of the Lxi's line art is excellent, its gray-scale output is somewhat disappointing — it isn't as good as what you get from the best 600-dpi printers, such as the \$2,500 Apple LaserWriter 16/600 PS using PhotoGrade technology.

Style + Function

The Lxi measures 22 inches high, 19 inches deep, and 16 inches wide. It has a 25-MHz RISC processor and ships with 8 MB of

RAM, which you can expand to 64 MB with standard 72-pin SIMMs. It also has 4 MB of flash memory, static RAM kept separate from the installed RAM, which is useful for storing commonly used fonts and macros. To store more fonts, you can opt for the expensive \$799 40-MB internal hard drive.

The Lxi has an Adobe PostScript Level 2 RIP and can switch automatically between PostScript and HP PCL 5. It has LocalTalk and parallel interfaces as well as built-in Ethernet. Network administrators will appreciate the included MarkVision software; it lets them monitor

printer traffic right from their desk.

The main paper tray holds 500 letter-sized sheets and has an indicator that tells you when the paper supply is running low; a second tray adds another 500 sheets to the printer's capacity. The manual feeder is robust enough to accept card stock as well as transparencies. You can even opt for a duplex module that lets you print on both sides of a piece of paper.

As versatile as this printer is, we were disappointed that its manual said virtually nothing about using it with Macs. It even took some sleuthing to find the Mac drivers, hidden in a shrink-wrapped networking-software manual.

To achieve its print quality, the Lxi uses Lexmark's Print Quality Enhancement Technology to smooth text and graphics and PictureGrade to

MacUser ZD
LABS



It's packed with practical features, but the Lexmark Optra Lxi can't keep up with its competition in speed or gray-scale output.

PHOTOGRAPHY / LEON

increase the number of lines it prints in each gray-scale image. You have to use Lexmark's proprietary \$199 DiamondFine toner cartridge, which uses a fine grade of toner. (You can also buy long-life DiamondFine cartridges for \$299 each.)

We compared the Lxi with the Apple LaserWriter 16/600 PS, which delivers exceptional-quality gray-scale output (see review, February '95, page 37). Our test platform was a Quadra 650 with 16 MB of RAM. Although the Lxi produced crisper line art at 1,200 dpi than the Apple printer did at 600 dpi, we had to look closely to discern the difference. And with PhotoGrade, the Apple printer produced better-looking gray-scale output. To compare output quality, we used the *MacUser* Print Quality Test Page (available on ZiffNet/Mac). At 600 dpi, with PhotoGrade, the Apple printer elegantly reproduced the details and shading in the test page's gray-scale photo and art. At 1,200 dpi, using DiamondFine toner, the Lxi lost details in the shadows and had problems with lighter shades of gray. On our gray-scale ramp (which runs from 10-percent black to 100-percent black), the printer created uneven bands at shades of 25-percent black and lighter and lost lighter shades altogether. Although the Lxi at 1,200 dpi produced cleaner line art, the Apple printer at 600 dpi was more accurate in preserving the line widths on the printed page. Both printers produced equally crisp, clear text in small and large font sizes.

To test speed with processor-intensive PostScript output, we printed a one-page Adobe Illustrator document. At 600-dpi, the Apple printer rolled out the printed page in 3 minutes, 45 seconds, faster than the Lxi at 600 dpi, which took 5 minutes, 42 seconds. At 1,200 dpi, the Lxi took 7 minutes,

21 seconds to print the same document.

Our Adobe PageMaker document tested the printers' ability to handle several file types at once. At both 300 dpi and 600 dpi, the Apple printer produced the pages in just over 3 minutes, clearly winning the race against the Lxi, which took well over 6 minutes to print the document at 300 dpi and 600 dpi and over 8 minutes at 1,200 dpi.

The Bottom Line

The Lxi's versatility is compromised by its mediocre gray-scale output. If you need 1,200-dpi printing, you're better off splurging on a dedicated 1,200-dpi printer, such as the Xanté Accel-a-Writer 8200, which can also produce tabloid-sized pages. Serving as a multipurpose office printer, the Lxi offers an unbeatable price. / Roman Victor Loyola

Lexmark Optra Lxi

Rating: 

Price: \$3,699 (list).

Pros: Crisp line art. High-capacity paper trays. MarkVision software enables administrators to monitor usage. A bargain.

Cons: Slow. Documentation lacks Mac references. Poor handling of light grays in gray-scale images. Expensive toner cartridges and internal hard drive.

Company: Lexmark International, Greenwich, CT; 800-891-0331 or 606-232-2000.

Reader Service: Circle #409.

Day-to-Day / An electronic calendar now complements a renamed Dynodex.

IF YOU LOVED Portfolio's venerable contact manager, Dynodex, but watched it wane in the wake of PIMs (personal information managers) that track not only your contacts but your schedule as well, you'll appreciate Portfolio's new Day-to-Day bun-

ble. Dynofind utility, introduced in Dynodex 3.5, gives you instant access to all your information without requiring you to launch a single module. You can find and edit contacts and add new ones; see today's schedule or your entire to-do list; and find and edit appointments and add new ones in your schedule. If you need to use module features that Assist doesn't give you access to, Assist lets you launch Contacts, Calendar, and Notepad. When it comes to convenience, the Assist menu lets you do more than the menu-bar access in most PIMs, including Adobe's DateBook/TouchBase Pro, which doesn't let you edit or delete events without first launching DateBook.

Day-to-Day also lets you view all the information contained in items on your calendar without opening them. For example, if you hold down the Shift and Option keys and point to an item on your schedule, a balloon pops up showing the time and name of the event and your notes about it. This almost makes up for the fact that the items are truncated, making all but the shortest unreadable (in Day-to-Day 1.01, which should be shipping by the time you read this, you'll have the option of wrapping text to the next line).

You can also quickly create custom subsets of calendar events with the List function. For instance, you might list all the aerobics classes you sweated through in the last two months or all the business lunches you plan to attend next week. You can save the search criteria for the custom subset as a Frequent Find, available on the List menu.

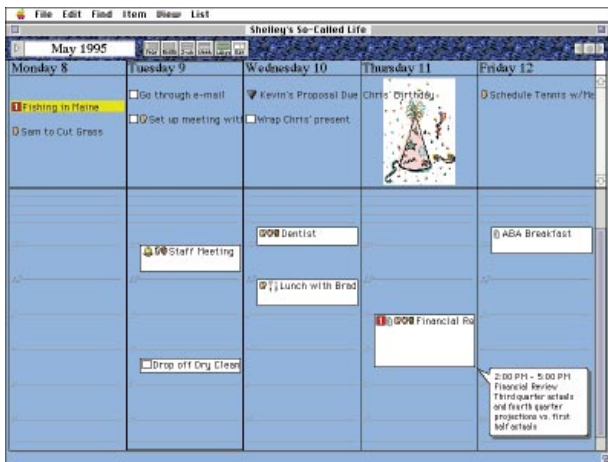
Overall, the scheduling features in Calendar are on a par with those in the most popular PIMs, such as Claris Organizer and Now Contact/Now Up-to-Date. You can schedule appointments by time; establish to-do lists; and identify special dates, such

as anniversaries and birthdays. You can schedule recurring events, such as a 10:00 A.M. staff meeting every other Tuesday, and set up alarms to remind you of the events in advance. You can schedule conflicting appointments and see the overlapping times on your calendar. And with well-designed, customizable views as well as day, week, two-week, month, and year views, you can look at your schedule and make appointments for the next few hours or far into the future. However, if you have lots of events and reminders scheduled, Calendar gets noticeably sluggish. Portfolio has promised to not only fix this but also release a PowerPC-native version by the time you read this.

Day-to-Day isn't networkable, in contrast to DateBook/TouchBase Pro and Now Contact/Now Up-to-Date.

Outdated Addressing

Ironically, the weakest part of the Day-to-Day bundle is Contacts, which, as Dynodex, was one of the best contact managers available several years ago. Since then, Dynodex's competitors have surpassed it in features and flexibility. Contacts lets you have only one address per contact; other contact managers typically give you space for two — a work address and a home address. There are no places for company division names; name prefixes such as *Mr.* or *Dr.*; name suffixes such as *Jr.* or *III*; or categories such as friend, colleague, and family. True,



Portfolio's new Calendar lets you set up any view you want, even weekdays only. You can also customize fonts, colors, and patterns, and if you Shift-Option-point to an event, a balloon with information about the event appears.

dle, which gathers its contact manager and notepad together with a new calendar.

Timely Consort

Portfolio's Day-to-Day Calendar is the only new element in the Day-to-Day PIM bundle. Day-to-Day Contacts, the contact manager, and Day-to-Day Notepad, the outliner, are simply new names for the virtually unchanged Dynodex and Dyno Notepad, respectively.

Portfolio has done a good job of linking Calendar with Contacts and Notepad. When you create an appointment in Calendar, you need only a few mouse clicks to transfer contact information, such as a phone number, into the event. You can also link external files to your calendar. For instance, if you want quick access to a spreadsheet for a financial-review meeting, you can create a link in Calendar's Edit Item window. Double-clicking on the spreadsheet's name in this window launches the spreadsheet.

Even better, Day-to-Day's Assist menu-bar icon, which takes the place of the



Assist gives you convenient menu access to the most commonly used PIM functions, so you can update your schedule or add a new contact without having to launch any of the Day-to-Day modules.

Contacts has 3 undefined fields you can use for such information. However, the inexpensive Claris Organizer has places for all the fields Contacts lacks as well as 4 undefined fields, and TouchBase Pro gives you 16 undefined fields. And unlike some competing PIMs, Contacts doesn't let you link external files to contact names.

The out-of-date documentation still refers to Contacts as Dynodex and, worse yet, explains how to use the obsolete Dynofind feature and Dynodex DA. The Easy Installation option for Contacts drops the useless and disabled Dynofind into your Control Panels folder. And if you install all the modules in the Day-to-Day bundle, you'll have to restart your Mac not once, but twice. At press time, Portfolio had promised that improvements were in the works.

Have Schedule, Will Travel


Day-to-Day lets you print your contacts and your schedules in a wide variety of page formats, including the popular Day-Timer and Franklin pocket-organizer formats. Day-to-Day also lets you trade data with its Windows counterpart as well as with the Sharp Wizard electronic pocket organizer.

Although it comes with toll-free-number directories, ZIP-code and area-lookup directories, and a leather pocket organizer, the \$150 Day-to-Day bundle is somewhat pricey for what it offers. You can buy Contacts or Calendar separately for \$79.95 each or Notepad for \$49.

The Bottom Line

Except for the superb menu-bar access via Assist, which can save you time and PowerBook-battery life, Day-to-Day lags behind its competitors in terms of features, value, and flexibility. / Shelley Cryan

Day-to-Day 1.0

Rating: 

Price: \$150 (list).

Pros: Assist menu-bar icon provides quick, easy access to Contacts and Calendar without launching modules.

Cons: Weak contact manager. Poor documentation. Quirky install. Calendar becomes sluggish when you've scheduled many events and reminders.

Company: Portfolio Software, Richmond, VT; 800-329-8632 or 802-434-6400.

Reader Service: Circle #410.

Light Source Colortron / Hardware-and-software combo captures color.

CAPTURING COLOR and reproducing it perfectly has always been an arcane art. Now Light Source has significantly advanced that art with its Eddy-Award-winning Colortron, a professional color-measuring device with excellent basic software.

An Eye for Color

The small, handheld Colortron is a true 32-band color spectrophotometer that attaches to your Mac's ADB port. You rock the binocular-case-shaped Colortron onto any target, and it enables you to pick up the color values from printed material, computer screens, film, textiles, and even 3-D objects such as an apple or your own skin and bring them into a color library on your computer. Since the Colortron is powered by an internal NiCd rechargeable battery, it's entirely feasible to take a Colortron and a PowerBook out into the field to sample colors.

The well-designed, extensible Colortron software presents an entire suite of applications in a tool bar, for which we have room to mention only a few. The Colorimeter tool shows you the numerical values of sampled colors in various color spaces, including RGB, LAB, LUV, and HSB; the related CMYK Process tool uses Apple's ColorSync calibration system to show the values in CMYK. You'll love the Match tool if you use Pantone color values, since it will find which Pantone color matches the color you've sampled. With the Lighting tool, you can see what your sampled color would look like under a variety of lighting conditions, including incandescent, fluorescent, and daylight. And you can use the innovative Color Harmony tool to get two to six colors that aesthetically complement your target sampled color. With Apple's extensible Color Picker, part of System 7.5 and also included with the Colortron, you can use most of these tools within any color-savvy program, such as QuarkXPress or Adobe Photoshop.

The software even keeps your Colortron accurate. Every week or so, the software reminds you to calibrate the hardware with a supplied set of color swatches, which were matched to your individual device before shipment.

You don't have to worry about your

prepress house miscalibrating your carefully selected colors, because you can embed the full spectrographic information captured by the Colortron hardware into the EPS file of color libraries.

It's important to note that the Colortron is a color-metering device, not a complete color-management system: You require additional software, such as the included ColorSync, to run the Colortron. We anticipate seeing a wide variety of color-calibration and -management software supporting the Colortron in the future.

The documentation that comes with the Colortron is some of the most extensive we've seen. Indeed, its primer on color theory surpasses comparable coverage we've seen in professional books on the same topic.

The Bottom Line

Devices comparable to the Colortron typically cost between \$8,000 and \$12,000 and rarely work with your desktop computer, much less a PowerBook. The Colortron is a fraction of the cost and its tools are extensible, allowing other developers to create supporting software to fit a wide variety of uses. If you're serious about color, you definitely need to take a look at the Colortron.

/ David Biedny



Don't be fooled by its size and price — the Colortron is a full-fledged 32-band spectrophotometer that attaches to your ADB port.

Light Source Colortron

Rating: 

Price: \$1,195 (list).

Pros: Inexpensive, professional-level spectrophotometer. Well-designed, extensible software.

Cons: Not yet supported by a wide variety of color-management programs.

Company: Light Source, Larkspur, CA; 800-994-2656 or 415-925-4200.

Reader Service: Circle #411.

Phyla / Point-and-click database modeling that's not as simple as it's cracked up to be.

BILLED AS “the database that handles complexity simply,” Mainstay’s Phyla is the Mac’s first object-oriented database program. Even if you don’t understand database jargon, you probably know there are two main database types in the personal-computer world: flat-file and relational. The object-oriented Phyla represents a third way of modeling and storing information, but we found it far from simple to learn and use.

No Programming Required

Phyla takes a point-and-click approach to database development that doesn’t require programming. And rather than storing a data set in one big table, as do flat-file-database programs, or in a series of linked files, as do relational applications, Phyla organizes information as stacks of *objects*.

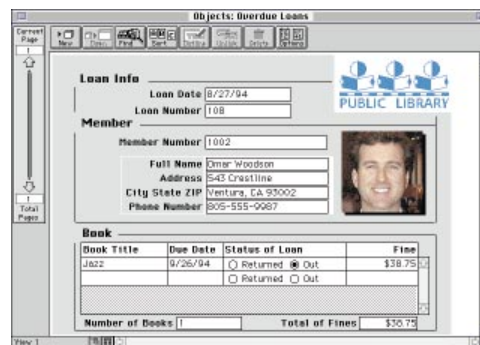
Objects in Phyla databases are roughly the equivalent of records in traditional databases — they have *attributes* that correspond to fields. Within a Phyla database, objects that share common attributes are organized into *classes*, which in turn can be broken into *subclasses* that inherit the attributes of the parent class but also have specific attributes of their own. Phyla defines interactions between classes, using logical or mathematical statements known as *relations*.

The chief benefit of Phyla’s approach, according to Mainstay, is that it simplifies database development by structuring it to mirror real life. The Phyla tutorial, in which you build a database for a library, provides a simple but effective example. In the program’s point-and-click Definition window, which presents a graphical view of your database structure, you create a class for borrowers (attributes include name, address, and card number), a class for books (attributes include title, author, and catalog number), and a class for loans (attributes include loan date and borrower number).

In addition to standard attribute types (including pictures, but not sounds or binary objects), Phyla provides a point-and-click editor for defining calculated

attributes (due date, for example, could be defined as loan date plus 30 days). You can add attributes or subdivide classes at any time, so as the library grows, you can change the Books class name to Items and create subclasses for books, magazines, and CDs. If the library wants to start lending videotapes and software titles, you can simply add two more subclasses.

Things get more interesting when you



Despite Phyla’s flexibility — a single form, for example, can accommodate data from multiple data sets — understanding the program’s unfamiliar terminology and unique structure can be a daunting task.

start adding relations and summary classes. To define a relation, you drag a line from one class to another and name the relation — borrowers Take Out books, for example. You then flesh out the relations by selecting from pop-up lists of functions, operators, and operands that let you set up constraints, which can range from simple links (say, between the borrower number in the Borrower class and the borrower number in the Loan class) to complex conditional equations.

For every class in a database, Phyla automatically generates an Outline window and a Form window. The Outline window displays a row for each object and a column for each attribute; expanding the outline reveals associated relations and related objects. The Form window starts as a bare-bones display of attribute fields, but you can convert it into an attractive custom form. And because you can add attributes from related objects, you could, for example,

enter all the information for a library loan — borrower, book, and transaction — into one screen, either by typing or by dragging and dropping objects from other windows.

You can create any number of additional views that display selected attributes, object subsets, sort orders, and custom layouts. The program also offers a rich set of data-entry aids, including default initial values, custom pick lists, automatic serialization, and range checking.

Fast and Slow

Phyla is not only flexible but also fast for most functions. In our search and sort tests, using a data set of 10,793 objects with 11 attributes, Phyla outperformed FileMaker Pro on a Quadra 630 as well as running in emulation on a Power Mac 8100/80. (Mainstay promises a native PowerPC version later this year.) Some changes to the database, however, can cause the program to initiate time-consuming housekeeping chores. When we created a new class and related it to an existing one, Phyla announced that it was “Migrating objects to conform to changes made to their class definitions” — a modal process that took nearly ten minutes.

But the biggest problem with Phyla is its conceptual complexity, especially given the program’s target audience — FileMaker Pro veterans who have hit the limits of Claris’ program. We found using Phyla for creating anything but the simplest application required a long mental leap into its object-oriented framework. Unfortunately, although the program’s 480-page manual is clear and thorough on the mechanics of the program, it offers virtually no guidance on underlying issues of object-oriented database design. Help appears automatically in several of the program’s core dialog boxes, but the messages are so technical they’re not likely to be much help to newcomers. A built-in syntax checker flags errors but doesn’t say how to fix them.


As for the dozen sample databases included in the package, they’re impressive demonstrations of Phyla’s advanced capabilities, but aside from a few sentences in accompanying Read Me files, you’re on your own trying to understand the way in which

these databases were put together.


Even elementary functions can be challenging. The cookbook database includes a recipe for Persian spaghetti, but when we attempted to locate it by using the Find command and entering `spaghetti`, Phyla reported “no matching objects.” Mainstay’s friendly and patient tech support finally helped us solve the problem — by composing the expression `Match (Recipe • RecipeName , 'spag') > 0`. And this is a package touted as requiring no programming!

The Bottom Line

In its present form, Phyla seems best suited for experienced database programmers looking for a fast, flexible way to build complex models. On the other hand, its appeal as a high-end development tool may be limited by the absence of custom menus, a compiler, a run-time engine, a client/server version, and a cross-platform counterpart.

Most FileMaker Pro users, we think, would be well advised to hold out for Claris’ upcoming relational version. If you need a more-powerful alternative right away, you’re probably better off with ACI US’ 4D First — it’s not much harder to understand and use than FileMaker Pro; it’s part of an expanding family of tools; and at \$99, it costs a quarter as much as Phyla. And although ACI US’ program doesn’t give you a recipe for Persian spaghetti, if you want to locate the Chicken Piquant recipe stored in a 4D First database, all you need to do is click on Name and Contains and type `chicken`. / Henry Norr 

Phyla 1.0.2

Rating: 

Price: \$495 (list).

Pros: Object-oriented architecture and graphical interface for creating complex relational databases. Most operations are fast. Extensive set of data-entry aids.

Cons: Steep learning curve for mastering unfamiliar data-modeling methods. Some elementary operations require use of complex syntax. Manual and sample databases inadequate. No compiler, run-time engine, client/server version, or cross-platform version. Pricy compared to competing products.

Company: Mainstay, Camarillo, CA; 800-484-9817, ext. 4636, or 805-484-9400.

Reader Service: Circle #412.

Comfort Keyboard System / Split to fit your hands

THANKS TO ONE-SIZE-FITS-ALL design, using standard keyboards may lead to discomfort; fatigue; and in some cases, painful, debilitating repetitive-stress injury (RSI). Fortunately, there are alternatives, including the flexible Comfort Keyboard System from Health Care Keyboard Company.

Three Pieces. The Comfort Keyboard System has three independent sections: a numeric keypad and right and left sections. Each section has a unique mount underneath that rotates and tilts in almost every direction and then locks securely in place. You can even change the sections around, which is great if you're a southpaw who prefers the keypad on the left. Since the keyboard is based on a conventional 105-key QWERTY arrangement, there's no learning curve for touch typists.

Your mouse and the keyboard sections,

connected to each other by coiled cables, plug into a 7.5-inch-wide by 6-inch-deep by 1.5-inch-high box, which in turn plugs in to the Mac's ADB port. This box has six unlabeled light-emitting diodes on the front that are supposed to convey information such as when to take a break. These and other features could be handled more effectively with a control panel, but since the keyboard system doesn't come with any Mac software, we ended up simply ignoring the lights.

The Comfort Keyboard System is clearly the most adjustable QWERTY keyboard available. Unfortunately, its premium price is likely to turn off all but the most serious RSI sufferers. / Owen W. Linzmayer

Comfort Keyboard System ★★★½ / Price: \$795 (list). Company: Health Care Keyboard Company, Wauwatosa, WI; 414-536-2160. Reader Service: Circle #413.



Intelligence Pro Collection 1.2.10 / Photo-enhancing plug-in

IF YOU SPEND HOURS at a time fiddling with Photoshop filters while trying to turn murky photos into crisp images, check out Intelligence, DPA Software's new plug-in. This suite of three Photoshop filters (for gray-scale, RGB, and CMYK images) automatically adjusts contrast, brightness, saturation, sharpness, snap, tone cast, descreening, and despeckling in a single dialog box.

Instead of analyzing a photo yourself and engaging in endless tweaking, you just select adjustments from Intelligence's pop-up menus. You can im-



prove a photo with a flat tone range, for example, by selecting Extra Hard from the Sharpness menu. Intelligence will analyze the image and make only the necessary adjustments.

Automatic Analysis. For images with light or dark backgrounds that might throw off the program's automated picturewide corrections, the Intelligence mode allows you to specify, with a marquee, a portion of the photo to focus on. The program also comes with RGB-to-CMYK conversion tables, adjustments for dot gain, and scanner-calibration settings. Intelligence works with DayStar Digital's PhotoMatic batch processor and ships with batch-processing macros for QuicKeys and Tempo.

On the negative side, Intelligence's manual is amateurishly produced and erratic, and the program lacks a preview option for viewing settings prior to their application. A bigger gripe is the cost — at \$599, Intelligence is nearly the price of its parent program, Photoshop. Novice users may also find the labels for the pop-up menus (Extra Hard and Snappy, for instance) to be unintuitive. However, for those who spend more than a couple of hours a week manipulating Photoshop images, Intelligence is a plug-in with definite potential. / Jim Benson

Intelligence Pro Collection 1.2.10 ★★★½ / Price: \$599; limited editions available for \$149 to \$399 (list). Company: DPA Software, Plano, TX; 214-517-6876. Reader Service: Circle #415.

ConcertWare 1.5 / Affordable music-notation software

MUSIC-NOTATION SOFTWARE has made quantum leaps since the last time we looked at one of its early pioneers, ConcertWare, in 1987. Some of the programs' early features — including the ability to input music into your Mac from a MIDI keyboard in real time — are now required in even the most basic notation programs. But time marches on, and the newest version of ConcertWare, disappointingly, has not kept up with the pace of innovations in the music-notation universe.

Over the years, ConcertWare has benefited from some improvements: the ability to display beams slanted rather than simply straight across, the ability to import and export Standard MIDI files, the ability to input notes from an on-screen piano keyboard, the generation of harmonies, and support for 32 staves of music (versus the paltry 8 staves offered by the base-model version of Passport Designs' MusicTime). At an estimated street price that squeaks in just under \$100, ConcertWare offers a fair amount of bang for the buck.

Time Is Money. Time is precious, and all too much of yours will be spent traversing dialog boxes and menu commands to do things that are easy to accomplish in more-expensive programs. Take page layout: Employing a program such as Coda's \$350 Finale Allegro, it's a simple matter to work with various text and score elements in a single Page Layout window. Using ConcertWare, you must open a couple of different windows, enter your text, invoke the Print command to access the Print Preview window, return to the original windows for adjustments, and so on. This rigmarole is regrettably all too typical of the ConcertWare experience. Other annoyances include a lack of resolution smaller than a 32nd and the lack of a reference card for the plethora of keyboard command equivalents.

Although ConcertWare is an affordable and reasonably capable notation program, it suffers from an ancient interface. Entry-level musicians and hobbyists may find ConcertWare adequate, if they're short on cash and long on patience. If your time is valuable, save your money for a higher-priced, more intuitive package. / Christopher Breen

ConcertWare 1.5 ★★★ / Price: \$159 (list). Company: Jump Software, Mountain View, CA; 800-440-5867 or 415-917-7460. Reader Service: Circle #414.



PHOTOGRAPHY / LEON

DragStrip / Drag, drop, and launch

IF THE APPLE MENU, aliases, and the Launcher control panel — convenient aids for launching applications and other files — don't suit you, take a look at Natural Intelligence's DragStrip.

Finder Palettes. DragStrip lets you create any number of strips, which are movable palettes of large or small icons. A single click on an icon (or a double-click if you prefer) launches the item or, in the case of folders and volumes, brings up a hierarchical pop-up menu of their contents. With a drag and a drop, you can install anything that appears on the Mac desktop into a strip, including documents, applications, folders, and special plug-ins called DragStrip Additions that, for instance, can bring up your Memory control panel or show you the current phase of the moon. Application icons can be configured to show a hierarchical menu of recently used documents, but the menu shows only the documents you've launched with DragStrip.



Rival utilities have many of the same features and offer some advantages over DragStrip: Binary Software's Square One 2.0, for example, tracks *all* the documents you've launched or created since you installed the software, and the shareware PowerLaunch Lite lets you start up a set of files with one click. DragStrip has the most polished and configurable interface, and it's currently the only utility of its type that's PowerPC-native. / Henry Norr

DragStrip 1.0 ★★★★★ / Price: \$59.95 (list). Company: Natural Intelligence, Cambridge, MA; 800-999-4649 or 617-876-4876. Reader Service: Circle #416.

A.D.A.M. The Inside Story Anatomy on your Macintosh

AFTER DEVELOPING multimedia anatomy software for the medical and health-education fields for years, A.D.A.M. (Animated Dissection of Anatomy for Medicine) brings its knowledge base to the masses in *The Inside Story*.

Under My Skin. When you first launch *The Inside Story*, you can set the program to have fig leaves cover genitals and breasts, which also locks out information on the reproductive systems — a feature some parents may appreciate. The opening screen shows an unclothed male body whose gender and skin tone you can change. You can strip off layers of the body with a slider to see what lies beneath. Click and zoom in on whatever interests you.

The Family Scrapbook gives you an animated guided tour of the body, divided into 12 sections, such as the gastrointestinal system. Adam and Eve are your escorts — the personal experiences of the pair serve as the basis for explanations, narrations, and video. For example, Adam choking on a piece of celery at a party segues into a detailed video demonstration of the Heimlich maneuver.

If you're looking for something livelier than *Gray's Anatomy*, you don't have to look any further than this comprehensive, meticulously illustrated CD-ROM. / Kristin M. Balleisen

A.D.A.M. The Inside Story ★★★★★ / Price: \$39.95 (estimated street). Company: A.D.A.M. Software, Atlanta, GA; 800-408-2326 or 619-490-8055. Reader Service: Circle #417.



Three by Five / Digital index-card organizer

WRITERS HAVE USED 3 x 5 index cards to organize their thoughts into books since time immemorial. Three by Five faithfully translates the cards into digital form, turning them into an inexpensive free-form organizer that puts not only text in its place but pictures and QuickTime movies too.

As you might surmise, the fundamental unit of information in Three by Five is the card. You can create text cards, label cards, picture cards, and movie cards. You can also create custom cards, which contain any combination of text, pictures, or sounds as well as pop-up menus and check boxes, quickly and easily with the built-in custom-card editor.

Clever Cards. Nice touches include parent/child relationships between the cards — for one thing, these relationships let you collapse connected cards into a stack, labeled by the parent card. You can create style sheets and default card layouts so your cards will look consistent. And flexible autoresize options for cards and zoom options for the virtual corkboard background — complete with font scaling so cards are readable even in the 25% view — make it easy for you to manage your screen real estate.

In fact if you have a large screen, you can work in both the card view and the traditional outline view simultaneously. When you make a change in one view, such as collapsing a topic, it's reflected

in the other view immediately — well, *almost* immediately.

Three by Five's screen refreshing is lethargic at best, even on the fastest of Macs. Another problem is the Undo function, which rarely works. In a program such as Three by Five where moving a single card can cause a ripple effect as the other cards move into place behind it, this is especially bothersome. And although the Find command is otherwise quite robust, it doesn't find items in pop-up menus or check boxes on custom cards, which makes using the cards — if you're going to use them liberally — nearly futile.

(MacToolkit's technical support said the ability to search for text in pop-up menus and check boxes will "probably be in the next revision.")

Despite its blemishes, Three by Five is fun and easy to use. Although it's neither

as powerful as more-expensive idea processors such as Inspiration Software's Inspiration nor as flexible as a full-blown database program such as Claris' FileMaker Pro, Three by Five is a reasonably priced program that lets you manage and organize text and other data quite well. If you like organizing your thoughts with index cards, chances are you'll like Three by Five even better. / Bob LeVitus

Three by Five 2.0 🍎🍎🍎 / Price: \$149 (list). Company: MacToolkit, Santa Monica, CA; 800-231-4055 or 310-395-4242. Reader Service: Circle #418.



MediaFactory / Awkward digital-video editor

COSTING ONLY \$199, MediaFactory has an advanced feature set and an interface that mimics that of QuickTime video editors that cost hundreds of dollars more. But Adobe and Avid needn't be worried, because MediaFactory is awkward and slow and its movies are jaggy and pixelated. Moreover, although this product is targeted at desktop-video novices, we found it hard to use.

Like the interfaces of Adobe Premiere and Avid's VideoShop, the MediaFactory interface uses various windows. You import your movies, PICS and PICT files, and AIFF sound files into the Clips



window and from there drag them into the Project window. You control video clips over time in the Film Editor window, whose tiny icons, such as the cutter icon and the blank-window icon, we found confusing.

Lackluster Features. Available tracks in the Project window highlight with a marquee when you drag clips over them, but when you drop a movie clip next to another, MediaFactory doesn't snap the clips together, as other DTV programs do. And if you have a movie that includes sound, you'll have to drag the movie and the sound into the Project window separately; you can't place them into your project as a single unit.

We were also disappointed with MediaFactory's Project-window Time Line. To edit a movie clip, you must define which part of the clip you plan to compile, using the Time Line — a fairly standard method among DTV editing programs. However, we didn't like having to click and drag a line from start to finish every time we needed to compile an entire movie. We would have preferred an easier way of selecting clip content as well as a Select All option for compiling an entire movie.

Overcompressed Documentation. MediaFactory's documentation also needs improvement — the current manual is far too sparse for novice movie editors. For instance, compression choices aren't explained, and they should be, because compression choices can make or break a movie.

NUTS Technologies claims that MediaFactory is PowerPC-native, but even on our 8100/80, it was painstakingly slow. Compiling a 28-second QuickTime movie took nearly twice as much time as it did with Adobe Premiere 4.0. We were equally disappointed with the pixelated quality of the QuickTime movies that MediaFactory created.

On the plus side, MediaFactory is very stable: As hard as we tried, we could never get it to crash. MediaFactory can run on any Mac, from the II on up, but you will want to use the fastest machine you can get your hands on.

If you need an inexpensive QuickTime-video editor for making movies at home, we recommend that you fork over the extra \$200 for Avid's VideoShop 3.0. MediaFactory won't do the trick, unless saving some money is worth putting up with snail-like speed and poor-quality movies. / Blake Roberts

MediaFactory 1.0 ★★ / Price: \$199 (list). Company: NUTS Technologies, Santa Clara, CA; 408-980-7800. Reader Service: Circle #419.

ErgoKnowledge / Ergonomics on CD-ROM

NUMB FINGERS, ACHING SHOULDERS, and blurred vision are some of the symptoms you may experience if your workstation isn't configured ergonomically for you. Using ErgoKnowledge, an ergonomics-training program on CD-ROM, can help increase your — and your employees' — awareness about computer-workstation ergonomics. In this product, Visionary Software takes regrettably little advantage of the CD-ROM medium and its technology, however, and consequently ErgoKnowledge comes across as lifeless. Furthermore, without giving users materials that reinforce the training, ErgoKnowledge may have only limited effectiveness over time.

Tame Training. Once you've configured ErgoKnowledge, each user spends about an hour going through the interactive lessons and quizzes. This method is fine for teaching employees ergonomics basics, but we would have liked a more playful, gamelike interface for reinforcing the lessons.

ErgoKnowledge gives you unlimited use for its \$995 price, which, depending on the size of your organization, can be anything from a good deal to an incredible bargain to fulfill ergonomics-training requirements for all your employees. Consider what you get for that price, however. The interactive lessons teach users how to properly configure their computer screens, the height of their chairs, and their keyboard position. These simple lessons in ErgoKnowledge would have been cutting-edge computer training five years ago, but today they tend to come across as fairly simple and, at times, even dull. The program quizzes users and keeps track of their scores in a file on whichever workstation is running the CD-ROM. Unfortunately, though, ErgoKnowledge does not come with printed training materials that employees can keep when they've completed the training.



Meager Multimedia. We were surprised that Visionary Software didn't take full advantage of QuickTime. Most of the QuickTime movies in ErgoKnowledge simply show the narrators talking. We would like to have seen QuickTime movies that showed real people using real computers as a supplement to the static, airplane-safety-card artwork that provides most of the program's information about setting up a properly ergonomic workstation. Since ErgoKnowledge takes up only 40 MB on a CD-ROM, which has a capacity of 600 MB, there is certainly enough room for more movies — or more material of another sort, if QuickTime throughput is a concern, as it may be if employees are accessing the training over the network, for instance.

Employers looking for a cost-effective way to teach their employees how to prevent stress injuries will find ErgoKnowledge to be one of the least expensive ergonomics-training tools. However, to really make an impact on employees mentally, it needs to be more compelling and cutting-edge. / Blake Roberts

ErgoKnowledge 1.0 🍌 / Price: \$995 (list). Company: Visionary Software, Portland, OR; 800-877-1832 or 503-246-6200. Reader Service: Circle #420. 📄



Bring on the

**The first Mac clones
are making history.
But should you make
the investment?**



CLONES

IT'S FINALLY HAPPENED. Apple is no longer the sole source of computers that run the Macintosh operating system. Clones have arrived.

Vendors have repackaged Apple's motherboards in the past — remember the ruggedized “Macs” from Colby? And vendors have bought up surplus Mac ROMs and built Mac alternatives — Outbound, with its **MacUser** **ZD LABS** Portable challenger, was the best known. But without Apple's blessing, without a license to produce authorized clones, these early attempts at providing Mac-alikes were bound to fall by the wayside. And fall they did — not necessarily to Apple's benefit.

Apple's decision to allow the cloning of the Mac comes very late in the game. The company would have done well to heed the chorus of kibitzers who for years have urged it to license its OS. Without clones, Apple has been unable to increase its share of the personal-computer market in major businesses. Without that Mac market share, software vendors have been slowly shifting their priority to developing for the much broader Windows market. And the specter of Windows 95, looking very much like a Mac, looms on the horizon.

It is clearly time for a change. Fortunately, Apple has responded. The last six months have seen a frenzy of negotiations with over a dozen companies that have expressed an interest in marketing computers that run the Mac OS. As of early March, three vendors had signed licenses with Apple to sell Mac-compatibles in the U.S. and two others had licensed the Mac OS for international distribution (see the “Foreign Affairs” sidebar).

BY HENRY BORTMAN

MAC CLONES

Two of the U.S. vendors, DayStar Digital (404-967-2077) and Radius (408-541-6100), are among the most respected makers of processor upgrades for Macs. Both companies will aim their systems at the top end of the graphics market. They will offer Photoshop powerhouses, well supplied with RAM and storage capacity. (Radius will also offer a system preconfigured for digital-video professionals sometime later this year.) The third U.S. company, Power Computing (800-999-7279), is a startup created for the express purpose of building Mac clones. Power Computing will sell its machines to the midrange mass market, competing with Apple's Power Mac 7100 and 8100 on price, flexibility, and service.

So what are these clones like? Are they compatible? How are they configured? What do they offer that Apple's Macs don't? Are they faster? Cheaper? Do they come bundled with more software? What kind of service and support are the clone vendors offering? And perhaps most important of all, Should you buy one?

We asked all these questions and more of the three U.S. licensees. And with the systems that were available for testing, MacUser Labs conducted a comprehensive set of speed and compatibility tests,

comparing the systems to similar Apple Power Mac models. Bear two things in mind as you read the report of our findings. First, the machines we tested were not final production units, although the performance of the shipping systems will likely be close to what we found in the labs. Second, although vendors were willing to give us preliminary pricing information at press time, only Power Computing could provide final pricing. Until these details are settled, it will be difficult to reach definitive conclusions about the value of these Mac competitors. The jury is still out.





Radius: Publishing Specialists

Radius will initially offer one system, the Radius System 100, which will incorporate Apple's Power Mac 8100/110 motherboard without modification. For this round at least, Radius is focusing on compatibility above innovation. What the company offers as an advantage over Apple is one-stop shopping — a system fully configured for the task for which it is designed.

The Radius System 100 is aimed at graphics professionals — in other words, Photoshop users. They're the type of people who

figure 1

Points of Difference / how to tell the clones apart

 <p>Apple</p>	 <p>DayStar</p>	 <p>Power Computing</p>	 <p>Radius</p>
Target users			
Anyone from home users to graphics professionals.	Graphics and multimedia professionals who need ultimate power.	Those who want a Power Mac but at a better price than Apple provides.	Graphic-arts professionals who want high-end preconfigured systems.
System specialties			
Has the lead in multimedia components and powerful processors.	Dual PowerPC 604 processors and a PCI bus — raw power without add-ons.	A bit more than Apple offers — a faster CD-ROM drive, a keyboard, and bundled software.	Bundles and preconfigures specialty peripherals such as the Thunder IV GX-1600.
Pricing goals			
Historically overpriced — but clones could change that.	Competitive with Apple but will offer higher-speed drives and multiple processors.	10 to 15 percent less than equivalent Apple Macs.	Less than the cost of buying the individual pieces.
Where they're sold			
Resellers, dealers, superstores, mass merchandisers, campus resellers, government.	Qualified resellers and dealers.	Direct and mail order.	Qualified resellers and dealers.
Service and support			
Aggressive support and repair policies. On-site repair.	Three-year warranty and aggressive support and repair policies.	Aggressive support and repair policies.	Will rely primarily on dealers and resellers to support its systems.
Company background			
The original Mac vendor.	Made its mark producing reliable Mac processor upgrades.	Startup company whose technical team is led by former Apple, APS, and Dell engineers.	Solid history of producing Macintosh monitors, graphics adapters, and accelerators.

spend hours each day editing high-resolution CMYK images and for whom shaving a few seconds off every filter operation can mean the difference between meeting a deadline and losing an account. Radius preinstalls the hardware and software in the system and then tweaks it so that it's ready to work when it arrives in stores. If you've ever tried to get several high-end components to work together correctly, you'll appreciate this service.

Since Radius couldn't tell us what it plans to charge for this system, we priced it for ourselves. We started with the equivalent of a Power Mac 8100/110, which Apple ships with 16 MB of RAM, a 2-GB internal hard drive, a CD-ROM drive, and 2 MB of VRAM. You can buy this standard Apple configuration for around \$6,000. In addition, the Radius System 100 ships with a Thunder IV G•1600, an ultrahigh-resolution graphics-display/accelerated-video adapter (figure \$2,850); a total of 40 MB of RAM (that's 24 MB more than in the 8100/110 — we added \$800 to the tab for this); a second, 500-MB internal drive (\$300); and an FWB JackHammer SCSI-2 card for its 2-GB Barracuda Fast and Wide SCSI drive (we added \$600 for the card and the premium on the drive). One more item — Adobe Photoshop 3.0.1 will be bundled and pre-installed (\$550). The grand total: \$11,100. Radius was willing to say only that it will sell this system for “under \$10,000.” How far under (assuming the configuration doesn't change) will tell you to what extent the company intends to compete on price. How far above will tell you how much it's trying to impress its shareholders.

By the way, although Radius' goal is to provide users with systems that are ready to be put to work and although it is one of the major monitor vendors in the Mac industry, it will *not* bundle monitors with its systems. A monitor will cost extra. The company will, however, offer its resellers substantial discounts on its monitors, so make sure that if you buy a system with a Radius monitor, the savings get passed on to you.

DayStar: Planning for the Future

Like Radius with its System 100, DayStar will aim its clone offering — the Genesis MP — at the top of the professional-graphics market. As *MacUser* reported last month (see *New on the Menu*, page 23), however, DayStar isn't spending its efforts designing Mac-compatibles based on today's Power Mac technology. It plans to leapfrog to the future of Mac computing. It will be the first company to offer a Mac clone with a PowerPC 604 processor. In raw-speed tests, the 604, expected to debut in Apple Power Macs later this year, clocks in at about twice the speed of today's fastest 601. That should mean a hefty boost for the likes of Photoshop users, whose appetite for processing power seems insatiable.

And DayStar isn't going to give you just one 604 processor. When you buy a DayStar Genesis MP system, you'll get two. Building on the expertise it acquired when it designed an experimental multiprocessor NuBus card, DayStar is moving the Genesis MP's processors off the motherboard onto a swappable daughterboard (the nPower), making future upgrades to faster (and more) processors inexpensive. DayStar has a four-processor design on the drawing board, and the Genesis MP will sport a whopping 325-watt power supply in

anticipation of increased loads from additional processors.

Historically, Mac software has not been designed to take advantage of more than one processor. But some applications — notably programs for compute-intensive 3-D rendering — have already been tweaked to work in multiprocessing environments. DayStar is working closely with the vendors of these applications to ensure that their programs can take advantage of the Genesis MP's multiple processors. Even better, DayStar guarantees that Photoshop will also be ready to take advantage of dual processors: The company is

On the Drawing Board



It won't be long before you start hearing about a radical new Mac OS machine from Radius. Targeted at video professionals who need broadcast quality, this as-yet-unnamed machine will incorporate a rack-mounted system containing Radius' VideoVision Telecast, a high-speed disk array, and a Mac motherboard.

writing a multiprocessing Photoshop plug-in that will ship with every Genesis MP system.

The Genesis MP — *MP* stands for Media Publisher, by the way — will also bid farewell to NuBus in favor of the PCI bus standard, which Apple is due to adopt later this year. Although NuBus has provided an easy way for users to add cards — such as graphics-display adapters, Ethernet adapters, and high-speed SCSI adapters — to the Mac, folks hungry for maximum performance have complained that NuBus' throughput has become a bottleneck. PCI, a higher-speed alternative to NuBus, is already a standard on Intel machines. Its adoption by Apple will offer users a much needed boost in throughput. Although most clone vendors are expected to develop PCI-based systems at some point, DayStar is the only company so far to announce that it is actively working on such a design.

In its base configuration, the Genesis MP will have 32 MB of RAM, a 2-GB internal hard drive, and a tray-loading quad-speed CD-ROM drive. You'll be on your own, however, when it comes to a mouse, a keyboard, and a monitor. You'll also be on your own when it comes to a graphics-display adapter. Contrary to Apple's precedent of offering built-in video, DayStar will forgo a graphics-display adapter and built-in video on the Genesis MP's motherboard.

As for the price of its system, DayStar would offer only a range of \$5,000 to \$10,000. But it has time to figure out a final price. The Genesis MP isn't scheduled to ship until August.

Power Computing: Power for the Masses

Radius and DayStar, with their high-end, everything-you-need-in-one-package approach, will give a small but important segment of the personal-computer market a streamlined path to Mac power. But even if both companies are wildly successful in their clone

efforts, they won't do much to help the Mac chip away at Intel's dominance in the overall market. The customer base the two companies are targeting is already solidly committed to the Mac.

If clones are going to help the Mac OS gain market share, clone vendors are going to have to sell millions of computers, not hundreds or even thousands. The first company to step up to that challenge is Power Computing. Its PowerPC-based desktop models, the 80-MHz Power 80 and the 100-MHz Power 100, which should be shipping in late April, are similar in many respects to Apple's current crop of Power Macs. (Note that Power Computing had not finalized product names at press time.) But they offer some distinct advantages over Apple's lineup. And that's precisely Power Computing's strategy: Offer more, charge less.

To find out just how much more Power Computing plans to offer, we compared its systems to similarly configured Apple Power Macs. An Apple Power Mac 7100/80, with 8 MB of RAM, a 700-MB hard drive, and a double-speed CD-ROM drive costs around \$3,050. It comes with a mouse but no keyboard (Apple's least expensive keyboard costs around \$85), and it has no bundled software other than System 7.5. Power Computing sells a similar configuration of the Power 80 — the same 8 MB of RAM, a slightly larger-capacity hard drive (730 MB), a quad-speed CD-ROM drive, and both a mouse and a keyboard. Total price tag: around \$2,600.

Although a savings of \$535 is nothing to sneeze at, you might wonder if it's enough to justify taking a risk on an unproved vendor. To sweeten the pot, Power Computing adds Now Utilities, Now Up-to-Date, Now Contact, ClarisWorks, and a CD-ROM containing over 200 unlocked Bitstream fonts. The total street value of this software is slightly under \$800. In other words, you get over \$1,000 more value from Power Computing's offering than from Apple's but pay \$535 less. Of course, if you're not interested in any of the bundled software, Power Computing's argument weakens considerably.

As the total system cost increases, so does the difference in price between comparable Power Computing and Apple units. Here's a

higher-end example. The Power Mac 8100/100 with 16 MB of RAM, a 1-GB hard drive, and a double-speed CD-ROM drive sells for around \$4,350. Power Computing sells a similar configuration (again with keyboard and bundled software) for about \$3,350.

How does Power Computing achieve this economy? By simplifying. Unlike Apple, which designs a custom motherboard for every new Mac, Power Computing uses a single motherboard design for its Power 80 and Power 100 systems. The only differences between the Power 80 and the Power 100 are the speed of the processor and the frequency of the clock crystal. Even Power Computing's next round of clones — tower units due out in May or June — will use the same motherboards as the initial desktop units.

Power Computing also won't design a custom enclosure for every new model. The Power 80s and the Power 100s look identical on the outside. Both models are based on the same standard IBM PC AT-style enclosure, which is plentiful and inexpensive. (Of course, Power Computing has added a curve or two to the front bezel of its clones — after all, Power systems *will* be running the Mac OS. They have to have a *touch* of class.) These and other economies of scale enable Power Computing to undercut Apple's prices. (Nor does it hurt that, to a large extent, Power Computing is cashing in on years of Apple's R&D investments.)

Despite some cost-conscious design decisions, Power Computing's initial offerings don't challenge Apple at the low end of the Power Mac market. We find this a bit strange, considering that 65 percent of the Power Macs Apple has sold have been 6100s, its least expensive model. You can purchase Apple's most stripped-down model, a Power Mac 6100/66 with 8 MB of RAM and a 350-MB hard drive (no CD-ROM drive, no VRAM card), for around \$1,700. Sure, Power Computing's least expensive offering (an 8/365 configuration) includes a faster processor, a keyboard, and all the aforementioned bundled software — and it's more expandable, but it also costs \$300 more. The whole point of low-end, low-cost systems is that people don't necessarily care if they get less as long as they spend less.

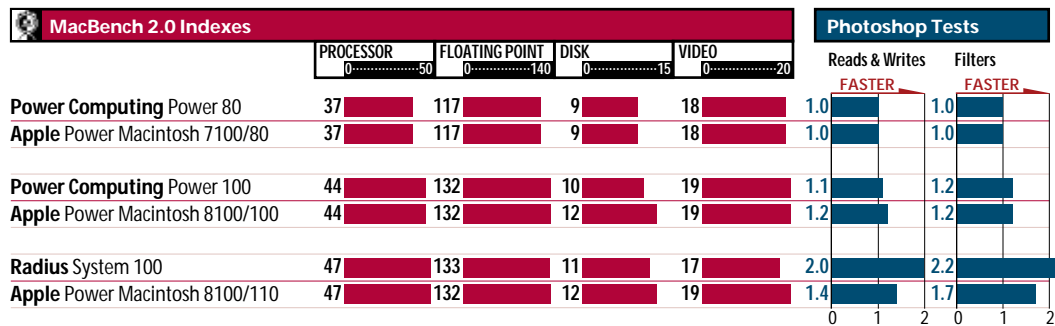
figure 2

Speeding Along / clones turn in solid times

When we pitted Power Computing's and Radius' Mac-compatibles against comparable Apple Power Macs, the clones held their own. For our first set of tests, we used MacBench 2.0 to measure how fast the computers' four main subsystems could handle typical business tasks. We tested each machine by using its internal hard drive and its video set to a color depth of 8 bits. The machines with the fastest processors did the best. (MacBench 2.0 scores are relative to those of a Quadra 630,

which is assigned a score of 10 for each test; longer bars are better.)

For our second set of tests, we ran a series of common Photoshop operations. We tested each machine by using its fastest hard drive and its video set to a color depth of 24 bits. The Photoshop scores are relative to those of a Power Mac 7100/80, which is assigned a score of 1.0 for each group of tests. The Radius System 100 outpaced the others, because it contains components geared to graphics professionals.



Power 80 Motherboard

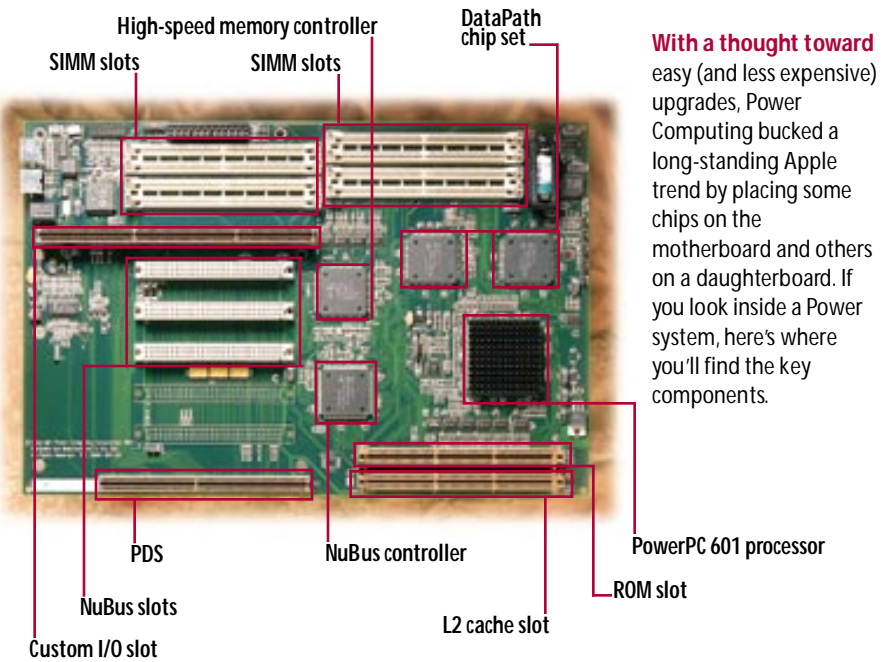
When we pointed this out to the folks at Power Computing, they let us in on a well-kept secret: The company plans to ship a Power Mac 6100-like system this summer. According to a Power Computing spokesperson, once this new model ships, Apple will no longer have the cheapest Mac in town. (Well, OK, it'll still have the cheapest *Mac*, but not the cheapest "PowerPC-based Mac OS-compatible system" in town — but that's too big a mouthful.)

Design Innovations

Although Power Computing's systems rely heavily on Mac technology, the company's engineers have introduced some interesting design innovations. The most obvious one is the presence of an I/O (input/output) daughterboard. Apple has always put all of a Mac's ports on the motherboard. Power Computing has veered away from this tradition. Only the printer, DRAM-video, and ADB ports live on the Power systems' motherboard. The modem, SCSI, Ethernet, and sound-in and -out ports are all on the daughterboard. The decision to put components on two separate boards was driven primarily by cost. By moving ports to a daughterboard, Power Computing can alter port configurations — offering, for example, a 10BASE-T Ethernet port instead of Apple's AAUI connector — without having to redesign its motherboard.

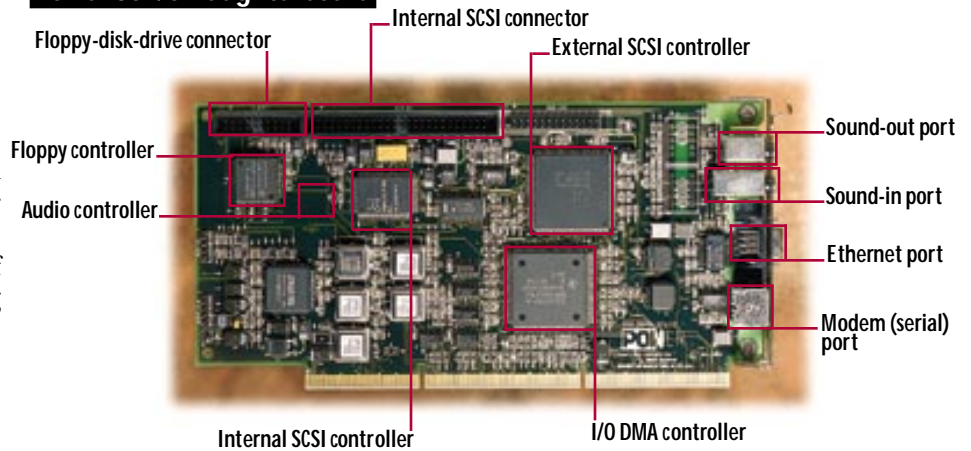
Power Computing also gives its customers a bonus on its video-display card. The card provides not only a standard Mac DB-15 video-display port but a VGA port as well. For those who want to connect a VGA monitor to a Power system, this port makes it a simple matter of plug-and-play — there's no need for a special adapter.

Power Computing is taking a fresh approach toward marketing as



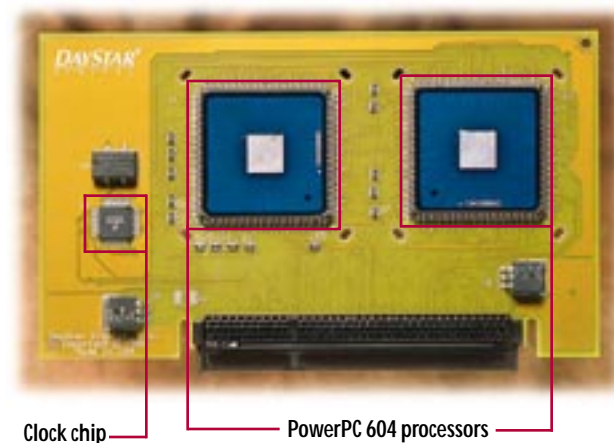
With a thought toward easy (and less expensive) upgrades, Power Computing bucked a long-standing Apple trend by placing some chips on the motherboard and others on a daughterboard. If you look inside a Power system, here's where you'll find the key components.

Power 80 I/O Daughterboard



well. Apple has an annoying habit of announcing hot new models and then being unable to deliver the most-sought-after configurations to dealers, but Power Computing is determined not to make you wait. When you're ready, dial 800-999-7279 and custom-order the configuration of your dreams. The company plans to have a large supply of RAM, hard drives of various sizes (ranging from 365 MB to 4 GB), extra VRAM, and even a selection of monitors. Tell 'em what you want; they'll price it while you're on the phone, fax a copy of your order to you, and put a system together and have it sitting on your doorstep in a few days.

Genesis MP's nPower Daughterboard

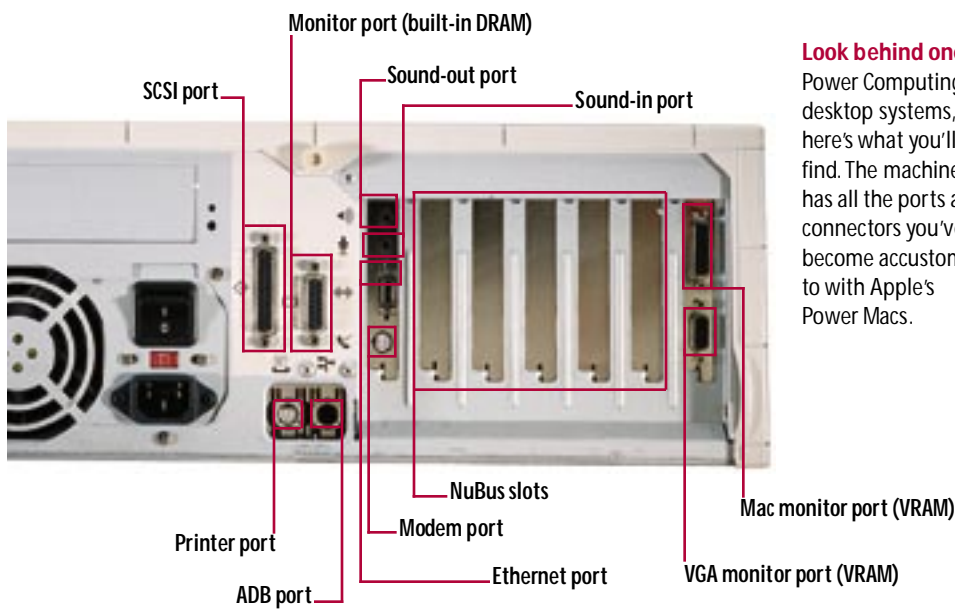


DayStar has added a few clever tricks to its Genesis MP. For example, the company uses a daughterboard that supports two PowerPC 604 processors and that can be upgraded later to contain as many as four.

On the Labs Bench

To see how the first crop of clones stacks up, MacUser Labs ran speed and compatibility tests on the Power 80, the Power 100, and the Radius System 100. DayStar's Genesis MP

From the Back



Look behind one of Power Computing's desktop systems, and here's what you'll find. The machine has all the ports and connectors you've become accustomed to with Apple's Power Macs.

Power 100 and the Radius System 100, it would be unfair to conclude that Macs in general have better disk-subsystem speed than clones. For example, the Power 100 we tested didn't have a drive comparable to that in the Power Mac 8100/100 to which we compared it. In the case of the Radius System 100, the drive for which we show Disk Mix test results is the internal 540-MB drive, which we compared to the high-speed internal 2-GB drive of the Power Mac 8100/110.

The Radius System 100, however, also contains a high-speed 2-GB drive, connected to a Fast and Wide SCSI-2 NuBus card. We used this drive for performing a series of disk-intensive Photoshop tests. Unlike most Mac applications, which read and write data in relatively small blocks, Photoshop moves data to and from a hard disk in very large blocks. It was in these tests that the custom drive in the Radius System

was not ready to test for this issue. For comparison, we also tested three Power Macs: a 7100/80, an 8100/100, and an 8100/110.

The three clones performed pretty much as you would expect from systems that differ technically from their Mac counterparts only in modest ways. We first ran our core suite of MacBench 2.0 tests. Based on extensive profiling of the top-selling Mac applications, MacBench is a standard for comparing the speed of the four major subsystems — processor, floating-point, disk, and video — of machines that run the Mac OS. MacBench numbers provide data on the relative speed of Macs being used for typical business tasks.

Not surprisingly, in the Processor and Floating Point tests, the clones performed identically to Power Macs that contained the same-speed PowerPC processors. The Disk Mix test is sensitive to the particular drive mechanism and software driver being tested. Although Apple's Power Macs scored better on this test than the

100 excelled, shoveling data to and from the computer nearly 43 percent faster than the Power Mac's drive.

In the Video Mix test, the only surprise was the poor showing of the Thunder IV GX•1600, the cream of Radius' graphics-display/accelerated-video-adaptor crop. Again, however, it's important to realize that the MacBench Video Mix test is based on typical business-application tasks. This test provides a good measure of the overall snappiness of the Mac interface — entering data, typing, pulling down menus, clicking on buttons in dialog boxes, and the like. This is not the type of work graphics-display/accelerated-video adapters are designed to enhance. When we did a series of Photoshop image-manipulation tasks (Unsharp Mask, Gaussian Blur, and Rotate), specialized routines handled by DSP chips on the Thunder IV card kicked in. In these tests, the Radius System 100 outpaced Apple's top-of-the-line Power Mac by 30 percent.

Foreign Affairs / *not all clones will come from the U.S.*

MOVE TO JAPAN — that's our advice if you're looking for the ultimate Mac for home entertainment and education. Pioneer, the consumer-electronics giant, and Bandai, a Japanese-toy-industry leader, have licensed the Mac OS and rolled out prototypes of their consumer clones.

Pioneer's Multimedia Personal-Computer line will include the MPC-GX1, which has a 66-MHz PowerPC 601, and the lower-cost MPC-LX100, powered by a 33-MHz 68LC040. These are fully functioning Mac clones as well as impressive home-entertainment centers with full AV capabilities. Each offers video input and capture; a 4.4x CD-ROM drive; and a built-in stereo speaker system that boasts two tweeters, two midrange speakers, and an internal subwoofer. Prices, configurations, and expansion capabilities had not been finalized at press time. Although no plans yet exist to bring either the MPC-GX1 or the MPC-LX100 to the U.S., a Pioneer spokesperson expressed interest in exploring that possibility after the line's Japanese release this summer.

Bandai's Pippin Power Player's vow of power and versatility may seem overstated when you first see the tiny 10-x-12-inch black box, but

inside is a 66-MHz PowerPC 603, a 4.4x CD-ROM drive, ADB and GeoPort connections, and 16-bit 44-kHz stereo-sound capability.

But the Pippin Power Player won't replace your Mac: It's a challenger to Sega and Nintendo that connects to your TV and plays CD-ROM titles modified to include portions of the Mac OS. Bandai hasn't announced plans for distribution outside Japan. / Rik Myslewski



Pioneer's soon-to-be-released MPC-GX1 may be the ultimate Mac clone for the home, with a stereo system, a CD-ROM drive, and AV capabilities. It's shown here with its companion CLD-PC10 laserdisc player.

If It Quacks Like a Mac . . .

Apple is working with Mac OS licensees to ensure that their machines behave just like the real item. In addition to reviewing clone vendors' technical designs, all of which are based heavily on Apple's own technology, Apple has set up a program for performing exhaustive sets of compatibility tests on clone systems. Now that Apple has committed itself to a clone-friendly strategy, the company wants to make sure users don't get a sour experience with the Mac OS.

We, of course, did some compatibility testing of our own:

- We installed popular graphics-display adapters from Radius, RasterOps, and EA Research and attached monitors at a range of resolutions. We even tried a VGA monitor.
- We installed Fast and Wide SCSI-2 cards from both ATTO and FWB and attached high-speed disk arrays.
- We printed via LocalTalk. We printed via Ethernet. We printed to monochrome printers. And we printed to color printers.
- We connected a UMAX scanner and scanned a test image.
- We connected a Kensington Thinking Mouse and a Wacom tablet via the ADB port.
- We hooked up external speakers and played a CD. We plugged in a microphone and recorded a system sound.
- We checked out file sharing.
- We turned virtual memory on, and we turned it off. We also tried Connectix's RAM Doubler.
- We installed Now Utilities.
- And we gave a thorough workout to several major Mac applications: Word, Excel, FileMaker, QuarkXPress, and Photoshop.

Guess what? Even though the units we tested weren't final, we found their compatibility with Apple's Macs and third-party products to be near-perfect. The only problems we had — a conflict between RAM Doubler and the SCSI JackHammer card in the Radius System 100, and some snags with various CD-ROM and hard-disk drivers in the Power Computing system — turned out to be repeatable on Power Macs as well. You might say the clones were not merely compatible with Macs, they were bug-for-bug compatible.

Service with a Smile

There's no doubt that clones — compatible, affordable, available — are going to shake up the Mac market. But one factor that is likely to play a big role in the success or failure of clone vendors is often overlooked in the hoopla about kilobytes and kilobucks. Tech support.

Historically, Apple has been vulnerable on this point. Although our recent spot checks calling 800-SOS-APPL show that the company has improved significantly, waits of 45 minutes to an hour on hold were common a year ago.

To find out how seriously vendors are taking the support issue, we grilled Apple, DayStar, Power Computing, and Radius about their support policies. Here's what they had to say:

Warranty. Power Computing and Radius will offer the same standard one-year parts-and-labor warranty that Apple adopted some years back. DayStar's warranty, however, will last three years.

Tech-Support Response. DayStar's stated goals were the most aggressive on this point. The firm says that after connecting to its support line, a customer shouldn't wait more than 25 seconds before speaking to a technician and that simple problems will be resolved within 5 minutes. Power Computing's target is a maximum of 3 minutes on

More Mac OS Questions

WHEN WE HEARD that Apple was going to license System 7.5, we wondered, Will the Apple menu still be called the Apple menu? The more we thought about it, the more questions we realized we had. But when we asked Apple those questions, we discovered that even in mid-March, the company still didn't have answers for some of them. Our conversation with Apple went something like this:

Q. What version of the system software will licensees ship?

A. It will essentially be System 7.5, but we haven't decided on a version number yet.

Q. What will the splash screen say when you first boot a clone?

A. Eventually, it will say, "Welcome to Mac OS" and will display the Mac OS two-blue-faces logo. Even Apple's Macs will display this startup screen. But the first shipping clones may still say, "Welcome to Macintosh."

Q. What will the first item be in the Apple menu when the Finder is active?

A. As with the splash screen, the first clones may still say, "About This Macintosh." As soon as we can get our act together, this will change to something like, "About This Mac OS Computer." Over time, the entire system will be changed so that current references to "Macintosh" will read "Mac OS."

Q. Will Apple license all the utilities in the Apple Extras folder that comes on the System 7.5 CD-ROM?

A. All the utilities that Apple has rights to will be licensed.

Q. Which utilities doesn't Apple have rights to?

A. We're not sure.

Q. What about fonts, such as Times, Helvetica, and Palatino, that Apple licenses from Linotype-Hell AG?

A. Uh, yeah. We're working on that . . .

Q. How about HD Setup (Apple's hard-disk driver) and Apple's CD-ROM driver? The versions that come with System 7.5 work only on drives with special Apple ROMs. Will you be "unlocking" them so users can install them for use with any drives?

A. The versions that will ship with the initial licensee computers will support Apple drives only. We're looking into changing this.

So, there you have it. Clearly, the licensed version of the Mac OS is a work in progress. But Cupertino has made *one* firm decision: The Apple menu will remain the Apple menu.

hold before a technician becomes available. Apple's is between 2 and 8 minutes, depending on the model. Radius' target is 4. Radius, however, said that it considered its dealers and resellers the first line of support for customers, because they would most likely understand the customer's needs better. This seems like a poor policy, given that Radius emphasizes its one-stop-shopping edge. **Repairs.** Radius and Power Computing each said they expect most repairs to be turned around in 48 hours. Radius again said that most repairs would be handled by the companies that made the initial sale and that the policies might vary. Apple strives for a 48-hour turnaround on walk-in repairs by dealers and a 72-hour turnaround for mail-in repairs. It also offers 48-hour on-site repair for all hardware except PowerBooks and Newtons — something the other vendors were not willing to commit to. At press time, DayStar had not yet finalized a repair-turnaround policy. None of the vendors were willing to commit unequivocally to cross-shipping loaners to customers whose downed machines would cause them to miss deadlines,

MAC CLONES

although all said they'd consider doing so on a case-by-case basis.

Of course, all this looks good on paper. But the proof will be in customers' actual experiences. DayStar's stated goals surpass those of its competitors. Power Computing, on the other hand, seems to have the deepest understanding of the importance of support (for example, the company plans to follow up with its first customers regarding their experiences). Radius' emphasis on preconfigured, ready-to-roll systems is a plus for high-end users, but its reliance on its resellers to bear the brunt of the tech-support burden could prove less than user-friendly.

Just Around the Corner

Now that we've given you a glimpse of how the first round of Mac clones stacks up, you might be wondering what to expect in the future. A lot. As Apple introduces new technologies later this year —

notably systems based on the PowerPC 604 chip and the PCI bus — expect to see clone vendors follow suit. Although DayStar is the only company that has staked out this territory so far, it won't have it to itself for long. The performance benefits of the new processor and expansion bus are too great for any clone vendor to ignore, especially those such as Radius that are targeting their products at performance-hungry professionals. Power Computing is considering producing a transition machine, one with NuBus and PCI slots, for customers who want the option to move up to the latest capability without sacrificing compatibility with already installed hardware.

Clone vendors are a likely source of machines that maintain backward compatibility in other ways as well. Rumor has it, for example, that Apple's next round of Power Macs will abandon 72-pin RAM SIMMs for 128-pin DIMMs (dual in-line memory modules), which have a wider data path. You may have just gotten over having to toss

figure 3

Vital Statistics / comparing clones and Power Macs

You can tell a lot about a computer from its specifications. In the case of the clones, a glance at the various configurations can tell you what type of users each targets. Take, for example, two basic peripherals — the mouse and the keyboard. Apple includes only a mouse; Power Computing, in its quest to offer a bit more for a bit less, bundles both a mouse and a keyboard. Similarly, Radius, with its one-stop-shopping approach, bundles both. DayStar, with its high-end, dual-processor

PowerPC 604-based machine aimed at an established base of Mac users, bundles neither.

And if you are wondering why DayStar's Genesis MP uses processors that are more advanced than that in Apple's top-of-the-line Power Mac, it's because the Genesis MP won't ship until late summer. By that time, the PowerPC 604 should be available in quantity. In addition, DayStar will equip its systems with a fast, PCI bus.

	Estimated street price	PowerPC processor	Processor speed	Installed RAM	Maximum RAM	Number of memory slots	Hard-drive capacity	CD-ROM drive (speed)	Installed VRAM	Maximum VRAM
DayStar										
Genesis MP	\$5,000 – \$10,000	604	120 MHz	32 MB	~512 MB	8	2 GB	4x	none	NA
Power Computing										
Power 80	\$1,999	601	80 MHz	8 MB	200 MB	8	365 MB	none	none	NA
Power 80	\$2,599	601	80 MHz	8 MB	200 MB	8	730 MB	4x	2 MB	4 MB
Power 80	\$3,049	601	80 MHz	16 MB	200 MB	8	1 GB	4x	2 MB	4 MB
Power 80	\$3,699	601	80 MHz	16 MB	200 MB	8	2.1 GB	4x	2 MB	4 MB
Power 100	\$2,899	601	100 MHz	8 MB	200 MB	8	730 MB	4x	2 MB	4 MB
Power 100	\$3,349	601	100 MHz	16 MB	200 MB	8	1 GB	4x	2 MB	4 MB
Power 100	\$3,999	601	100 MHz	16 MB	200 MB	8	2.1 GB	4x	2 MB	4 MB
Power 100	\$4,999	601	100 MHz	16 MB	200 MB	8	4 GB	4x	2 MB	4 MB
Radius										
System 100	<\$10,000	601	110 MHz	40 MB	264 MB	8	500 MB, 2 GB*	2x	6 MB [†]	NA
Apple Computer										
Power Mac 6100/66	\$1,699	601	66 MHz	8 MB	72 MB	2	350 MB	2x [§]	none	NA
Power Mac 7100/80	\$2,749	601	80 MHz	8 MB	136 MB	4	500 MB	none	1 MB	2 MB
Power Mac 7100/80	\$3,049	601	80 MHz	8 MB	136 MB	4	700 MB	2x	1 MB	2 MB
Power Mac 7100/80AV	\$3,599	601	80 MHz	16 MB	136 MB	4	700 MB	2x	2 MB	2 MB
Power Mac 8100/100	\$3,549	601	100 MHz	8 MB	264 MB	8	700 MB	none	2 MB	4 MB
Power Mac 8100/100	\$4,349	601	100 MHz	16 MB	264 MB	8	1 GB	2x	2 MB	4 MB
Power Mac 8100/100AV	\$4,599	601	100 MHz	16 MB	264 MB	8	1 GB	2x	2 MB	4 MB
Power Mac 8100/110	\$5,999	601	100 MHz	16 MB	264 MB	8	2 GB	2x	2 MB	4 MB

*The higher-capacity drive is external.

[†]VRAM is included on the Thunder IV GX-1600 card.

[§]The CD-ROM drive is optional.

out your older Macs' 30-pin SIMMs when you upgraded to a more recent model. Well, beware: You may have to do it again. Unless an enterprising clone vendor, sensing an opportunity, offers a model with a 604 processor, a PCI bus, and support for 72-pin SIMMs.

Although the first batch of compatibles relies very heavily on Apple's technology — and this will continue to be the case for a portion of the clone market — expect to see the likes of DayStar, Power Computing, and Radius doing more and more custom design and development. Portable clones are one area ripe for such innovation. In fact, Toshiba is rumored to be working on Mac OS portables — although the rumor says that Intel is leaning heavily on the successful Windows notebook-computer vendors to shun the Mac OS.

You can also expect to see Mac-compatibles based on the *common hardware reference platform* (chrp) in the second half of 1996. More than just a mouthful of jargon, chrp (pronounced "chirp") is a motherboard-design specification any manufacturer can use to build a PowerPC-based computer. Any computer that complies with the chrp specification will be able to run any or all of several operating systems: Mac OS, Windows NT, OS/2, Sun's Solaris, and IBM's AIX. Apple's goal in supporting chrp is to make it easier and less expensive for vendors to build PowerPC-based computers — and hopefully encourage them to license the Mac OS.

The Big Question

For now, the question remains, Should you buy a clone? That depends on what you need. If you're in the high-octane market that DayStar and Radius are targeting, you'd be well advised to consider their Mac alternatives seriously. Without final pricing, however, it's hard to say whether either company's offerings will be a bargain. If, however, the advantages that both companies are promoting — everything in one box and one place to turn to when something breaks — translates into consistently good user experiences, these machines may be worth even a premium price.

If Power Computing's offerings are more your style but you're still a bit wary, bear in mind the company's 30-day money-back guarantee. Try a Power system, and return it if you're not happy with it. If you work at a large corporate site that has a bunch of Macs, buy two or three, sprinkle them around, and see how they hold up. Besides, if you're in the market for a Power Mac 8100, you may have to wait months before Apple can deliver (as of early March, Power Mac 8100s were back-ordered until June). On the other hand, if Power Computing's claims pan out, you can have a Power 100 on your desktop in under a week.

Mac clones unquestionably hold great promise. But oddly, although in most customers' minds that promise has everything to do with the bottom line, the Holy Grail of Mac-dom — a reasonably powered, complete system for under \$1,000 — remains elusive. No one's even come close. If a stripped-down, inexpensive, non-Apple version of a Power Mac 6100 is the machine you've been saving up for, the clone market has nothing to offer you. Not yet. ☒

Henry Bortman, *MacUser's* technical director, has been compatible with the Mac OS since he got his hands on a 128K Mac. *MacUser* project leader Jeffrey Milstead managed the testing for this report.

 MacBench 2.0 is available on-line on ZiffNet/Mac. See page 4 for information on accessing ZiffNet/Mac.

Cutting Edge Quatro 850

"MAC CLONES NOW!" proclaimed a small ad that appeared in the back of *MacWEEK* in late January, months before any of Apple's OS licensees shipped their products. The offer, from Cutting Edge, of El Cajon, California, was bona fide, but Cutting Edge's definition of *clone* wasn't the same as Apple's. As a result of the companies' difference of opinion, Cutting Edge has scaled back its initial foray into the Mac-clone market. Still, the company plans to sell the Quatro 850 — an Apple Centris 650 motherboard repackaged in a tower-style case — through a nationwide network of about 30 resellers.

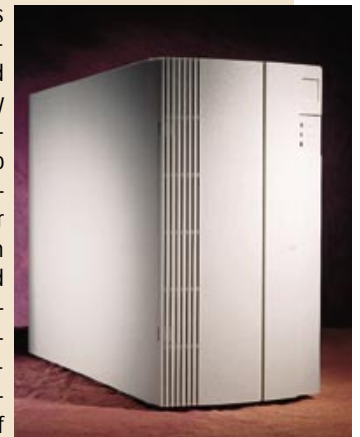
Cutting Edge conceived the Quatro 850 as a way of reselling Centris 650 logic boards acquired from companies that buy and resell surplus Apple parts. (Mike Ehman, Cutting Edge's president, said the company does not disclose its suppliers' names.) Cutting Edge designed a tower case to hold the board and added a 200-watt power supply and drive bays for up to five SCSI devices. Originally the firm planned to sell fully configured systems with 25-MHz or 33-MHz Motorola 68040 or 68LC040 processors and bundled with Cutting Edge-branded RAM, hard drives, mice, and keyboards, in addition to optional third-party peripherals such as CD-ROM drives and monitors. The *MacWEEK* ad offered a 25-MHz 68LC040 system with 8 MB of RAM, a 270-MB hard drive, a keyboard, and a mouse, for \$999.

Apparently the offering didn't sit well with Apple: Although neither company is willing to comment in detail, Cutting Edge pulled its ad after only two weeks and expunged *clone* from all references to the Quatro 850, which it now describes as a "Mac alternative case design." Ehman also reports that the previously abundant supply of Centris 650 logic boards it planned to use in the Quatros has diminished considerably since the ad's appearance. As a consequence, Cutting Edge still expects to meet dealer demand for its systems but will not sell Quatros directly. Cutting Edge also ended plans to ship systems with third-party peripherals, but it will supply its own keyboards, mice, hard drives, and RAM to dealers. Cutting Edge plans to offer empty Quatro cases to dealers who want to buy their own boards or install users' boards in the tower cases.

Quatro system configurations and prices will be decided by individual dealers, but our research indicates that the price for a Quatro with a 25-MHz 68LC040 processor, a keyboard, and a mouse will be consistent with Cutting Edge's original \$1,000 direct-sales prices. Cutting Edge guarantees its case and components for one year, but dealers will be responsible for all service and support. A list of Quatro dealers is available from Cutting Edge (619-441-6991).

Cutting Edge may try to package non-Centris 650 Apple motherboards in the Quatro case and will also seek a Mac OS license from Apple, Ehman added. Apple PR rep Jenni Johnstone said Apple's only comment was that Cutting Edge is not a Mac OS licensee and that Apple had no plans to negotiate a license with it. So Apple can't certify the Quatros' full compatibility with Mac software and hardware.

Bear in mind, then, that although a Quatro 850 may be an appealing bargain, it's also a calculated gamble. Apple *did* build the Cutting Edge motherboards but has disowned them in terms of warranty, service, and upgrades. And with some boards furnished by Cutting Edge and others by dealers, it may be hard to know exactly what you're getting. Proceed cautiously: In this instance, the Cutting Edge is a place where risk takers *maybe* rewarded. / Jim Shatz-Akin



THINK GIG

CONQUER
THE LIMITS
OF SPACE
WITH A
DRIVE THAT
HOLDS 1 TO 2
GB OF DATA.

BY
MARK
FROST

If you're a typical business user who's owned a Mac for a year or more, you've almost certainly got a significant problem on your hands: The hard drive that shipped with your computer — no matter how roomy it seemed when you bought it — is getting crowded. Several remedies are possible: You can toss some files you *probably* won't need again, transfer data onto floppy disks for storage every couple of work sessions (and invest in *a lot* of disk labels), or save aggravation and spring for a new storage device.

Here again, you have choices: A removable-media drive, such as a SyQuest or optical drive, provides great data portability. Using removable cartridges *can* get expensive, however, and if you're anything less than super-organized, you may find yourself sifting through stacks of cartridges looking for a particular file. A tape drive can certainly offer relief, but these devices aren't really meant for everyday storage use. Without question, the easiest, most comfortably familiar option is to get a new hard drive: You already know how it works, you don't need any special software to use it, and it's the fastest type of storage device you can buy. Best of all, you can get a *humongous* drive with a capacity of a gigabyte or more without paying a humongous price.

MacUser ZD
LABS



1- TO 2-GB HARD DRIVES

To find the best big-drive options, we asked vendors to send us one or two drives each, with a capacity in the range of 1 to 2 GB and a good price/performance ratio for office applications. We didn't test the superfast disk arrays, RAID's, or Fast and Wide SCSI storage systems many vendors offer for specialized uses. Our evaluation of 42 drives focused on bang for the buck — drives that offer high capacity and/or speed at a fair price. We also considered support, software and documentation, and quality of design and construction.

A Question of Values

We began our assessment by calculating each drive's cost per megabyte: We divided the formatted capacity (the "MB available" value reported in an erased disk's main window) by the estimated street price. The results were encouraging: Just a few years ago, vendors eagerly pursued the Grail-like goal of \$1 per megabyte. Today, one of

the drives we tested — the Cutting Edge CFP 2105S — cut that cost nearly in half, at only 51 cents per megabyte. Furthermore, only 4 of the 42 drives we tested — the MASS Microsystems MASSter Drive 1630, the MegaDrive Mercury 2.1, and the MountainGate IncreMeg 1.7GB AV and IncreMeg 2GB — exceeded \$1 per megabyte. (Some of the extra cost of the MountainGate and MegaDrive models is because they are removable hard drives — more on this later.)

The notion of bulk-buy bargains wasn't particularly applicable to these drives, since per-megabyte cost didn't decrease much as drive capacity increased. Among the fourteen 1-GB drives we tested, costs ranged from 59 cents to 97 cents per megabyte. Among the twenty-four 2-GB models, per-megabyte costs ranged from 51 cents to \$1.10. The four in-between drives, which had capacities of 1.4 to 1.6 GB, ranged from 66 cents to \$1.14 per megabyte. If your only goal in purchasing a hard drive is obtaining tons of storage

The Bottom Line

MacUser ZD LABS THERE'S LITTLE LOGIC to the relationship among price, capacity, and speed for hard drives in the 1- to 2-GB range. Premium prices don't necessarily mean high speed, and cost per megabyte doesn't always drop as drive capacity rises. Shop carefully, and you'll get ample disk space *and* zippy speed at a reasonable price.

- ⊕ = OUTSTANDING
- = ACCEPTABLE
- ⊖ = POOR

PRICE/
PERFORMANCE
CUSTOMER
SERVICE
DESIGN AND
CONSTRUCTION
SOFTWARE AND
DOCUMENTATION

FWB PocketHammer 2100 ⊕ ⊕ ● ⊕
The fastest drive we tested, the PocketHammer 2100 (\$1,865 list, \$1,720 estimated street), isn't exactly inexpensive but delivers top speed at a reasonable price.

Dynatek HDA 1.0Q ● ⊕ ● ⊕
Great speed at a reasonable price is the hallmark of the 1-GB HDA 1.0Q (\$999 list, \$849 estimated street). It scored fourth in speed tests and offered great after-sale support.

MicroNet Advantage 2000 ⊕ ● ● ⊕
Low cost per megabyte and respectable speed make the MicroNet Advantage 2000 (\$1,395 list, \$1,259 estimated street) a fine choice among 2-GB drives.

	Cutting Edge CFP 1060S	⊕	●	●	●
	Cutting Edge CFP 2105S	⊕	●	●	●
	Dynatek HDA 2.0Q	●	⊕	●	⊕
	La Cie Joule HD 2160	●	⊕	●	●
	Loviell Lightning 2100	⊕	⊕	●	●
	MacProducts Magic 2GB IBM	⊕	●	●	⊕
	APS 1.0GB	●	●	⊕	●
	APS 2.5GB	●	●	⊕	●
	FWB HammerPE 1000	●	⊕	●	●
	La Cie Joule Portable 1400	●	⊕	●	●
	MacConnection MDS	●	●	●	●
	Express 2GB	●	●	●	●
	MacConnection MDS	●	●	●	●
	Vortex 1GB	●	●	●	●

	PRICE/ PERFORMANCE	CUSTOMER SERVICE	DESIGN AND CONSTRUCTION	SOFTWARE AND DOCUMENTATION
	MacProducts Magic 2GB			
	Seagate	●	●	⊕
	MASS Microsystems			
	MASSter Drive 2010	●	⊕	●
	MaxConcept LPBC1000E	●	●	●
	MaxConcept LPS2050E	●	●	●
	MegaDrive Mercury 2.1	●	●	●
	MicroNet SS-2070	●	●	⊕
	Microtech P1400	●	⊕	●
	Microtech P2000	●	⊕	●
	Mirror IBM 2100	●	⊕	●
	Mirror Seagate 1075	●	⊕	●
	Spin Spirit 2GB	●	●	⊕
	Apple 1080 MB External	●	⊖	●
	Liberty 50 Series 1GB	●	⊖	●
	Liberty 50 Series 2GB	●	⊖	●
	MacWarehouse PowerUser			
	Pro 2.0	⊖	●	⊕
	Micropolis MicroDisk			
	2GB AV LT	●	⊕	⊖
	Micropolis MicroDisk 2GB LT	●	⊕	⊖
	MountainGate			
	IncreMeg 2GB	●	●	●
	Optima Discovery 2100	●	⊖	●
	PDQ 1GB	⊕	●	⊖
	PDQ 2GB	⊕	●	⊖
	CORE COREdisk Slim	●	⊕	⊖
	MacWarehouse			
	PowerUser Pro 1.0	⊖	●	⊕
	MASS Microsystems			
	MASter Drive 1630	⊖	⊕	●
	MountainGate			
	IncreMeg 1.7GB AV	⊖	●	●
	Optima MiniPak 1000	●	⊖	●
	Spin Spirit 1GB	⊖	●	⊕

Listing is alphabetical within groups of equal mouse ratings.

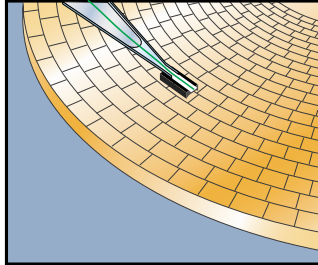
figure 1

Heads in a New Direction / new technology boosts drive speed, capacity

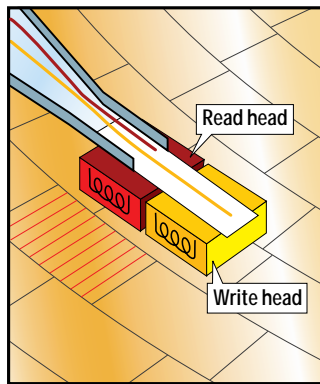
Two of the drives we tested, the Dynatek HDA 1.0Q and the Mirror IBM 2100, are based on IBM mechanisms that utilize a promising new technology in the heads that they use for reading data from the disk.

Magnetostrictive (MR) heads contain lighter, faster read elements than do the inductive heads used in most current-generation drives, and they make it possible to fit more data on a disk. Here's how they work:

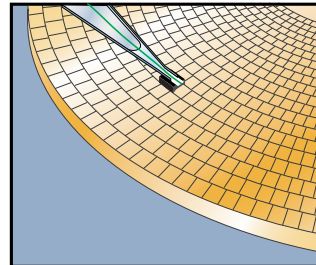
Inductive



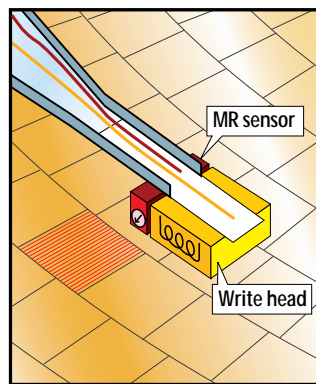
To read the magnetically polarized regions that have been written as 1s or 0s on the disk platter, an inductive read head places a minuscule wire coil in the regions' magnetic fields, which induce electrical current within the coil. The direction of the current changes with each region's polarity and is recognized by the drive as a 1 or a 0. For this method to work, the written regions on the disk must be physically large enough to generate a magnetic field the head can sense.



Magnetostrictive



An MR head, which is much smaller than an inductive read head, contains magnetized elements that spin and realign as they move between magnetic fields of differing polarity. Rather than registering the polarity of blocks themselves, when reading data, an MR sensor senses change in polarity (or lack of it) between blocks and translates it into 1s and 0s. This means that blocks can be smaller than those required by inductive read heads. Smaller blocks mean that more data can be stored on a disk of a given size.



space for little cash, look in the Cost/MB Index column of figure 2 and focus on the single-dollar-sign entries. They offer real storage bargains, at 63 cents or less per megabyte.

Make It Quick

Our evaluation of drive speed began with the assumption that you want snappy performance when opening and saving files created with basic office applications. (If you're looking for superfast drives for such purposes as video editing, the business-class drives we evaluated for this report probably aren't for you.) We used MacBench 2.0, the latest version of the Mac benchmark software developed by Ziff-Davis Benchmark Operation, to test drive speed. The Disk Mix test, based on the data-transfer characteristics of 12 popular Mac applications, is an excellent indicator of drive speed.

The top performer in the Disk Mix test was the FWB Pocket-Hammer 2100, which beat its nearest competitors, the Apple 1080 MB External and the MacProducts Magic 2GB IBM, by a margin of about 4 or 5 percent, respectively. Low scorers in the Disk Mix test were the Spin Spirit 1GB drive and the two MacWarehouse Power-User Pro drives. Full results are shown in figure 2.

In keeping with our budget-conscious emphasis, we didn't stop with a look at raw speed. We also calculated a speed/value index by dividing each drive's Disk Mix test score by its estimated street price. The drives that have five arrows in the Speed/Value Index column of figure 2 had the best balance of speed and price.

Hire a Good Driver

A hard drive's speed is largely a function of its *mechanism*, the sealed assembly inside the case that contains the controlling electronics, drive motor, coated platters on which data is stored, and the heads that read and write data. Figure 2 reveals that drives with the same mechanism aren't necessarily equally speedy, however. Driver software accounts for the difference.

The driver sets controls on the drive mechanism to ensure that it works properly with the Mac. There are two features — SCSI Manager 4.3-compliance and enabled write caching — every driver should offer to ensure fast speed. When buying a drive, be sure to ask the vendor if its driver software supports these features.

SCSI Manager 4.3, which is built in to the ROMs of Power Macs and which is also available as part of System 7.5, gives drives that have compliant driver software a significant speed boost. It allows *asynchronous* data transmission between a hard drive and your Mac, which frees the Mac's processor from having to wait for the drive between transfers of chunks of information. The speed benefit of asynchronous transfers varies from drive to drive. The CORE and MegaDrive drives were the only ones we tested that didn't ship with SCSI Manager 4.3-compliant software.

The write cache is an area of memory in every drive we tested that can improve data-transfer speed by as much as 20 percent — as long as it's turned on in the driver software. Seven of the drives we tested — the CORE COREdisk Slim, MacWarehouse PowerUser Pro

1- TO 2-GB HARD DRIVES

figure 2



Tools for Comparison Shopping / vast space or fast speed?

Set your priorities, and decide whether you want your money to go toward lots of disk storage, high drive speed, or a balance of both. If lots of inexpensive storage space is what you crave, look for drives with just

one dollar sign (\$) in the Cost/MB Index column. If you want top speed for general office applications, focus on the top performers in the MacBench 2.0 Disk Mix test and the five-arrow performers in the Speed/Value Index

	List price	Estimated street price	Formatted capacity	Mechanism	Driver software	Warranty
✓ FWB PocketHammer 2100	\$1,865	\$1,720	2,045.7 MB	Digital DSP3210S	HDT Primer v1.6.2	5 years
Apple 1080 MB External	\$899	\$850	1,013.4 MB	Quantum Empire_1080S	Apple Disk Tools 7.3.2 ¹	1 year
MacProducts Magic 2GB IBM	\$1,499	\$1,499	2,146.5 MB	IBM OEM DFHSS2W	Anubis Utility v2.52x	5 years
✓ Dynatek HDA 1.0Q	\$999	\$849	1,031.9 MB	IBM DPES-31080	Dynatek Compass Pro	3 years
✓ MicroNet Advantage 2000	\$1,395	\$1,259	2,055.4 MB	Conner CFP2105S	MicroNet Utility v6.4.9	1 year
Loviél Lightning 2100	\$1,299	\$1,079	2,003.8 MB	Quantum Empire_2100S	Anubis Utility v2.52s	5 years
PDQ 2GB	\$1,129	\$1,050	2,003.5 MB	Quantum Empire_2100S	Spot On 2.3.1	1 year
MaxConcept LPBC1000E	\$847	\$840	1,060.0 MB	Conner CFP1060S	Lido 7 v. 7.4.0j	2 years
Microtech P1400	\$1,108	\$955	1,333.2 MB	Quantum Empire_1400S	Diskforce Utility v2.52x	5 years
PDQ 1GB	\$779	\$625	1,027.4 MB	Quantum Empire_1080S	Spot On 2.3.1	1 year
Cutting Edge CFP 2105S	\$1,050	\$1,050	2,045.7 MB	Conner CFP2105S	Drive7 Lite 3.0.9GL	5 years
Cutting Edge CFP 1060S	\$599	\$599	1,010.9 MB	Conner CFP1060S	Drive7 Lite 3.0.9GL	5 years
Micropolis MicroDisk 2GB AV LT	\$2,260	\$1,710	2,045.3 MB	Micropolis 4221-09MZ 1020A	Anubis Utility v2.52LUN	5 years
Mirror IBM 2100	\$1,199	\$1,199	1,918.0 MB	IBM OEM 0664M1H	HDT Primer PE v1.6.2	5 years
MountainGate IncreMeg 2GB	\$2,219	\$2,110	2,003.7 MB	Quantum Empire_2100S	IncreMeg 4.02	2 years
Microtech P2000	\$1,752	\$1,440	2,038.2 MB	Seagate ST12550N	Diskforce Utility v2.52x	5 years
MacProducts Magic 2GB Seagate	\$1,399	\$1,399	2,045.6 MB	Seagate ST32550N	Anubis Utility v2.52x	5 years
APS 1.0GB	\$650	\$650	1,008.4 MB	Seagate ST312300N	APS PowerTools 3.06	5 years
MASS Microsystems MASter Drive 2010	\$2,147	\$1,961	2,042.0 MB	Seagate ST12550N	HDT Primer PE v1.5.1	5 years
MacConnection MDS Vortex 1GB	\$700	\$700	1,027.7 MB	Quantum Empire_1080S	HDT Primer PE v1.6	2 years
Liberty 50 Series 2GB	\$1,599	\$1,599	2,045.7 MB	Seagate ST32430N	HDT Primer PE v1.6	2 years
CORE COREdisk Slim	\$1,020	\$880	999.1 MB	Conner 1000MB C001	CORE Installer 2.0	5 years
Optima Diskovery 2100	\$1,830	\$1,710	2,038.1 MB	Seagate ST12550N	DiskMount v2.7	1 year
MacConnection MDS Express 2GB	\$1,200	\$1,200	2,003.8 MB	Quantum Empire_2100S	HDT Primer PE v1.6	2 years
La Cie Joule Portable 1400	\$879	\$879	1,332.3 MB	Quantum Empire_1400S	Silverlining v5.6	5 years
MaxConcept LPS2050E	\$1,881	\$1,605	2,038.2 MB	Seagate ST12550N	Lido 7 v. 7.4.0j	2 years
MicroNet SS-2070	\$1,999	\$1,765	2,043.1 MB	Seagate ST32550N	MicroNet Utility v6.4.9	2 years
La Cie Joule HD 2160	\$1,199	\$1,199	2,003.7 MB	Quantum Empire_2100S	Silverlining v5.6	5 years
FWB HammerPE 1000	\$959	\$870	1,027.6 MB	Quantum Empire_1080S	HDT Primer PE v1.6.2	5 years
Mirror Seagate 1075	\$669	\$669	1,004.1 MB	Seagate ST312300N	HDT Primer PE v1.6.2	5 years
Micropolis MicroDisk 2GB LT	\$2,170	\$1,575	1,952.8 MB	Micropolis 4221-09MZ 1128	Anubis Utility v2.52LUN	5 years
Liberty 50 Series 1GB	\$999	\$999	1,027.6 MB	Quantum Empire_1080S	HDT Primer PE v1.6	2 years
MegaDrive Mercury 2.1	\$2,524	\$2,355	2,147.0 MB	Seagate ST32550N	Steadfast 1.0.3	2 years
Optima MiniPak 1000	\$955	\$890	1,004.1 MB	Seagate ST31200N	DiskMount v2.7	1 year
Dynatek HDA 2.0Q	\$1,699	\$1,529	1,952.8 MB	Micropolis 4221-09MZ	Dynatek Compass Pro	3 years
APS 2.5GB	\$1,100	\$1,100	1,952.8 MB	Micropolis 4221-09MZ	APS PowerTools 3.06	5 years
MASS Microsystems MASter Drive 1630	\$2,003	\$1,745	1,609.5 MB	Seagate ST11950N	HDT Primer PE v1.5.1	5 years
Spin Spirit 2GB	\$1,299	\$1,299	2,045.8 MB	Seagate ST12400N	Red Line! 2.11	5 years
MountainGate IncreMeg 1.7GB AV	\$1,929	\$1,835	1,610.4 MB	Micropolis 2217-15MQ1005101	IncreMeg 4.02	2 years
MacWarehouse PowerUser Pro 2.0	\$1,499	\$1,499	2,045.8 MB	Seagate ST12400N	Red Line! 2.11	2 years
MacWarehouse PowerUser Pro 1.0	\$900	\$900	1,004.2 MB	Seagate ST312300N	Red Line! 2.11	2 years
Spin Spirit 1GB	\$749	\$749	1,004.2 MB	Seagate ST312300N	Red Line! 2.11	5 years

✓ MacUser RECOMMENDS

*8 x 6 x 2.5 in. or smaller. ¹Silverlining 5.6 driver software is provided on-disk but is not used for preformatting. ⁵No password protection as formatted, but supplied Silverlining 5.6 allows it.

column. Use the other columns in the table and the mouse ratings in "The Bottom Line" to compare drive features and customer service.

The drives we tested are listed here in order of speed. MacBench 2.0

reports normalized scores (longer bars are better), using the Quadra 630 as a baseline machine; this machine is assigned a score of 10. We connected each drive to a Power Mac 6100/66 for testing.

Switchable termination	Portable*	SCSI Manager 4.3-compliant	Password protection	Backup software	Money-back guarantee	Toll-free tech support	Cost/MB index	Speed/value index	MacBench 2.0 Index
		●	●				\$\$\$	▶▶▶	8.3
		●	§			●	\$\$\$	▶▶▶▶	8.0
		●	●	●	●	●	\$\$\$\$	▶▶▶▶	7.9
		●	●	●		●	\$\$\$	▶▶▶▶	7.8
		●	●	●			\$	▶▶▶	7.8
		●	●			●	\$	▶▶▶▶	7.7
		●	●		●	●	\$	▶▶▶▶	7.7
		●	●		●		\$\$\$	▶▶▶▶	7.6
		●	●		●	●	\$\$	▶▶▶▶	7.6
		●	●		●	●	\$	▶▶▶▶	7.6
	●	●	●		●	●	\$	▶▶▶▶	7.5
	●	●	●		●	●	\$	▶▶▶▶	7.4
		●	●				\$\$\$	▶▶	7.3
		●	●		●	●	\$	▶▶▶	7.2
	●	●	●		●	●	\$\$\$\$\$	▶	7.1
		●	●		●	●	\$\$	▶▶▶	7.1
		●	●	●	●	●	\$\$	▶▶	7.1
●		●	●		●	●	\$\$	▶▶▶▶	7.0
		●	●			●	\$\$\$\$	▶▶	7.0
		●	●			●	\$\$	▶▶▶	7.0
●	●	●	●		●		\$\$\$	▶▶	6.9
						●	\$\$\$	▶▶▶▶	6.9
		●	●	●			\$\$\$	▶▶	6.9
●	●	●	●		●	●	\$\$	▶▶▶▶	6.9
		●	●		●		\$\$\$	▶▶	6.8
		●	●	●			\$\$\$	▶▶	6.8
●		●	●		●	●	\$	▶▶▶	6.8
		●	●				\$\$\$	▶▶▶▶	6.6
		●	●		●	●	\$\$	▶▶▶▶	6.6
		●	●				\$\$\$	▶▶	6.6
●	●	●	●		●		\$\$\$\$	▶▶▶▶	6.6
	●		●	●			\$\$\$\$\$	▶	6.4
		●	●	●			\$\$\$	▶▶▶▶	6.3
		●	●	●		●	\$\$\$	▶▶	6.2
●		●	●		●	●	\$	▶▶▶	6.2
		●	●			●	\$\$\$\$\$	▶▶	6.1
●		●	●		●	●	\$	▶▶	5.6
	●	●	●		●	●	\$\$\$\$\$	▶	5.6
●		●	●		●	●	\$\$	▶▶▶▶	5.5
●		●	●		●	●	\$	▶▶▶	5.5
●		●	●		●	●	\$\$	▶▶▶▶	5.5

1- TO 2-GB HARD DRIVES

2.0, MicroNet SS-2070, both Cutting Edge drives, and both Optima drives — came with their write caches disabled.

In addition to optimizing drive speed, driver software should let you divide your drive's disk into *partitions*, multiple virtual volumes you can mount individually on the Mac's desktop. If you're savvy enough, you can arrange partitions to increase drive efficiency: The outermost partition, which is usually the first one created when you partition a disk, is generally the one to which data is transferred the quickest, so placing your applications there can boost their speed.

There are more-mundane reasons for partitioning too: For organizational reasons, you may want to isolate certain applications and files by placing them in separate partitions. If several people in your office share a Mac, you may want to give each of them a separate partition, which they can password-protect. At home, using a separate partition for your work files can keep them out of children's reach. All the drives we tested come with partitioning software.

Grand Designs

Before you zero in on the drive that appeals most to your pocket-book, stop and consider drive design. You should look for a few design features that make a drive convenient: switchable SCSI termination, which lets you turn termination on or off without adding an external terminator block; a pair of SCSI connectors, which allows a

drive to be in the middle or at the end of a chain of devices (some portable drives are too small for two connectors); and a case design that lets you stack the drive with other SCSI devices on your desk. Other handy, but less essential, design features include a drive-access light that tells you when data is being transferred to or from the drive, a case you can place either horizontally or vertically, and extra AC outlets on the back of the case. The drives that we tested from APS, MacWarehouse, and Spin Peripherals possess all these design features.

Not every drive's features are useful, though. Here are a few examples of attributes we could do without:

- ◆ The case for the Micropolis drives is huge, but only one of its two SCSI connectors is accessible unless you open up the case. The SCSI ID selector is also unnecessarily hidden behind the front panel.
- ◆ The MASS Microsystems case was unstable when we used it vertically. It looked as though removing the feet might help, but we feared doing so might damage the case.
- ◆ Despite the FWB PocketHammer 2100's strengths, its power and activity lights are so recessed, they're almost invisible.

Going Mobile

Beyond the essential design features, you may require portability or extra security. In figure 2, we've noted as "portable" any drive with dimensions smaller than 8 x 6 x 2.5 inches. Any such drive is compact enough to pack (carefully) in a briefcase for a trip to a service bureau or a client's office. But the Liberty drives we looked at deserve special mention for their extremely small, rugged metal cases and optional internal battery packs (\$189 each).

A different kind of portability is offered by the MegaDrive and MountainGate removable hard drives, which are designed for situations in which data must be locked away when it's not in use. The drive enclosures fit into docks (available with single- or multiple-drive bays) that contain the power supply and all the cables that connect to your Mac. You can pull the drives out of their bays even when your system is powered up. (Disconnecting a conventional hard drive from a powered-up system is extremely risky.)

La Cie's Joule system lets you stack multiple Joule devices (SyQuest or optical drives, hard drives, and so on) in a sleek, integrated tower that looks great on your desk. Like the removable drives, Joule devices share a common power supply (in the Joule base) and an active terminator (in the Joule cap). Definitely convenient, but when multiple drives depend on one power supply, you risk losing access to *all* your data if the power supply fails.

In past reviews, we've criticized the Joule system for requiring you to lug the base and the cap around along with the drive if you want to share it with others. That problem is addressed with the new Joule Portable dock. This dock, which ships with the Joule Portable 1400 system, powers and terminates one Joule device at a time and is small enough to make the 1400 truly portable. The portable dock works with most, but not all, Joule mechanisms: It doesn't have enough juice to power the Joule HD 2160 drive.

Deconstructing Construction

Good construction quality is something you should look for in every drive. Our hats go off once again to APS, Spin, MacWarehouse, and Mirror. Their drive cases were not only well designed but also

More to Lose / big-drive backup tips

REMEMBER, EVERY SILVER CLOUD has a dark lining. When you buy a drive as capacious as 1 or 2 GB, you get room for loads of stuff, but with it comes the potential for *major* data loss. Every drive crashes eventually, so you'd better be prepared. How? Back up.

You can take several approaches to backing up your data. The one we've labeled "safest" is the best, but the others work as long as you're diligent. No matter which backup scheme you use, remember to make duplicate backups and keep one in a disaster-proof spot, preferably at a remote site.

Safest option: Get a DAT drive and an automatic-backup utility such as Dantz's Retrospect. Tapes are inexpensive, and the prices of drives (about \$850 for 2-GB capacity) are falling fast. You can fit the contents of an entire 2-GB disk on a tape, and using scheduling software ensures that you won't forget to back up regularly.

Cheap option: Use your current internal hard drive to back up essential files, starting with the System Folder. (To avoid schizophrenic behavior from the second System Folder, make sure to specify your desired startup drive in the Startup Disk control panel.) Next, copy mission-critical project files at the end of every work session. If space allows, add applications, starting with those you use most often.

Speedy option: File-synchronization programs such as Leader Technologies' PowerMerge can double as backup tools. You can't schedule them, but they can save you time. Instead of drag-copying your project folder to the backup drive each time you quit working, you can use these utilities to back up only new or changed files.

Long-haul option: Tape is good for routine backups, but it deteriorates over time. For long-term archiving of data, consider a removable-cartridge drive, such as a magneto-optical or SyQuest drive.

Dumb option: Drop all your cash on a huge drive, ignore backup altogether, and tattoo the number of a reputable data-recovery service, such as DriveSavers (415-883-4232), onto your arm.

1- TO 2-GB HARD DRIVES

sturdy, well shielded, and otherwise generally solid. The FWB and CORE drives were also extremely well constructed.

We wish we could say the same for all the drives we tested, but alas, no. We found a couple of grievous construction problems:

- ◆ The PDQ 2GB drive's SCSI-ID switch was wired incorrectly — when the switch read 1, the actual ID was 5, and so on.
- ◆ The Cutting Edge drives' fans were anchored by tiny pieces of foam core and double-sided tape. Durable this isn't.

Ready, Set, Go?

Once you've figured out which drive meets your requirements, it's time to think about how you'll set it up. In theory, it's easy: Unpack it, and — consulting a simple, clear manual — plug in the power cord, attach the cable to your SCSI chain, and set the SCSI ID. Terminate the drive if required, boot your computer, and away you go.

Of course, things aren't always as plug-and-play as we might like, as our testing experience bore out. The drives from Spin Peripherals and MacWarehouse (whose drives are manufactured by Spin) were the hardest to set up, because they lacked cables, manuals, and software. When we called to request these essential items, the vendors apologized and said they simply goofed with our shipment.

Setup of the CORE, MegaDrive, PDQ 2GB, and Spin Spirit 2GB was complicated by the vendors' failure to preformat the drives. Every other vendor preformats its drives, so all you have to do is plug the unit in. Formatting is a hassle you don't need.

Sending Out an SOS

Even the best products can head south, and in the case of hard drives, they will — eventually. Even if you're lucky enough to have years of trouble-free use, you may need some help when connecting

a drive to a new system or when it's time to update your driver software. Remember that part of what you pay for with a hard drive is after-sale support.

We called the vendor of each drive we tested to assess tech-support quality and were pleased to find that the majority were competent and professional. A standout was Dynatek, whose support staff was particularly thorough and courteous.

The tech-support booby prize goes to Liberty Systems, whose technician picked up the phone promptly but then became rude: When we questioned his advice, he replied, "Do you want my help or not?" Later he told us, "Normal people do it the normal way and read the manual." Memo to Liberty: Normal people deserve courtesy.

Drive-Buy Advice

Our search for a speedy, capacious hard drive at a reasonable price yielded three products — two 2-GB drives and one 1-GB drive — deserving of the MacUser RECOMMENDS seal. The 2-GB FWB PocketHammer 2100 was unbeaten in our speed tests, and its per-megabyte cost, although not exceptionally low, was certainly acceptable. A more economical 2-GB drive is the MicroNet Advantage 2000, which ranked fifth among all the drives in our Disk Mix speed test yet costs an exceptionally low 61 cents per megabyte.

Among the 1-GB drives, the Dynatek HDA 1.0Q takes top honors, scoring fourth in our speed tests and delivering good value. ☞

Mark Frost is a *MacUser* senior editor. Project leader Kristina De Nike managed the testing for this report.



MacBench 2.0, the benchmark software used to test the hard drives for this report, is available on-line on ZiffNet/Mac. See page 4 for instructions on accessing ZiffNet/Mac.

Directory / vendors of hard drives tested

Apple Computer The Apple drive is manufactured and marketed by La Cie.	Dynatek Automation Systems Bedford, NS Canada 800-267-6007 902-832-3000 902-832-3010 (fax)	Loviell Minneapolis, MN 800-688-3696 612-828-6880 612-828-6881 (fax)	MASS Microsystems Milpitas, CA 800-522-7970 408-956-5999 408-956-5995 (fax)	Micropolis Chatsworth, CA 800-345-3748 818-709-3300 818-701-2809 (fax)	MountainGate Data Systems Reno, NV 800-556-0222 702-851-9393 702-851-5533 (fax)
APS Technologies Kansas City, MO 800-235-2753 816-483-6100 816-483-3077 (fax)	FWB San Francisco, CA 415-474-8055 415-775-2125 (fax)	MacConnection Marlow, NH 800-800-1111 603-446-3383 603-446-7791 (fax)	MaxConcept San Diego, CA 619-530-9014 619-530-9032 (fax)	Microtech International East Haven, CT 800-626-4276 203-468-6223 203-468-6466 (fax)	Optima Technology Irvine, CA 714-476-0515 714-476-0613 (fax)
CORE International Boca Raton, FL 800-688-9910 407-997-6044 407-997-6009 (fax)	La Cie Beaverton, OR 800-999-0143 503-520-9000 503-520-9100 (fax)	MacProducts Austin, TX 800-624-9307 512-892-4070 512-892-4455 (fax)	MegaDrive Systems Hawthorne, CA 800-404-6342 310-247-0006 310-247-8118 (fax)	Mirror Technologies Edina, MN 800-654-5294 612-830-1549 612-832-5709 (fax)	PDQ Peripherals Santa Clara, CA 408-727-2600 408-727-2435 (fax)
Cutting Edge El Cajon, CA 800-257-1666 619-441-6992 619-441-6999 (fax)	Liberty Systems San Jose, CA 408-983-1127 408-243-2885 (fax)	MacWarehouse Lakewood, NJ 08701 800-255-6227 908-367-0440 908-905-9279 (fax)	MicroNet Technology Irvine, CA 800-800-3475 714-453-6000 714-453-6101 (fax)	Spin Peripherals Newton Upper Falls, MA 800-215-9200 617-630-1250 617-630-1251 (fax)	

V.34 MODEMS

SHOULD YOU BUY NOW AND SAVE TIME AND MONEY OR WAIT UNTIL THE TECHNOLOGY MATURES?

MACH-SPEED MODEMS

TIME IS MONEY. NO NEWS THERE. Whether it's your e-mail, that important file you left on the office server, or critical sales figures from your central corporate database, when you need it, you need it *now* — or sooner.

If you need to grab information remotely, the bottleneck has always been your modem — that prosaic piece of info-plumbing that lets your Mac communicate over telephone lines. But because the phone system was designed for *analog* voice communication rather than *digital* data transfer, modems have never been fast enough for the demands of the “Now” generation. Until today.

A new crop of high-speed modems is appearing on your dealer's shelves and in your favorite mail-order catalogs that doubles the previous standard's top transfer rate of 14,400 bps to a breakneck 28,800 bps. Based on the new *V.34 modulation standard*, these speedsters are not only the fastest modems ever designed but they're also the smartest. A V.34 modem uses a complex bag of tricks to squeeze as much data as possible into each and every call — and to continually monitor each connection to ensure constant peak performance. That's the good news.

The bad news is that the V.34 standard is still in its infancy — and the baby still puzzles its parents. Designers are continuing to tweak

BY STEPHEN SATCHELL AND RIK MYSLEWSKI



Some high-speed modems, such as the Supra SupraFAXModem 288 (Mac) and the AT&T/Paradyne Comsphere 3810Plus, sport alphanumeric displays. Others, such as the Logicode Quicktel 2814XVM and the E-Tech Bullet 100E, are fashion statements — although the speedy U.S. Robotics Courier V.Everything with V.34 proves that looks aren't everything.



their modems; as they gain experience with V.34, they will be updating them, improving both speed and reliability. Also, just as when previous modem standards were introduced, getting reliable connections between different makes of modems is a hit-or-miss proposition, despite the best efforts of vendors to test and test and test some more. When we thoroughly tested 16 new V.34 modems for this story, we discovered that most were still abysmal at working well with other brands.

If you want the latest in telecommunications technology and you want it right now, V.34 is for you — but buy a pair of modems: one for each end of your phone connection. Or you may prefer to wait or even select a slower (and lower-priced) modem and readdress the upgrade question later. Warning: If you choose V.34 now, pick a modem that lets you update the firmware easily and quickly by downloading new software from your Mac into *flash ROM* (see figure 4 for information on which of the modems offer this feature).

PHOTOGRAPHY / GIAMPIERO BENVENUTI

Who Needs Top-Speed Telecommunications?

Doubling the speed of the connection between two modems doesn't necessarily mean your work will go twice as fast. Some uses benefit more than others.

One of these is Internet access. If you have a SLIP or PPP account with a service provider and that provider has V.34 modems in its dial-in system, you're in for a treat. When you access the World Wide Web, you'll see speed go from a snail's pace to something a little faster than a turtle — slow but bearable. Gopher, ftp, and NNTP (news) access are also considerably enhanced. Check to see if the modem you are considering is compatible with the service provider's modems — your provider should be able to help.

Apple Remote Access users will rejoice to learn that our tests show that ARA 2.0.1 does a fine job of using V.34 modems on a simulated cross-country connection, both when the V.34 modem is connected to the server and when it is connected to a remote client

(see figure 2). However, be forewarned: Not all modem vendors provide the necessary CCL (connection control language) file, which contains the list of commands your modem needs in order to work properly with ARA. If ARA is important to you, make sure the appropriate CCL file is either included with the modem or available from the modem vendor's on-line service.

WAN managers should consider installing V.34 modems for dial-up portions of their networks. The *probing tone* used by V.34 to

continually monitor line conditions and adapt accordingly can significantly enhance the performance of the link. This probing tone is one of V.34's most important enhancements over V.FC (V.Fast Class), the interim 28,800-bps modulation method that emerged when some modem manufacturers decided they couldn't wait any longer for the formal V.34 standard. The probing tone is also missing from the other unofficial interim modulation method, V.32terbo, a 19,200-bps strategy that's merely an extension of the previous formal standard, 14,400-bps V.32bis.

Finally, die-hard bulletin-board users who move data around by using the Zmodem data-transfer protocol will enjoy the full benefit of faster modulation. However, they'll need desktop Macs based on 68030, 68040, or PowerPC chips — or earlier Macs that have serial-port cards that allow high-speed data transfer, such as the Creative Solutions Hustler card. Owners of older, slower Macs will experience some, but not all, of the benefits of V.34, because their Macs' serial ports just aren't up to handling the volume of data V.34 modems can sling around.

If you are looking for a worry-free modem for unattended operation (such as a modem back in your office that will allow you to access all your files while you're on the road), you should consider only three of the modems we tested: the AT&T/Paradyne Comsphere 3810Plus, the Motorola V.3400, or the U.S. Robotics Courier V.Everything with V.34. Although these are among the most expensive modems we tested, they're ideal for unattended operation. Each is designed to recover from virtually any internal glitch — a glitch that would cause the rest of the modems tested here to lock up or stop operating properly. The key element of these top-class modems' robustness is a *watchdog timer*, which can reset the modem at the first sign of trouble. Yes, that breaks the connection, but you know that when you call back, the modem will answer. A modem that lacks a watchdog timer must be manually reset after a glitch — a real problem if you're dialing in from across the country and there's no one back at the office to help you out.

The Bottom Line



THE FASTEST MODEMS EVER MADE are now available for your Mac — but there are growing pains. Before you make the jump to 28,800 bps, realize that modem designers are still working on getting their V.34 modems to work well with modems from other manufacturers. But if it's speed you need and you need it now, buy a pair: one for each end of the connection.

- ⊕ = OUTSTANDING
- = ACCEPTABLE
- ⊖ = POOR

PRICE/
PERFORMANCE CUSTOMER
SERVICE SPEED FEATURES

★★★★ Supra SupraFAXModem 288 (Mac) ⊕ ● ● ⊕



The best V.34 modem for your desktop is the Supra SupraFAXModem 288 (Mac) (\$230 estimated street). An inexpensive, solid performer, it has a handy alphanumeric display, is easily upgradable, and is from a company that really knows the Mac.

★★★★ U.S. Robotics Courier V.Everything with V.34 ● ⊕ ⊕ ⊕



For your office network, it's hard to beat the U.S. Robotics Courier V.Everything with V.34 (\$595 list, \$400 estimated street). Although the AT&T Paradyne Comsphere 3810Plus and the Motorola V.3400 have some network-management advantages, the Courier's still a best buy.

★★★★	Cardinal 28.8 Fax/Data Modem	⊕	●	●	⊕
★★★★	Practical Peripherals MacClass 288MT II V.34	⊕	⊕	⊕	●
★★★★	U.S. Robotics Mac&Fax Sportster (V.34)	⊕	⊕	⊕	●
★★★★½	Archtek SmartLink 2834A	⊕	●	●	●
★★★★½	AT&T/Paradyne Comsphere 3810Plus	●	⊕	⊕	●
★★★★½	Logicode Quicktel 2814XVM	⊕	●	●	●
★★★★½	Multi-Tech MultiModem MT2834ZDX	●	⊕	●	●
★★★★	E-Tech Bullet 100E	●	●	●	⊕
★★★★	Hayes Optima 288 V.34/V.FC+FAX for Mac	●	●	●	●
★★★★	Motorola V.3400	●	⊕	●	●
★★★★	Multi-Tech MultiModem MT2834BA-MAC	⊖	⊕	●	⊕
★★★★	Zoom V.34X Model 460 (Mac)	●	●	●	●
★★★★½	Best SmartOne 2834FX	●	●	⊖	●
★★★★½	Boca V.34 BocaModem	●	●	⊖	●

Listing is alphabetical within groups of equal mouse ratings.

Who Doesn't Need a V.34 Modem?

If you make a lot of local calls and your 14,400-bps modem is working just fine, consider sticking with it for a while. This is especially true for users who rely on information services such as America Online, CompuServe, and Prodigy. These services may prove slow to deploy the new V.34 technology, because their backbone networks need to be upgraded at the same time to handle the extra load. And you may have to pay a premium for 28,800-bps access, at least in the beginning. (As we go to press, CompuServe is beta-testing 28,800-bps access.)

Users of mail services such as AT&T EasyLink and MCI Mail won't see any real productivity improvement with V.34 modems over existing 9,600-bps V.32 connections. Note, though, that V.34 modems should operate perfectly well when connecting to slower modems.

If you offer a service to others, you might want to delay upgrading to V.34 — even upgrading your V.FC modems to V.34 — until the vendors have had a chance to fix some more of the interoperability problems. If you can't wait, remember to check the features listed in figure 4 and consider only those modems that have flash ROM, for easy software upgrades.

figure 1

MacUser ZD LABS **V.34 in Detail** / three key considerations

Our testing was thorough — so thorough, in fact, that space limitations prevent us from showing any but the most critical aspects of modem performance. You can download additional results from ZiffNet/Mac (see end of article), but be forewarned: There's a mountain

of modem-performance data for you to digest.

We used a Telecom Analysis Systems phone-network simulator for all our tests. In each test, we used two identical modems, one at each end of the simulated connection.

Connection Reliability

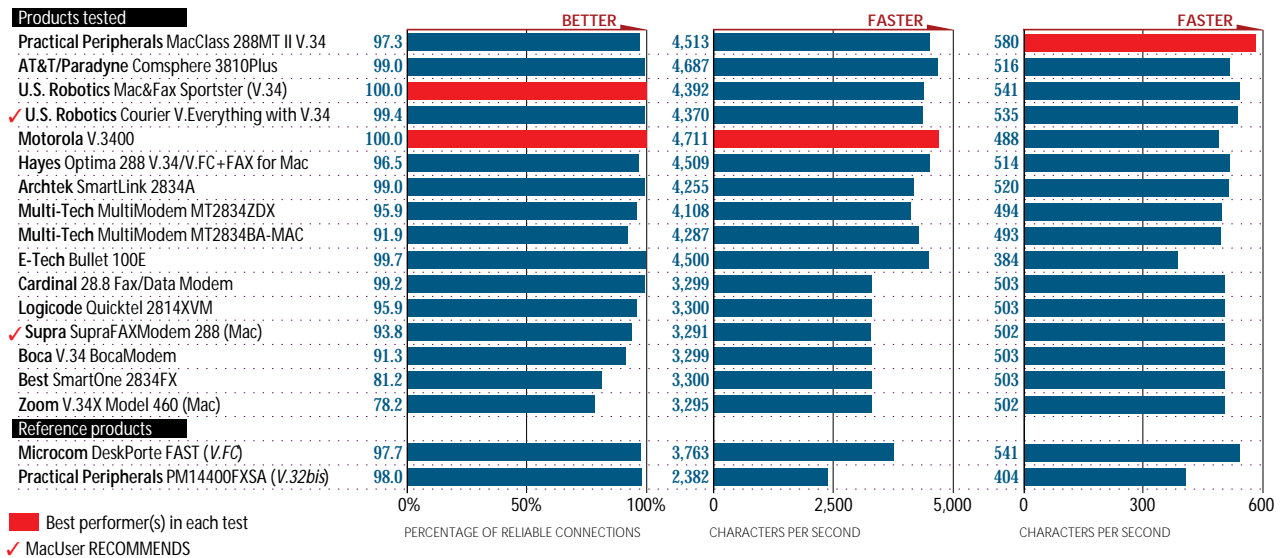
To evaluate each modem's ability to connect properly, we made 119 calls over seven line types and found the percentage of calls in which data transferred correctly.

File Compression

To measure each modem's compression talents, we sent a compressible file back and forth between two modems and then averaged the results.

Block Transfers

To test each modem's responsiveness, we measured the effective throughput, over a cross-country link, of a 133K block of data after it had been requested.



Inside the V.34 Toolbox

The secret to V.34's superiority is a flexible architecture coupled with a built-in connection-testing system. A V.34 modem's *data pump* (signal converter) has an arsenal of at least 112 *algorithms* — mathematical tools that enable it to transmit data at 12 speeds (from 2,400 bps to 28,800 bps in 2,400-bps increments) — plus more than 10 options that shape, warp, equalize, and encode the signal to increase the chances your data will make it across accurately the first time.

Different V.34 modems have different sets of tools. One reason for the differences in tool sets is that each tool costs the vendor (and you) money; each is patented, and the modem vendor has to pay a royalty for each modem it sells that uses the tool. Consequently, the rule of thumb is, the more expensive the modem, the more complete its toolbox is likely to be. Two V.34 modems automatically compare tool kits during startup and then use only those tools they have in common.

Whatever tools the vendor may include with the modem are useless, though, unless the modem knows when to use them. This is where the test, or probing, tone comes in. The modems test both directions of the line at the beginning of each connection and then swap test data. Based on this information, each modem decides on the best way to make the connection. With some V.34 modem pairs,

you might even end up with a different data rate in each direction — these so-called *asymmetric connections*, although unusual, are quite usable.

Beyond the Similarities

Modems come in two types: industrial-strength and consumer-grade. The former are intended for constant use, unattended, where any communications lapse lasting more than a few seconds means dollars lost. Their prices are high, because they include such things as watchdog timers, network-management support, and other features important for shared modems. The AT&T/Paradyne Comsphere 3810Plus and the Motorola V.3400 are in this class; the U.S. Robotics Courier V.Everything with V.34 has some, but not all, of these features — and it costs less.

The Comsphere 3810Plus is unique among these modems in that *all* its firmware — all the DSP (digital signal processor) code as well as the controller code — can be updated via software. You can make the update by calling an already updated modem and letting the two modems handle the update by themselves, or you can load new software via the serial port.

Network managers should take note that the AT&T/Paradyne Comsphere 3810Plus, the Motorola V.3400, and the U.S. Robotics Courier V.Everything with V.34 are also available in rack-mountable

figure 2



V.34 and Apple Remote Access / high-speed telecommuting

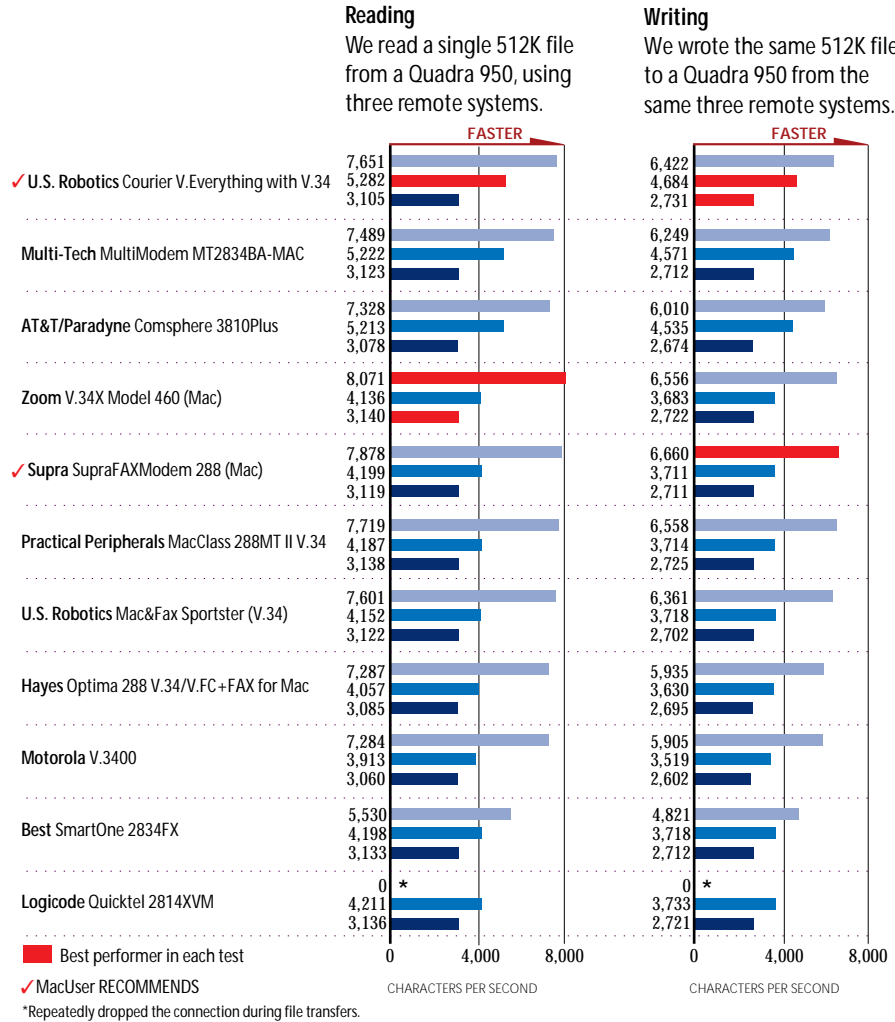
We have good news for users of Apple Remote Access: It works great over a V.34 connection. Among the vendors of the 16 modems reviewed for this story, 11 offered the CCL files necessary for ARA access.

We hooked up each modem to a Quadra 950 with an Apple Multiport Server NuBus card on which ARA 2.0.1 had been installed. We then transferred files to and from three clients: a Quadra 700 with a V.34 modem identical to the one being tested, a PowerBook 180 with

a V.32terbo (19,200-bps) Global Village PowerPort/Mercury modem, and a PowerBook Duo 230 with a V.32bis (14,400-bps) Apple Express Modem.

Only one modem, the Logicode Quicktel 2814XVM, failed any test. Despite advice from Logicode's tech-support staff, the Quicktel 2814XVM repeatedly dropped the connection during file transfers to and from the Quadra 700.

CLIENTS	
	Quadra 700 with V.34 modem identical to the modem being tested
	PowerBook 180 with V.32terbo Global Village PowerPort/Mercury modem
	PowerBook Duo 230 with V.32bis Apple Express Modem



configurations, which is useful if you have a modem bank for ARA.

The other 13 modems we tested are consumer-grade. But don't let that label fool you: All these modems work hard, but when operating unattended for weeks or months, any modem may stop working every once in a while, and without a watchdog timer, it's stuck until someone resets it.

All the modems we tested have indicators to let you know their state, and some sport LCDs that show even more about the state of the connection in progress. Troubleshooting connection problems is easier with LCD-equipped modems.

Only three modems have an external volume control: the E-Tech Bullet 100E, the Multi-Tech MultiModem MT2834BA-MAC, and the U.S. Robotics Courier V. Everything with V.34; all the rest control

speaker volume through software. The advantage of the knob is you can turn the volume low enough that the baby in the next room won't wake up or that the person in the next cube won't be periodically serenaded.

One oddity of modem marketing is that the higher the modem's price, the less likely the modem is to come with bundled software. For modems that lack bundled software, we suggest you look into the shareware ZTerm or the low-priced commercial SITterm, from Aladdin Systems.

Finally, remember that you have to get power to a modem. Most of the ones we tested use plug-in transformers with a single wire to the modem. All these bricks cover multiple outlets on a power strip. There are two notable exceptions: The Motorola V.3400 has a

standard power cord between the modem and the outlet, and the AT&T/Paradyne Comsphere 3810Plus has an unusual power supply with a detachable AC cord.

The Four Key Questions

When picking a modem, look at the following four criteria, in this order: capability, reliability, applicability, and performance — only then should you consider price. *Capability* is how well the product manages to conform to its specifications. *Reliability* refers to how often the modem can do its job correctly — and be ready to do its job again (see figure 1). *Applicability* refers to how well the features of the modem fit your needs. Finally, *performance* describes how fast the modem can transfer various types of files over many types

of connections and how quickly it can respond to requests for block transfers as well as single-character transfers.

Most of the modems performed well in our connection-reliability tests, making a connection most of the time. Notable exceptions were the Best SmartOne 2834FX and the Zoom V.34X Model 460 (Mac). The SmartOne 2834FX had serious problems with only one type of line, but the Zoom V.34X Model 460 (Mac) missed the most connections of all the modems we tested, by quite a margin.

A modem's latency — how quickly it responds to requests — is important when your work requires remote database operation, in which an update requires short, discrete operations that must be completed one at a time. There was little difference among the modems, with the exception of the Practical Peripherals MacClass

figure 3



V.34 Performance / the early returns

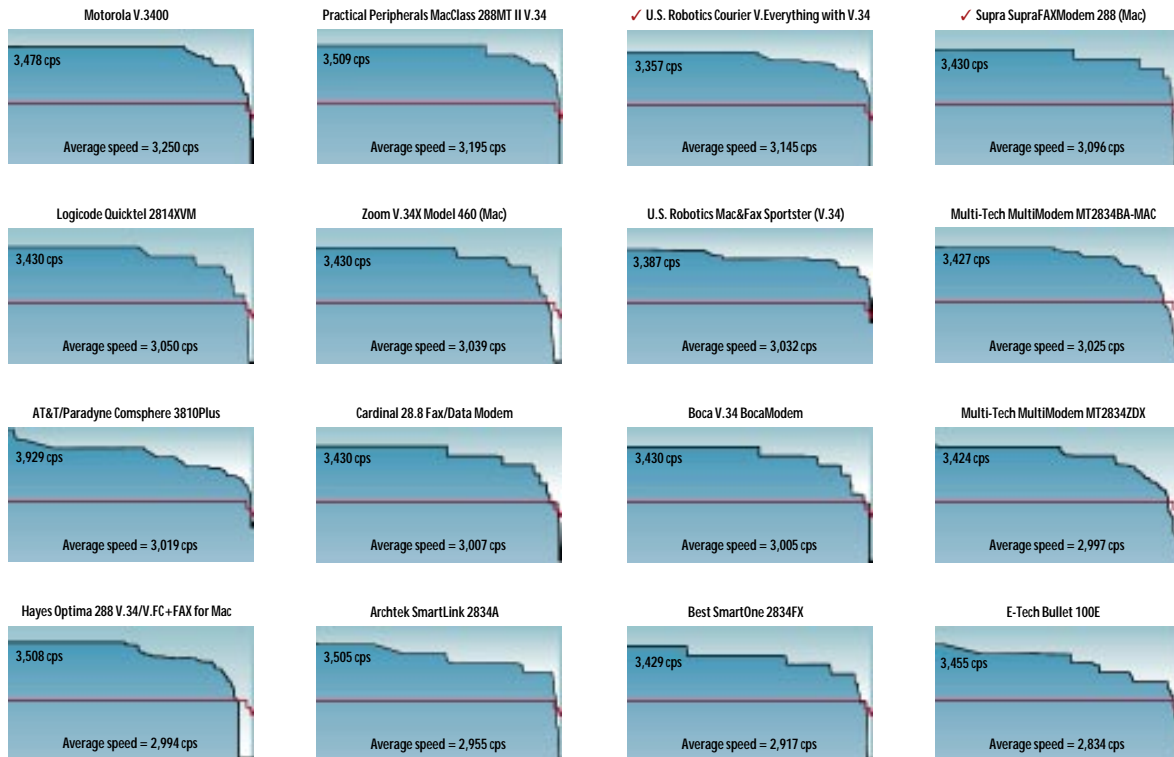
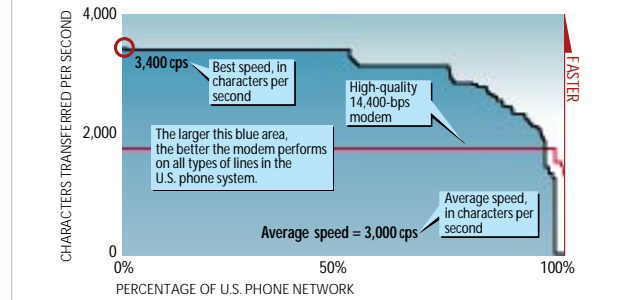
You aren't able to control the route your modem connection will take as it goes out over the phone line. The telecommunications industry has identified many types of lines — 168, to be exact — each of which challenges a delicate high-speed modem signal in a different way: with hums, clicks, pops, echo, and other noises. We tested each modem on all 168 lines.

A perfect modem would perform identically — and optimally — on each and every line type. Too bad it's not a perfect world. We discovered that although each V.34 modem was able to perform admirably on most lines, its speed decreased when the going got tough. Not all the modems failed the same tests — the graphs below (listed in order of overall average speed) each show worsening speed from left to right, regardless of the reasons for the degradation.

As modem designers continue to improve their wares, expect

enhancements in the ability of V.34 modems to deal with challenging phone connections, until they approach the steady performance of our reference Practical Peripherals PM14400FXSA 14,400-bps modem.

How to Read These Graphs



✓ MacUser RECOMMENDS

figure 4

Features of V.34 Modems / some full-featured bargains

	Archtek SmartLink 2834A	AT&T/Paradyne Comsphere 3810Plus	Best SmartOne 2834FX	Boca V.34 BocaModem	Cardinal 28.8 Fax/Data Modem	E-Tech Bullet 100E	Hayes Optima 288 V.34/V.FC+FAX for Mac	Logicode Quicktel 2814XVM	Motorola V.3400	Multi-Tech MultiModem MT2834BA-MAC
List price	\$289	\$1,095	\$299	\$319	\$229	\$499	\$579	\$299	\$895	\$849
Estimated street price	\$240	\$890	\$299	\$230	\$190	\$460	\$400	\$210	\$850	\$700
Data-pump manufacturer	AT&T	AT&T (DSP)	Rockwell	Rockwell	Rockwell	AT&T	Rockwell	Rockwell	Motorola	AT&T (DSP)
Processor manufacturer	AT&T	AT&T	Rockwell	Rockwell	Rockwell	Motorola	Motorola	Rockwell	Motorola	Zilog
Number of status indicators	9	13	8	8	8	8	8	8	6	13
Alphanumeric display		●				●			●	
Speed indicators		●			●	●		●	●	●
Serial cable included	●		●	●			●	●		●
Flash ROM included	●	●			●	●		●		●
Caller ID supported						●		●		●
Voice-operation switch									●	●
Volume-control switch/dial						●				●
V.32terbo modulation	●	●		●		●				●
V.FC modulation			●	●	●		●	●		
MNP 2 error control	●	●	●	●	●	●	●	●	●	●
MNP 3 – 4 error control	●	●	●	●	●	●	●	●	●	●
MNP 10 error control					●			●		
Class 1 fax	●		●	●	●	●	●	●	●	●
Class 2 fax			●	●	●	●	●	●		●
Synchronous operation	●	●	●			●	●	●	●	●
Warranty	2 years	2 years	2 years	5 years	lifetime	2 years	2 years	lifetime	2 years	5 years
✓ MacUser RECOMMENDS										

*Both U.S. Robotics modems support the Class 2.0 ANSI/EIA/TIA-592 standard.

288MT II V.34, which did significantly better than the rest of the pack, and the Motorola V.3400, which did only slightly less well.

All the modems did well when faced with a broad spectrum of connection types. Although the AT&T/Paradyne Comsphere 3810-Plus has an advantage over all the rest because it extends V.34 to allow 33,600-bps connections on the best of lines, it was able to use that advantage only rarely — most of the time, it behaved like the rest of the best V.34 modems. The Motorola V.3400 and the Practical Peripherals MacClass 288MT II V.34 edged out the rest; no modem fell significantly behind.

Finally, when we tested each modem's ability to transfer a wide variety of files, four led the pack and are our recommendations for users who do a lot of Zmodem-based file transfer (Zmodem is the fastest protocol to use for downloading files from a bulletin-board system): the Archtek SmartLink 2834A, AT&T/Paradyne Comsphere 3810Plus, Hayes Optima 288 V.34/V.FC+FAX for Mac, and Practical Peripherals MacClass 288MT II V.34.

Powerful but Incompatible

Since the V.34 standard is so new, modem designers haven't had much time to play with each other's products, resulting in the sad situation that few work well with modems from other vendors yet. To discover the extent of the problem, we tested each modem with a group of reference modems. Four were V.34 modems, each with a different data pump; the others were a V.FC Microcom DeskPorte FAST and a V.32terbo Cardinal MVP192E.

The news wasn't good: We found that *none* of the V.34 modems we tested for this report was able to operate at an acceptable level with *any* of our reference modems. And we're being generous in what we mean by *acceptable*: No V.34 modem we tested could achieve the

speed of the slower modem to which it was connected — for example, no V.34 modem could even perform at V.32terbo speeds when connected to our V.32terbo reference modem. By the time you read this, however, the vendors will have had an opportunity to identify and hopefully fix many of the problems.

Hitting a Moving Target

Picking the right V.34 modem is tough, particularly since modem designers will have had a chance to improve them between the time we did our tests and the time you read this.

Among industrial-strength modems, it's a toss-up in general but an easy pick for Mac users. The U.S. Robotics Courier V. Everything with V.34 is supported by virtually every Mac and networking product, and upgrading is quick and easy. However, for large modem pools, the AT&T/Paradyne Comsphere 3810Plus or the Motorola V.3400 outclass it in terms of network-management features. Between the AT&T/Paradyne and Motorola modems, we have to give the nod to the AT&T/Paradyne, because all its firmware can be updated automatically and the modem itself is a screamer.

The choice among consumer-grade, desktop modems is much tougher. After much data-sifting and soul-searching, we give the nod to the Supra SupraFAXModem 288 (Mac). It's fast and inexpensive, it has an easy-to-read alphanumeric display that's handy for seeing what it's doing at a glance, and its flash-ROM feature makes upgrades a snap.

Among the close contenders for top desktop V.34 modem are the Archtek SmartLink 2834A, the Logicode Quicktel 2814XVM, and the Practical Peripherals MacClass MT288 II V.34. The latter, with its great overall performance, would have been our easy first choice if it had included flash ROM. Both the SmartLink 2834A and the

Multi-Tech MultiModem MT-2834TDX	Practical Peripherals MacClass 288MT II V.34	Supra SupraFax Modem 288 (Mac)	U.S. Robotics Courier V.Everything with V.34	U.S. Robotics Mac&Fax Sportster (V.34)	Zoom V.34X Model A60 (Mac)
\$349	\$279	NA	\$595	\$339	\$269
\$270	\$240	\$230	\$400	\$290	\$200
AT&T (DSP)	Rockwell	Rockwell	U.S. Robotics	U.S. Robotics	Rockwell
Zilog	Intel	Rockwell	U.S. Robotics	U.S. Robotics	Rockwell
10	8	4	12	7	15
●		●	●		●
●		●	●	●	
		●	●		●
●		●	●	●	
	●	●	●	●	●
●	●	●	●	●	●
●	●	●	*	*	●
		●	●		●
10 years	lifetime	5 years	2 years	5 years	7 years

Quicktel 2814XVM are low-priced journeyman performers, but neither vendor has yet figured out ARA — Archtek had not developed a CCL in time for our testing, and the Quicktel 2814XVM repeatedly quit in the middle of ARA testing when connected to another Quicktel 2814XVM modem. With further development, however, both may prove worthy contenders. Stay tuned. 📧

Steve Satchell is the principal of Satchell Evaluations, a Nevada modem-testing firm. Rik Myslewski is *MacUser's* executive editor. Project leaders David Kison, Jeff Witt, and Stephen Chan managed the testing for this report.



Additional test results are available on-line on ZiffNet/Mac. See page 4 for instructions on accessing ZiffNet/Mac.

Trends / not much faster or cheaper

WILL V.FAST BE V.LAST? Affectionately known to its first engineers as *V.Fast*, the V.34 standard pushes standard phone lines to the limits of their data-carrying capacity. It's a minor technomiracle that modem designers have been able to squeeze so much through a phone system that was never designed to carry anything more challenging than "Mr. Watson, come here. I want you." But despite what the bumper stickers may say, don't expect another miracle. There may never be a V.34bis.

Expect only incremental improvements in V.34 modems. AT&T/Paradyne, for example, has proposed methods for achieving faster-than-28,800-bps rates, but it appears that these tweaks will fit comfortably within the V.34 specifications. Further, less visible, additions to V.34 may also be added by others, culminating in a projected final V.34 speed of 33,600 bps. But it will still be V.34, and it will still be the end of the line — the phone line, that is.

To go faster, using basic-rate ISDN is your best choice. State governments and phone companies are working together to promote expansion of this service — slowly, but surely. Sending data over a single ISDN *B circuit* at a rate of 56,000 or 64,000 bps is standard; the jury is still out on a single standard for *reverse multiplexing*, a procedure for using both B circuits as a single 112,000-bps connection. No doubt other schemes for even higher transfer rates will emerge in a year or two.

Prices won't change much in the next year. Unlike at every previous modem-technology introduction, V.34 prices were low as soon as the modems hit the dealers' shelves. Don't expect them to go much lower, though.

Stac Electronics, of San Diego, is doing its bit to help shave prices, however, with the new Stac 9410 chip, which implements the V.42bis BTLZ compression algorithm in hardware. A modem maker that adopts this chip can use inexpensive 8-bit controller chips instead of the considerably more expensive 16-bit controller chips that grace many V.34 modems today.

Directory / vendors of V.34 modems tested

Archtek America
City of Industry, CA
818-912-9800
818-912-9700 (fax)

AT&T/Paradyne
Largo, FL
800-482-3333
813-530-2000
813-530-2103 (fax)

Best Data Products
Chatsworth, CA
800-632-2378
818-773-9600
818-773-9619 (fax)

Boca Research
Boca Raton, FL
407-997-6227
407-997-0918 (fax)

Cardinal Technologies
Lancaster, PA
717-293-3000
717-293-3055 (fax)

E-Tech Research
Santa Clara, CA
800-328-5538
408-988-8108
408-988-8109 (fax)

Hayes Microcomputer Products
Norcross, GA
404-441-1617
800-429-3739 (fax)

Logicode Technology
Camarillo, CA
800-735-6442
805-388-9000
805-388-8991 (fax)

Motorola
Mansfield, MA
800-487-1456
508-261-4000
508-337-8004 (fax)

Multi-Tech Systems
Mounds View, MN
800-328-9717
612-785-3500
612-785-9874 (fax)

Practical Peripherals
Thousand Oaks, CA
805-497-4774
805-374-7200 (fax)

Supra
Vancouver, WA
800-727-8772
360-905-1410
360-905-1401 (fax)

U.S. Robotics
Skokie, IL
800-877-2677
708-982-5010
708-933-5800 (fax)

Zoom Telephonics
Boston, MA
800-666-6191
617-423-1072
617-338-5015 (fax)

SCANNERS /

HP Scans Color at a Black-and-White Price

THERE'S NO EXCUSE *not* to own a color scanner these days. Prices have never been lower, and quality continues to rise. Case in point: Hewlett-Packard's new ScanJet 3c color flatbed scanner, which offers 600-dpi scanning at a 400-dpi price.

Packaged in a sleek new case, the ScanJet 3c inaugurates HP's next generation of scanners. The ScanJet 3c offers true 600-dpi resolution, which can be interpolated to 2,400 dpi in software, and captures 30 bits per pixel of color in one pass. Priced at \$1,179, with an expected street price of less than \$1,000, it replaces the 400-dpi, 24-bit ScanJet IIcx.

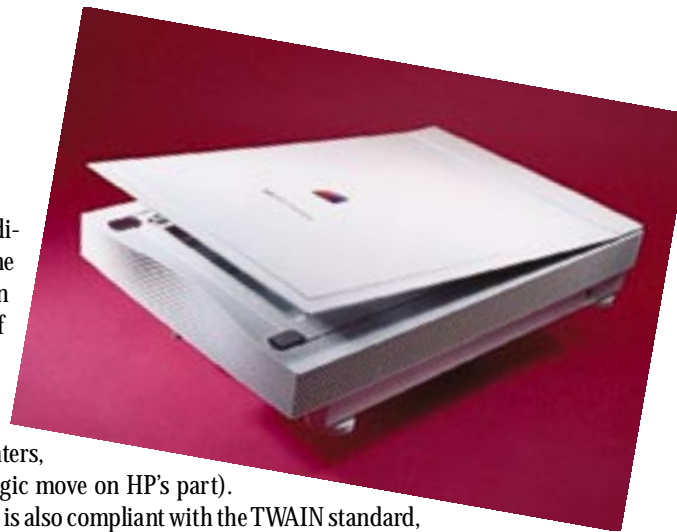
The unit ships with Adobe Photoshop LE 3.0 image-editing software and Calera WordScan Plus 1.2 optical-character-recognition software as well as the HP DeskScan II scanning utility. Recognizing that color scanners find their way into home offices as well as graphic-arts studios, HP includes the nifty Copy Utility, which lets you use the scanner as a color copier. The utility sends images from

the scanner directly to the printer (given the trend of offering scannerlike copy stations with color printers,

this is a strategic move on HP's part).

The ScanJet 3c is also compliant with the TWAIN standard, so you can scan directly into any TWAIN-savvy application.

The scanner's platen accepts reflective media as large as legal size. An optional adapter (\$759) lets you scan slides and transparencies. To facilitate OCR and photocopying, a 50-page automatic document feeder (\$559) is also available. 800-722-6538 or 208-396-2551. / Pamela Pfiffner



Adobe Makes Pages ScreenReady

GRAPHICS THAT LOOK GOOD on paper don't often make the leap to the screen with ease. Adobe ScreenReady takes a layout from any application and rasterizes it into a 72-dpi PICT file, with anti-aliased type and graphics geared for the screen. ScreenReady's Chooser-level driver handles any output that doesn't contain EPS graphics, and its PostScript utility handles material that includes EPS graphics. It can batch-process files in the background, change bit depth and resolution, and optimize color palettes for various monitors. There's even automatic alpha-channel generation for compositing final images. \$199. 800-521-1976 or 206-628-2749. / Sean J. Safreed



ON-LINE PUBLISHING /

Looking Good on the Internet

PUBLISHING ON-LINE doesn't mean giving up the fundamentals of designing paper publications. Two new products give you more power and flexibility in creating and displaying documents on the Internet's World Wide Web.

Fonts on the Web. Today, Web publishers have limited control over type. You can bold and italicize text, choose between monospaced and proportional fonts, and sometimes change type size, but you can't use the same fancy fonts you use on paper. Now, Bitstream has used its TrueDoc technology, which encodes character shape information in one compact Portable Font Resource (PFR) file, to create a prototype Web browser that lets electronic publishers use any fonts they want to in their documents — including dingbats and fonts with non-Latin characters.

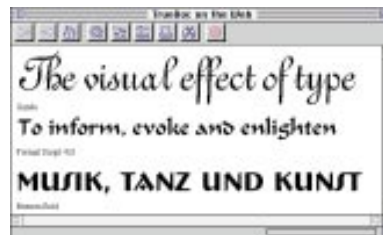
A TrueDoc-enabled browser would download a small PFR file for each typeface used on a page. After downloading the typeface, the browser could cache it away to use again later. And because the technology is an extension to HTML, the language in which all Web pages are written, TrueDoc Web pages can be viewed by non-TrueDoc browsers — just without the special typefaces.

The company says the developers of several Web browsers are interested in using TrueDoc to move Web pages beyond Times and Monaco. 617-497-6222.

HoTMetaL Pro. Since HTML is the language that rules the Web, creating pages on the Web requires encoding them as HTML. Several shareware HTML utilities have appeared in the past year, but SoftQuad's HoTMetaL Pro is the first commercial HTML editor for the Mac.

Based on SoftQuad's popular Windows HTML editor, HoTMetaL Pro uses icons — separate from the editable document text — to represent the markup codes HTML uses to specify styles, type specs, and hypertext links. To add a new markup tag, you just select text and type a keyboard shortcut. HoTMetaL Pro prompts you with a list of HTML styles, so even newcomers to the language can write effective Web documents. An HTML rule checker ensures that the document adheres to the HTML specification, and links to Apple events let you preview your document in a Web browser.

A full-featured editor as well, HoTMetaL Pro includes templates, a spelling checker and thesaurus, a context-sensitive Find and Replace command, and style sheets. \$195. 800-387-2777 or 416-239-4801. / Jason Snell



GRAPHICS /

Fractal's Poser Models for Digital Artists

POOR BODY IMAGE got you down? Drawing human figures and finding the right model's pose frustrate many graphic artists. Now Fractal Design offers relief in a new program called Poser, which helps you render the human form for inclusion in graphics and layouts.

Poser provides a virtual mannequin you can manipulate with simple controls. Move the hand on the on-screen model, and the elbow and shoulder move or rotate realistically. Poser lets you change the size of individual body parts to create a lanky figure or a Sumo wrestler. It includes built-in body sizes for figures that range in age from infant to adult and that maintain the proportion of arm to torso length and so on. Models can be male or female, with fully defined muscles or in skeletal form. Poser includes a library of classic poses to get you started.

When you've posed your model just so, Poser renders a detailed image of the figure, using a bump map to simulate muscles and a decal map that's

applied like Superman's costume (cape not included). The image can be saved as a PICT file with alpha-channel information, and you can export the model to a 3-D program in DXF or RIB format. Fractal is also looking into incorporating Apple's QuickDraw 3D, to provide interactive rendering, and the 3DMF file format, for more-robust file transport to other applications. \$199; until the end of August, \$99. 800-297-2665 or 408-688-5300. /SJS



MONITORS /

Now There's Room for a PressView

A RELIABLE COLOR DISPLAY is essential to graphic artists and publishing professionals. But most calibrated monitors on the scene tend to be big — and expensive. Now Radius is bringing the color finesse of its 21-inch PressView system to a new monitor that boasts a more manageable size and price.

Priced at \$2,399, the PressView 17SR color display system is based on a new intelligent 17-inch DiamondTron aperture-grille CRT from Mitsubishi. With an extremely fine dot pitch of .25 mm and support for resolutions up to 1,600 x 1,200 (close to 144 pixels per inch), the tube provides publishers with the 1.92 million pixels

necessary for demanding color work.

But the tube's only half of the story. The unit ships with preset white points of D50, D55, and D65, which mimic the lighting standards of most prepress shops. For further refinement, you can use Radius' PressView Display Management Software, which adjusts the monitor's amplifier gain rather than changing colors on the video card, to set the white point at anywhere from 3,000 K to 9,500 K. Like its larger sibling, the PressView 17SR sports a gray bezel that provides the neutral background necessary for color correction and comes with an ergonomic hood that blocks out ambient light.

To ensure accurate color over time, the display ships with Radius' ProSense color calibrator. This hardware/software package offers a closed-loop system that measures monitor phosphors to give the monitor feedback on white point and gamma, data the monitor uses to color-correct itself. The PressView software supports Apple's ColorSync 2.0 and lets you write profiles for color-management systems from Agfa, Kodak, and EFI. 408-541-6100. /PP



FINE PRINT

The Type Connection

ON THE NEXT PAGES, we discuss how to buy fonts using unlockable CD-ROMs. But some companies have taken instant gratification a step further: on-line purchasing of fonts and graphics. ⇨ CompuServe pioneered on-line font buying, in which a user previews a typeface in a low-resolution screen image and then elects to download the files. The cost is charged to the credit card on which the regular CompuServe charges are paid. One of the more popular services is **DTP OnLine** (GO:DTPONL), which carries fonts and clip art from Monotype and Treacyfaces, among others. Font prices range from \$25 per font to \$270 for an entire family. ⇨ You don't need to subscribe to an on-line service to order fonts via a modem connection. That's a boon for fans of **Emigre**, the cutting-edge type-design company that prefers to sell fonts direct rather than through a retail outlet. With its Now Serving! service, Emigre provides SoftArc's First Class Client software (with connection speeds as high as 28.8 kbps) that lets you access fonts from Emigre, Apollo Program, and House Industries. Demo software, job postings, and design forums are also available. Font prices range from \$59 to \$95 for Emigre fonts. You pay for connect time, but there are no download fees. 800-944-9021 or 916-451-4344. ⇨



Emigre Magazine



Type Foundries



Order Here!



Yet another small type foundry that has expanded into cyberspace is **Alphabets*Incorporated**, whose designOnLine service sells A*I's innovative type designs, from the likes of Peter Fraterdeus and Philip Bouwsma. It too offers discussion forums and other services. Subscriptions cost \$45 per quarter (\$15 for students). Fonts sell for at least 15 percent off retail prices, which are \$35 to \$75. 708-328-2733 or 800-326-8973. ⇨ Emigre's service also offers a gateway to **Designlink**, a bulletin board for graphic artists that offers classified ads, design tips, demo software, a calendar of events, and a place to upload work samples. Access is free for 30 minutes daily. Subscription plans start at \$30. 510-930-6746. /PP

TYPE AND TYPOGRAPHY / BY KATHLEEN TINKEL

Dialing for Dingbats

Why buy an unlockable-font CD-ROM? You get instant font gratification and the flexibility of buying one font, one family, or an entire library, all at lower prices.

UNLOCKABLE-FONT CD-ROMS are *the* way to buy fonts in the mid-'90s. Why? In 1992 when we last looked at font CD-ROMs, they were, frankly, a bit of a hard sell. Things have changed in the past three years:

More Fonts. The historic foundries, once fiercely competitive, have merged their collections in an aggregation usually referred to as the "Adobe library," which now includes about 3,000 fonts, two-thirds more than in 1992. There are also many more new fonts from small foundries and independent designers, along with tens of thousands of mass-market fonts in shareware and commercial collections.

Lower Prices. Real-world font prices have fallen dramatically. Today's list price for fonts in the Adobe library is about 25 percent lower than it was a year or two ago. There are also more special collections, seasonal deals, and deeper discounting in general. On average, users pay only half to two-thirds as much for professional-quality fonts today as they did in 1992.

Cost Cutting. Falling prices combined with the need to handle more products has led to streamlining of sales and distribution at the foundries. Font CD-ROMs are cheaper to manufacture, stock, and distribute than font packages on floppies.

Software Sales. Retail software outlets today focus on fewer, high-volume items. Most retail and mail-order outlets no longer offer fonts in the traditional package of a full typeface family. If they carry fonts at all, they stick to a few special value packs.

Specialty Retailers.

Specialists have taken the lead in serving the sizable niche market for fonts. The three major retailers — FontHaus, FontShop, and Precision Type — were just getting established three years ago. They too find inventories of fonts in packages cumbersome and expensive and have enthusiastically adopted CD-ROMs — usually charging less than the foundries to unlock the fonts.

User Needs. The font market depends on professional users — at graphic-design firms, ad agencies, publishing houses, and service bureaus — who buy fonts regularly. Most of these users have built their in-house libraries and now need fonts for specific projects. This adds to the allure of unlockable CD-ROMs, since most permit purchase of a single font.

The CD-ROM Boom. As the popularity of CD-ROM drives soars, selling wares on CD-ROM makes sense. In 1994 alone, sales of CD-ROM drives more than doubled, to nearly 27 million installed worldwide.

Improved Technology. Unlocking fonts from early CD-ROMs was frustrating and difficult, and the process wasn't helped by scanty documentation and an unwieldy interface. The unlocking systems are much improved today, with automated order entry and fax-in/fax-back procedures for managing the unlocking codes.

Today's CD-ROM Scene

Unlockable-font CD-ROMs are still evolving. Font market leader Adobe now offers around-the-clock access for unlocking

fonts on its Type On Call CD-ROM, and other foundries may follow suit. For variety, Agfa and Monotype have added fonts from small foundries and independent designers to their core libraries. Newcomers, including Letraset, Autologic (whose CD-ROM is sold primarily through FontHaus), and Berthold (its Diamond CD is sold exclusively through FontShop), have entered the game. Image Club, the company that introduced CD-ROM-unlocking technology and that is now a division of Adobe, remains a player.

Two more unlockable-CD-ROM collections were announced but not available for review at publication time: Precision Type (800-248-3668 or 516-864-0167) promises a three-CD-ROM set in the second quarter containing most of the libraries the company handles, including fonts from the now defunct Font Company. And International TypeFounders (610-584-1011; 610-584-8859 [fax]), a new coalition of small foundries and independent designers, will have a CD-ROM by the time you read this.

Font CD-ROMs are not for everyone. They make sense if you buy type regularly, not just once or twice a year. CD-ROMs are not updated as often as the libraries they cover, so they're also not the best way to keep up with new type releases, although Agfa has embarked on an ambitious twice-yearly update cycle.

The fonts are stored on the CD-ROM in an



encrypted format. To order, you contact the type vendor by phone or fax and then provide product names or numbers, codes the unlocking utility requires, and credit-card information. Built-in automated order forms, sometimes linked to a browsing utility, ease this process, allowing you to store your address and other required information, entering the product detail at a click of the mouse, and including codes automatically on a faxable order form.

For each of the products on your order, the vendor responds with unlocking codes that you enter in the CD-ROM utility to unlock the software you want, so you can copy it to your hard disk or a floppy disk. (It's a good idea to make an archive copy on a floppy disk, by the way.) Most vendors prefer faxing for the unlocking transaction: It gives them a written order (including your signed agreement to the terms of the font license), and the form they fax back is a handy reference when you enter the unlocking codes. Most of the time, the codes are faxed within minutes, but a few users report that unlocking can take several hours or even more than a day.

Getting started is reasonably easy: You open the CD-ROM and run an Installer (or in the case of Autologic APS-TypeScriber, drag a file into your System Folder). There are several unlocking systems, so it's important to follow the specific directions for each. Note that if you lose a critical file, you'll have to reinstall it before the next use (and then may have to appeal to the vendor for new codes if you failed to back up already unlocked fonts). The browser utilities are OK (some are more useful than others), but if you know which font(s) you want, it's easier to refer to a printed reference for the product numbers.

Unfortunately, many vendors don't include a printed catalog with the CD-ROMs.

Choosing a CD-ROM

Font CD-ROMs are available directly from foundries, but it's often preferable to buy discs from dealers, who may offer more-aggressive discounts. All these unlocking

CD-ROMs list for less than \$100, with even lower street prices (see figure 1 for a detailed comparison of the unlockable CD-ROMs available at press time). Most vendors update earlier versions for free or for a nominal charge.

The price of most of the CD-ROMs includes free fonts. Aside from Image Club, all the vendors require that you register your CD-ROM to cash in on any free unlocks, and many give you a short list of free fonts to choose from. (Agfa also includes one free font already unlocked on its CD-ROM.) Except for Letraset's, all the CD-ROMs give free access to screen bit maps. Some of the CD-ROMs also include other types of software, such as type utilities and clip art. Image Club is most extravagant in this respect.

After buying the disc and obtaining your free fonts, you buy fonts piecemeal. Prices vary, but only within a narrow range. Adobe sets the pace with its unlockable-font CD-ROM, with base prices of \$25 per font and \$99 per four-style family. In part because they're all peddling the same basic library, most of the other font vendors begin there as well but may offer discounts. But fonts in type families sell for less; there may be discounts, depending on the number of fonts bought at one time; and other special offers abound, especially from dealers.

Minimum purchase requirement is another factor. Image Club doesn't break up packages, so even if you need only one font, you may be required to unlock (and pay for) four or six. Agfa had a similar requirement but now allows single-font unlocks.

One-Stop CD-ROMs

You can also buy completely unlocked font collections on CD-ROM.

URW America (800-229-8791 or 603-882-7445; 603-882-7210 [fax]) offers several CD-ROMs, with prices beginning at \$100 for smaller collections and going up to \$1,200 for a two-CD-ROM set (1,000 fonts with stylistic variations). These fonts are based on digital outlines URW produced under contract for the major foundries. The company owns the data but hasn't licensed the trademarks, so these fonts have unfamiliar names.

Bitstream (800-522-3668 or 617-497-6222; 617-354-7954 [fax]) sells TypeShop, a CD-ROM containing its library of 1,085 high-quality fonts in PostScript Type 1 format for

a street price of about \$600 (from FontHaus, Phil's Photo, and other dealers). A second unlocked CD-ROM (\$400 list), due out by the time you read this, will have 200 fonts, including some expert sets with designed small caps and old-style figures.

You can also find CD-ROMs that contain hundreds of fonts for pennies per font. A caution: Although it's not always true that you get what you pay for, some sort of quality compromise is likely with very low-priced font collections. For one thing, there are few text families among them. Display faces usually have fewer characters (many have no figures, and some are only a single case) and often have no kern pairs. Unfortunately, you may also find poor typographic quality or technical problems. Another compromise is that few inexpensive font collections are licensed (authorized by trademark owners). Prices for professional fonts include royalties paid to type designers and foundries that license trademarked names. Sellers of inexpensive collections often copy licensed fonts without authorization, a practice that is legal — but considered unethical by many — under current copyright laws. This practice also means the fonts will have unfamiliar names.

All that aside, you can find bargains. For example:

Fantazia Concepts (216-951-0877; 216-951-9241 [fax]) sells 2,500 fonts for \$50.

OptiFont (708-675-6530) sells 400 fonts for \$500.

SoftKey (800-227-5609 or 617-494-1200) sells 1,500 fonts for \$40.

Swfte International (302-234-1740; 302-234-1760 [fax]) sells three volumes of about 100 fonts each for \$50 apiece.

The Bottom Line

Clearly, when it comes to fonts on CD-ROM, there's a lot from which to choose. Given the pricing structure and the pay-as-you-go philosophy, it makes sense to keep several of these discs in your software tool chest. But if we had to pick just one package, it would be the Monotype CD, for its elegant interface, intriguing type collections, and valuable software extras.

Kathleen Tinkel writes regularly about fonts, graphic design, and prepress for MacUser and other publications.



figure 1

Just Your Type / unlockable-font CD-ROMs compared

	Adobe Type On Call	Agfa Type CD-ROM	Art & Type Vendor	Autologic APS-TypeScriber	Diamond CD: Types Around the Clock	Fontek CD	Fonts Just in Time	Monotype CD
Product version	4.0	5.0	3.0	3.0	1.0	2.0	5.0*	4.0
CD-ROM price	\$99	\$99	\$99	\$18	\$89	\$100	\$49.99	\$49.99 (2 discs)
Fonts								
Number of fonts	2,000+	3,000	750+	3,000	1,270	254	4,300+	3,400
Foundries represented	Adobe	Agfa, Adobe, Font Bureau, TreacyFaces, T26	Image Club	Autologic, Bitstream, Adobe	Berthold	Letraset	Linotype, Elsner & Flake, Berthold	Monotype, Adobe, Type Designers of the World
Formats	Type 1 (Mac, PC)	Type 1 (Mac)	Type 1, TrueType (Mac, PC)	Type 1 (Mac)	Type 1 (Mac, PC, UNIX)	Type 1, TrueType (Mac)	Type 1, some TrueType	Type 1, some TrueType (Mac, PC)
Price per font†	\$22 – \$25 (list price less 35%); special-offer discounts	\$24 for Adobe; \$29 – \$59 for others	\$15 – \$19; package discounts	\$20; large-volume discounts	\$25 each for 1 – 2; package discounts	\$39.95 (display fonts); DesignFonts and text families priced separately	1 – 4 fonts unlocked at one time; \$22.50 each; 5 – 9, \$20 each; 10 – 19, \$18 each	\$22.50; volume, value-pack, and special-offer discounts
Minimum order	none	2 fonts	whole packages	none	2 fonts	none	none	none
Free unlocks	30 preselected fonts plus choice of 2 packages from list of 8, Adobe Type Manager, Adobe Type Reunion	20 preselected Agfa fonts	\$250 worth of fonts or clip art plus 12 dated coupons for an additional \$20 discount	any 10 Autologic fonts	none	any 2 display fonts, LetraStudio	any 4 Linotype fonts and any 38 Clipables clip-art images	any 8 Monotype fonts
Unlockable extras	9 sets of Aridi Ornamental Caps (EPS)	Agfa TypeChart, KernEdit	30 volumes of Image Club's DigitArt	none	none	Envelopes (for Adobe Illustrator), border utility, paper templates, Pantone Cross Reference Software	1,100 Clipables clip-art images, 5,000 pi characters, Linotype utilities	12 sets of Aridi Ornamental Caps (EPS), Mecanorma clip art, Visions Edge XTensions (for QuarkXPress), DTP software
Free on-disc	PSPrinter driver, Downloader, Font Porter, Acrobat Reader, type histories, guide to pronunciation, screen fonts	Agfa Quill Script (Type 1), tutorials on type and graphic design, multimedia presentations, screen fonts	screen fonts	screen fonts	low-resolution outlines	Letraset Character Chooser	screen fonts	screen fonts, type histories
Unlocking								
Who unlocks	Adobe	Agfa (or selected dealers, if bought from them)	Image Club	FontHaus	FontShop USA	Letraset (or dealers)	Linotype-Hell (or selected dealers, if bought from them)	Monotype (or dealers)
Order via	phone or fax	phone or fax	phone	phone or fax	fax	phone or fax	phone or fax	fax
Codes via	fax	fax	phone or fax	phone or fax	fax	phone or fax	fax	fax
Unlocking hours	24 hours, 7 days	M – F 8:30 A.M. – 6 P.M. Eastern	M – F 8 A.M. – 6 P.M. Mountain	M – F 9 A.M. – 6 P.M. Eastern	M – F 8 A.M. – 7 P.M. Central	M – F 9 A.M. – 6 P.M. Eastern	M – F 9 A.M. – 5 P.M. Eastern	M – F 8 A.M. – 6 P.M. Central
Comments								
Pros	Around-the-clock access. Plenty of special offers. Works on Macs and PCs.	Good tutorials. Access to Agfa's pi fonts. Fonts from independent designers Philip Bouwsma, Doug Olena, David Siegel.	Low prices. Good catalogs and documentation. Well-organized CD-ROM. Good-looking clip art.	Decent price. Very simple interface — no installer, no browser.	Renowned Berthold quality. Low-res outlines permit laser comps.	Easy access to popular Letraset faces; dealers include art-supply stores. Nice printed catalog.	Good prices. Easy access to Elsner & Flake library in North America.	Nice interface and smooth unlocking process. Large collection at good prices. Handy catalog. Works on Macs and PCs.
Cons	Adobe library only. Relatively high base prices.	High prices.	Need to buy whole packages of fonts or clip art. Some fonts are of mediocre quality.	Very minimal interface. No printed reference. Last update 1993.	Some users may balk at fonts that lack ligatures and other special features.	Relatively high prices; limited or no discounts.	Difficult installation procedure. No printed reference.	None.
Company	Adobe Systems Mountain View, CA 800-833-6687 408-986-6555 408-986-6587 (fax)	Agfa Wilmington, MA 800-424-8973 508-658-5600	Image Club Calgary, Alberta, Canada 800-387-9193 (catalog requests only) 403-262-8008 403-261-7013 (fax)	FontHaus Fairfield, CT 800-942-9110 203-367-1993 203-367-1860 (fax)	FontShop USA Chicago, IL 800-897-3872 312-360-1998 312-360-1997 (fax)	Letraset Paramus, NJ 800-343-8973 201-845-6100 201-845-4708 (fax)	Linotype-Hell Hauppauge, NY 800-842-9721 516-434-2700 516-233-2166 (fax)	Monotype Typography Chicago, IL 800-666-6897 312-855-1440 312-855-9475 (fax)

*Version 6.0 is due out by the time you read this.

†Approximate prices; discounts available through dealers.

GRAPHICS HOW-TO / BY JANET ASHFORD

Posterized Photos

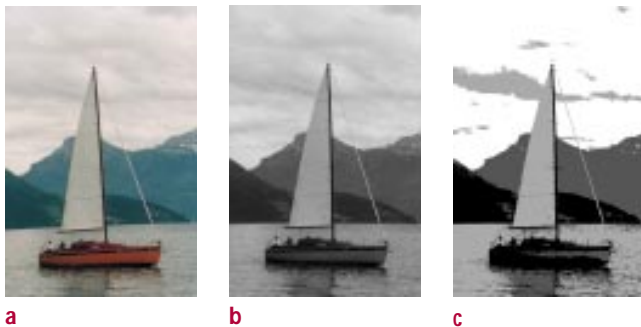
Transform an ordinary photograph into attractive poster art with three essential software tools.

STYLIZED TRAVEL POSTERS, such as those created by Swiss artist Otto Baumberger in the 1930s, are popular again. Baumberger used paint and a good eye to reduce the tonal range of nature to dramatic areas of flat color. You can mimic this style by posterizing a photograph, even a lackluster one such as this photograph of Lake Lucerne. Here's how: Scan and posterize the photo in Adobe Photoshop, convert the bit-mapped image to outline form in Adobe Streamline, and then add color and type in Adobe Illustrator or Macromedia FreeHand. (Both Illustrator and FreeHand have built-in autotracing tools, but Streamline is a better choice if you do a lot of autotracing; it's faster and more precise and offers more options, including ones for working with gray-scale as well as black-and-white images.) This technique is fast: The whole process takes about an hour.

Janet Ashford is the coauthor, with Linnea Dayton, of Adobe Illustrator: A Visual Guide for the Mac, distributed by Addison-Wesley.



1. Scan and posterize the photo. Scan a color photo (a) at 300 dpi, and then crop it and convert it to gray scale in Photoshop (b). Use the Posterize command (Image: Map: Posterize) to convert the scan to a four-level posterization (c).



2. Autotrace with Streamline.

To prepare the picture for autotracing, separate areas that share the same gray value, such as the sail and the clouds, with a thin line drawn in Photoshop (a). In Streamline, autotrace the scan as a four-level posterization with maximum smoothing (b). Although Streamline can posterize a gray-scale image, posterizing it first in Photoshop allows more control over the gray-scale conversion.



3. Add color. In Illustrator or FreeHand, select the shapes and fill them with bold and pastel colors. Because we took the step of separating the sail and clouds, we were able to fill these two elements with different colors.



4. Finishing the poster.

Helvetica, a sans serif typeface designed in Switzerland during the mid-1950s, was given the Latin name for Switzerland. We finished our Swiss-style poster by adding red type set in Helvetica Condensed and adding a black stroke, as shown above. The style of the finished piece is similar to that of Otto Baumberger's 1935 Swiss travel poster, shown here.

EXPERT TIPS / BY BOB SCHAFFEL AND CHUCK WEGER



Learning to Love Gray

Neutral colors tell a lot about an image. When colors are out of whack, turn to the gray areas.

COLOR CORRECTION NEEDN'T be reserved only for rocket scientists. This month we suggest a method of color correction that has several benefits — especially for those who don't have a Ph.D. in "scan-ology."

When it comes to color-correcting images with precision, it's tempting to get wrapped up in color-management software and color-measurement devices. No doubt about it — these tools are extremely helpful. But there's a simpler way to get farther down the color-correction path before you start fiddling with new software and tools. The philosophy is simple: If a scan's color is wrong across the image, you can bring much of it back into kilter if you correct the image's gray balance.

What do we mean by proper gray balance? There are many objects we perceive as being neutral in color: the white fabric of a ship's sail, or the gray and weathered siding on a house in New England, or perhaps the shadows that objects cast in sunlight. If a scan has a color cast, it will affect the data values for these objects. By correcting these values so the neutral objects have neutral values (in RGB that means roughly equal parts of each color, and in CMYK it means slightly more cyan than the other three colors), you can bring the image back into better gray balance. You can selectively correct any particular colors that are still out of whack (the scientific term, of course), using the complete arsenal of color tools.

Locate and choose three of the image's neutral areas to represent three data points in the tonal curve for gray-balance correction. These three areas are as follows: the brightest highlight (such as the ship's sail, but not the glint of the sun off metal), the midtone neutral (such as the house siding),

and the shadow neutral (such as an object shadow in sunlight).

To recognize neutral balance, you define it: Pick target tints for the three points on the curve. Each image might require some departure from the following numbers.

For the highlight, aim for 5%C, 3%M, 3%Y, and no K. For the midtone, use 51%C, 39%M, 39%Y, and 15%K. Things are more complicated for the shadow. If

you're working on a traditional high-end scanning system, the numbers you use for the shadow might be 98%C, 88%M, 88%Y, and 75%K. But if you're using Adobe Photoshop, shoot for 70%C, 55%M, 55%Y, and 98%K. That is because Photoshop includes Undercolor Removal (UCR) and Gray Component Replacement (GCR) in its densitometer readings; both affect gray balance (see Expert Tips, May '95, page 101).

Next, use the on-screen densitometer (Windows:Palettes>Show Info) to survey the pixels in the target areas to find out whether or not they're balanced for neutral tones. Although you're working in RGB, set the Info palette to show CMYK data, and start with the highlight target area.

Let's say your highlight readings show values of 31%C, 4%M, 26%Y, and 0%K. OK, what is the color cast? Low magenta in the


balance means a green color cast (recall the color theory from "Charting a Course for Color," April '95, page 106). Now use the Curves menu (Image:Adjust:Curves) to reset the gray balance. Although it looks like you should adjust the green curve (to change magenta), remember that this is the highlight target area, so the magenta percentage is already at the stated target value. Instead, decrease the cyan, by brightening the red. Next, turn to the blue curve and decrease the yellow, by brightening the blue. Repeat the process as necessary to achieve the target percentages.

Use the same procedure for the midtones, using the aforementioned target values.

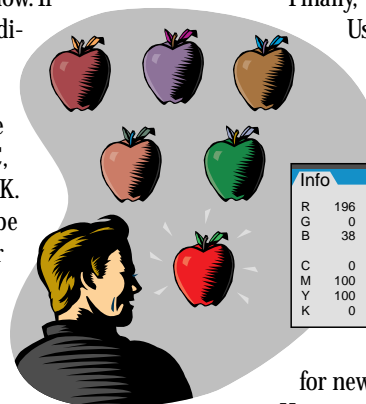
Finally, work on the shadow area.

Use common sense about how far to bend the curves. We have suggested some target numbers, but you may need to alter colors for different press conditions (for example, correcting a highlight to 9%C, 8%M, and 7%Y for an image that is destined

for newsprint).

Here are some benefits to this method: First, by making simple adjustments at the start of a correction, you can save the data integrity of the file by not overdoing the transformations. Second, it's usually possible to find objects that appear neutral, even in files where the color is out of whack. Third, rather than guessing what the data ought to be for chromatic sections of an image, you can rely on the values for gray, which are well established. 

Bob Schaffel is technology director of the Professional Prepress Alliance. Chuck Weger is a consultant and publisher of the Photoshop Monitor newsletter.



NETWORKING

ELECTRONIC DATA PUBLISHING /

Find Facts Fast with Folio VIEWS

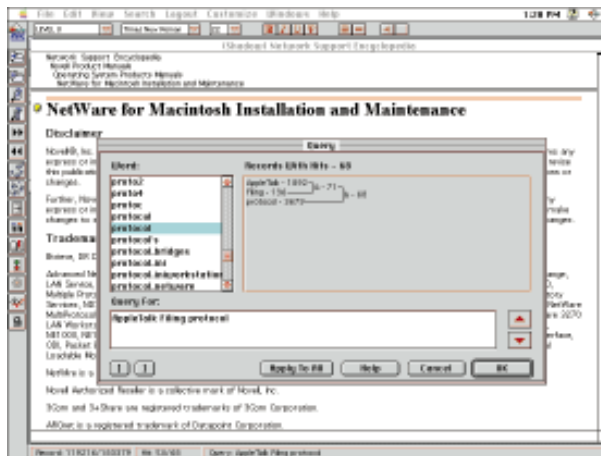
APPLESEARCH FACES some serious competition, now that Folio (800-228-1132 or 801-229-6710) has ported its Folio VIEWS 3.1 to the Mac from Windows. Folio VIEWS is an information-server/client software system that can locate thousands of text entries in seconds. The cross-platform software can index, search, and retrieve text over a variety of network systems, including AppleTalk/AppleShare, Novell NetWare, Banyan VINES, and others. You can also view Lotus Notes databases from within Folio VIEWS.

Although it's similar in concept to AppleSearch, Folio VIEWS uses a different structure. Folio VIEWS keeps its data in a file called an *infobase*, a formatted-text document that usually resides on a server Mac or PC or on a CD-ROM. The structure of the infobase makes searching and navigating remarkably speedy. For example, when you search for a text string, Folio VIEWS lets you know how many entries exist *before* it actually performs the search; if the number is dauntingly large, you can redefine your search criteria to narrow the focus before conducting the actual search. You can also add

hypertext links to simplify navigation through an infobase.

Editing and security features help you manage infobases. The dynamic indexing feature automatically indexes any new text you add to the infobase. As for security, you can lock an infobase if you don't want users making changes. Folio VIEWS also lets you disable the Print and Save As commands for particular users and groups, and you can limit the number of users allowed to access an infobase simultaneously.

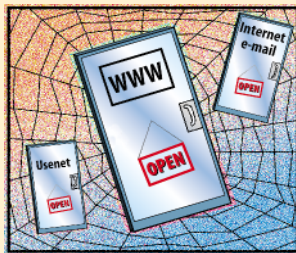
The Folio VIEWS 3.1 product family includes three products: the client software, Infobase Manager for Macintosh (\$295), and two different versions of the infobase-building software. You can build your infobase either with Folio VIEWS 3.1 Infobase Production Kit for Macintosh (\$895) or with Folio VIEWS 3.1 Professional Infobase Development Kit for Macintosh (also \$895); the latter is geared more toward professional developers and includes tools for producing infobases on CD-ROM. All Mac products come in 680x0 and PowerPC-native form. / John Rizzo



NETWATCH /

Internet Access from On-Line Services

COMPETING FOR THE WANNABE netters, the major on-line services continue to add Internet-access methods to their offerings. Internet e-mail, which all the major services support, was just the beginning. The latest hip checklist items pertain to the graphical World Wide Web. A WWW site lets Internet users access information about the on-line service, and a WWW browser provides access to the Web from the on-line service.



On-line service	ftp capability	Usenet newsgroups	WWW site	WWW browser
America Online	now	now	5/95	6/95
CompuServe	now	now	now	5/95
eWorld	5/95	5/95	now	9/95
Prodigy	8/95	8/95	now	8/95

ELECTRONIC MAIL /

CE Gets User Lists in Sync

IF YOU'VE ALWAYS wanted your QuickMail directory to be in better sync with the rest of the office (or the rest of the world), CE Software (800-523-7638 or 515-221-1801) has news for you. The company now offers InterOFFICE Message Exchange, a software-only gateway that automatically updates lists of e-mail users among servers. And although CE sees InterOFFICE as a useful product for large QuickMail-only networks, it is also offering software modules (called access units) that let you connect QuickMail to more than a dozen PC, UNIX, and mainframe e-mail systems.

With the add-on access units, InterOFFICE Message Exchange can pass messages among various e-mail systems and enables users to see lists of users from other e-mail systems. Access units are currently available for popular mail

systems such as Lotus cc:Mail, Microsoft Mail, and Novell Global MHS, as well as for host-based systems such as IBM OfficeVision, MCI Mail, and Digital's ALL-IN-1 Mail. Access units for UNIX standards include those for X.400 messaging and MIME enclosures. In addition, access units for Lotus Notes, Banyan Intelligent Messaging, and X.500 directory service will be available later this year.

The InterOFFICE core and access units can run on a variety of computers, including PCs running Banyan VINES, Intel SVR4 UNIX, or SCO UNIX; HP workstations; IBM RS/6000s running AIX; and IBM 370 mainframes. InterOFFICE Message Exchange prices start at \$4,500 for QuickMail access. Prices for the other LAN-based access units range from \$4,500 to \$7,500, and midrange/mainframe access units range from \$8,500 to \$24,000. / JR

HIGH-SPEED DATA TRANSFER /

More ISDN Options from 4-Sight, Telebit

MODEMS JUST AREN'T fast enough for some people. For graphics professionals or organizations that need faster connections between branch offices, ISDN (Integrated Services Digital Network) phone service is an attractive alternative — primarily because it can transmit data at between 56 and 128 kbps, much faster than any modem. To serve these markets, 4-Sight (800-243-0516 or 515-221-3000) has released a fast new four-port NuBus ISDN card, while the newest router from Telebit (800-835-3248 or 408-734-4333) is designed to bring ISDN to small offices, at a low cost.

4-Sight's forte is ISDN-based file transfer, which is perfect for huge graphics files. The company's Quatro NuBus card makes it possible to use multiple ISDN ports and channels in parallel to transfer a single large file at rates as fast as 3.5 MB per minute, according to 4-Sight. The card has four ISDN ports, each of which you attach to its own ISDN line. Each port supports two 64-kbps channels.

The Quatro is typically bundled with one of two 4-Sight connection-management products: Manager 2.0 (\$4,795 for bundle) or Graphics Superhighway Broadcast (\$5,795); the card is also available by itself (\$3,495), for users who



own a previous version of Manager. Each software package provides a graphical interface for managing file transfers and lets you use multiple ISDN channels for a single connection. The Broadcast package can turn a Quatro-equipped Mac into an ISDN server, to which users can send their files for ISDN transfer (the bundle price includes a ten-user license). Broadcast supports simultaneous transmission of an individual file or a group of files to multiple locations, as well, and it lets you use multiple Quatro boards in one Mac.

At \$1,399, the Telebit NetBlazer LS ISDN router is meant for a more budget-minded environment, such as a branch office seeking fast data transfer to an office in another location. The NetBlazer LS ISDN contains one ISDN port (equipped with a Stac data-compression chip for extra-fast file transfer), an Ethernet port (for connection to the local network), an asynchronous serial port (for other modem connections), and a synchronous serial port (for WAN connections, such as T1). Although the NetBlazer LS ISDN is multiprotocol (it supports AppleTalk, ARA 2.0, IP, and IPX), you'll have to use a DOS-based interface or a terminal emulator to manage it. / Shelly Brisbin

WIRELESS COMMUNICATION /

Roving Newtons Beam onto the LAN

NEWTON MESSAGEPADS can talk to *each other* without wires, but how about reaching the rest of a network? Photonics (800-997-2326 or 408-955-7930), maker of COOPERATIVE wireless adapters for PowerBooks and other Macs, is shipping a wireless adapter for the Newton 110 and 120 MessagePads — an appropriate platform for highly mobile users, such as hospital workers who need network access on the go.

The COOPERATIVE Adapter for Newton (\$209) uses diffuse infrared beaming to contact a LocalTalk network. According to Photonics, an integrated battery pack containing three AA batteries provides about 20 hours of power without recharging. The adapter communicates with the network by way of one or more Photonics Access Points (\$129 each), which are connected

to the physical network. Each access point has a radius of 25 feet and doesn't require you to aim at a sensor; the receivers react to the presence of infrared light in the room rather than to a focused beam. / SB

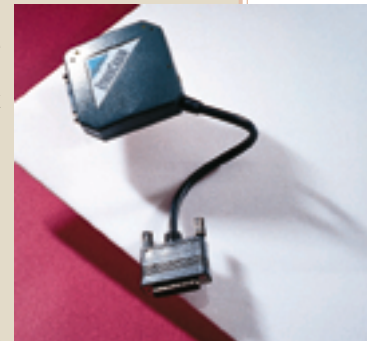


Accelerating Ethernet

IT'S HARD TO FIND FAULT with RunShare, the Eddy-award-winning utility for accelerating file transfers, except that only one user at a time can access an accelerated server. Fortunately, Run now has an answer — the \$1,499 **Run Graphic Server Accelerator**, an Ethernet card with a multisection version of RunShare built in. According to Run, large file transfers are two to four times as fast with the new card. 800-478-6929 or 201-529-4600. ♦ The current battles over defining a 100-megabyte-per-second Ethernet standard could result in different standards for Macs and PCs. Mac vendors are supporting 100BASE-T and the **Fast Ethernet Alliance**, which now boasts over 60 members, including **Dayna** and **Farallon**. The competing standard, 100VG-AnyLAN, is gaining momentum with PC vendors but has few Mac supporters. PC vendors like AnyLAN's secure but expensive token-ring-like topology; Mac vendors don't. ♦ Do you have lots and lots of people dialing in to your network?

Xylogics' new **Remote Annex 4000** (starting at \$4,795) remote-access server can expand to 72 ports. For less portly needs, the **Remote Annex 2000** (starting at \$2,695) comes in 8- and 16-port versions. In addition to supporting ARA, both new boxes support the IP, IPX, PPP, SLIP, and LAT protocols. 617-272-8140.

♦ **Apex Technology** (800-767-4858 or 208-336-9400) is now offering a new, flexible method of connecting PCs to your Macintosh Ethernet network. **EtherChain** (\$279) is a parallel-port-to-10BASE-T connector based on Farallon's Eddy-award-winning EtherWave technology. EtherChain comes with AppleTalk, Novell ODI, and Microsoft NDIS network drivers. In addition, a printer pass-through port lets PCs connect to networks and parallel printers. ♦ **Rockwell** is the first vendor to ship a modem chip set that can send both voice and electronic data simultaneously. The RC288ACI/SVD follows the Digital Simultaneous Voice and Data standard. Expect SVD modems to appear from major modem vendors sometime this summer. / JR



MAC TO PC / BY JOHN RIZZO



Database Divisiveness

New cross-platform client/server tools from the Windows side will help the Mac blend into corporations but won't stop contentious database debates.

TO STAY OUT OF TROUBLE, avoid discussing the following three topics with strangers: religion, politics, and databases. Of these topics, the last is the worst, because it contains the most divisive elements of the

first two. Writing a story about databases is like writing a story about the "best" religion. You'll get angry letters no matter what conclusions you draw. Arguments over single-platform or single-user databases — their speed, ease of use, and features — are bad enough. But throw in the strongly held opinions of Mac bigots and Windows zealots — as you do when you talk about cross-platform client/server systems in which Macs and PCs access a host database server over a network — and you've got the makings of an all-out database holy war.

The Windows side likes to say that Macs haven't made it into more business environments because they lack client/server tools. Actually, there are a couple dozen software tools for creating Mac client/server databases — ACI US' 4D Passport, Blyth Software's Omnis 7, Uniface's Uniface, and Prograph's Prograph CPX, to name a few (for a full list, send for Liam Breck's Macintosh Client/Server Database Development Summary, by e-mailing breck@external.umass.edu). Many, such as Omnis 7, are cross-platform, letting you create virtually identical Mac and Windows links to host databases. Unfortunately, these aren't the tools most often used in the Windows world.

Fortunately, two of the popular Windows database-front-end builders, Powersoft's PowerBuilder and Gupta's SQLWindows, are scheduled to come to the Mac this year. Additionally, Oracle, the biggest player on the host side, will be porting its database-server software to the Mac and will offer a

cross-platform front-end builder. Combined with new data-access-software standards, these products should help the Mac's fortunes in corporate environments — although they probably won't end the debate about which database products to use.

Front-End Friction

The tools most important to the Mac's success as a database platform are front-end builders (also known as client/server development environments), used by consultants and in-house developers to create user interfaces to databases. A certain vendor's front-end builder is generally designed to access the vendor's own database (as SQLWindows accesses Gupta's SQLBase Server, for example) and also powerful host-based databases, such as Oracle, SYBASE, Informix, Microsoft SQLServer, and IBM's DB/2.

Although it's true that more front-end builders exist for Windows than for the Mac, Windows developers who say there are none for the Mac are twisting the truth. They really mean that there are no Mac versions of the top three Windows front-end environments: PowerBuilder, SQLWindows, and Microsoft Visual Basic. Other Windows tools, such as those from Blyth, are popular with Mac developers but make up less than 10 percent of the Windows market.

Of the three most popular Windows

front-end builders, PowerBuilder will be the first to arrive for the Mac. Powersoft is planning to release PowerBuilder Enterprise for Macintosh by the end of June (pricing was not available at press time). Gupta plans to release a beta Mac version of SQLWindows by the end of June, but the company was unable to provide information about the product's actual name or release date at press time.

Visual Basic is the only one of the top



three Windows front-end builders without a Mac version on the horizon. However, Oracle Power Objects, a front-end builder to be released for the Mac and other platforms later this year, will use a Visual Basic-like scripting language so Visual Basic fans can use it easily. Power Objects also has some advantages over Visual Basic. According to Oracle, the product is optimized for developing client/server applications and includes built-in intelligence. Indeed, a pre-release version I saw was impressive.

Oracle is also bringing its host-based server-software offerings to the Mac. Due this year are Power Mac versions of the single-user Personal Oracle7 development tool (in May) and Oracle7 Workgroup Server for Mac (this fall); versions of these

products for Windows NT, OS/2, and NetWare are also on the way. These server-software packages are likely to find rapid user acceptance, because they offer powerful database software without the hassles of UNIX. However, Oracle will have a tougher time getting Power Objects accepted, given the Windows-side loyalty to PowerBuilder, SQLWindows, and Visual Basic.

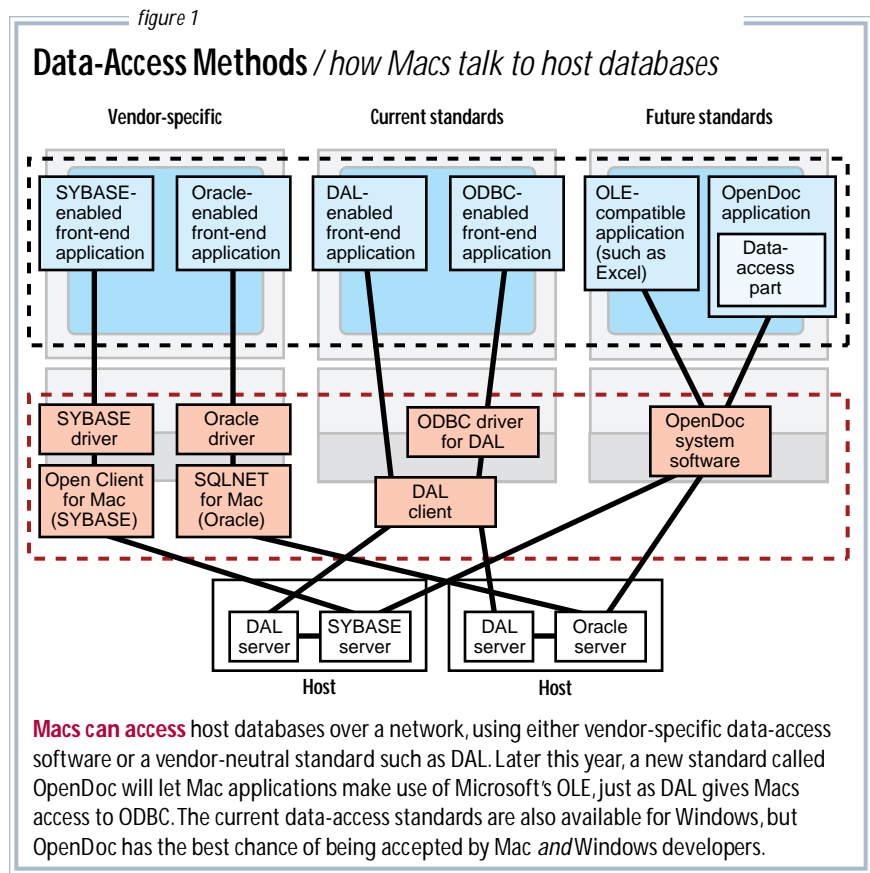
Similarly, Mac developers loyal to 4D or Omnis 7 may balk at accepting Mac versions of popular Windows front-end builders. A Gupta representative said that the new Mac ports most likely won't give Mac clients all the features available to Windows machines. Mac-centric products such as 4D and Omnis 7 will probably continue to offer the best set of features for Macs.

Database-Access Debates

Although cross-platform front-end builders are important for corporate acceptance of Macs, they aren't the only necessary item; companies also need cross-platform *data-access software* (see figure 1). This layer of software lets the client front-end software communicate with a host database — either one brand of database (if you choose native data-access software from that database's vendor) or multiple brands (if you choose one of the available data-access-software standards). Going with a data-access-software standard is often preferable, because of its greater flexibility, even though it may be slower than native software and unable to take advantage of all the features of a particular host database. Unfortunately, finding a cross-platform standard that's acceptable to Mac as well as Windows sites is not an easy task.

Microsoft's position, predictably, has been to push its own standard, ODBC (Open Database Connectivity), which is popular on the PC side but rare on the Mac side. Although Apple does make a Mac ODBC driver, it's a generation behind the Windows version, due to the time lag in Apple's obtaining new ODBC technology from Microsoft. The lack of mature ODBC support for Macs has been influential in keeping Macs locked out of some locations.

While Microsoft was evangelizing ODBC, Apple pushed DAL (Data Access Language), which it sold last year to ITI (Independence Technologies, Inc.). Many database experts consider DAL superior to ODBC, because it



performs some connectivity tasks automatically, allowing developers to write less code. DAL Client for Mac and Windows 1.5 even supports ODBC drivers, so front-end applications that speak ODBC can use DAL to communicate with servers. However, Microsoft's clout has kept DAL from making it into many Windows sites.

Recently Microsoft has backed away from evangelizing ODBC in favor of its own newer standard, OLE (Object Linking and Embedding). OLE 2 is about 500 percent faster than ODBC, according to Oracle. OLE 2 also lets you use Excel as your front end — so if you're comfortable writing OLE 2 commands in Excel, you don't have to learn how to program a database-development environment. However, Mac support of OLE 2 for database connectivity doesn't yet exist, and neither Gupta nor Oracle are planning to support OLE 2 in their Mac database-development environments.

All is not lost for would-be Mac database clients, though; CIL (Component Integration Labs), an organization of which Apple is a member, will soon come out with a standard that's capable of bridging the gap between Macs and OLE 2. OpenDoc, which is scheduled to ship in September, is fully OLE

2-compatible; in fact, it has already received Microsoft's blessing as an "OLE development environment." OpenDoc is expected to offer more user features and easier programming than OLE does. Its ability to provide equal capabilities to Mac and Windows sites bodes well for OpenDoc's acceptance as a cross-platform standard.

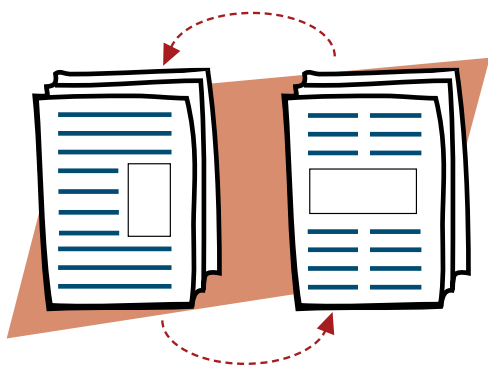
Beyond Biases

With new products about to bridge some of the gaps that have kept Macs out of cross-platform database environments, the outlook for Macs is getting better — if partisan loyalties don't get in the way. Mac developers may or may not be able to embrace Windows front-end builders or the Visual-Basic-like Power Objects. And OpenDoc's acceptance as a cross-platform standard for client/server database access will depend more on political and market pressures than on technical merits. As for the likelihood of more database-server software being ported to the Macintosh — well, just remember: No one ever kicked Macs out of a business for lack of server software. ☒

MacUser technical editor John Rizzo is the author of MacUser Guide to Connectivity and How Macs Work.

Perfecting Your Word Processor

ONE GREAT ADVANTAGE to owning a full-featured word processor such as WordPerfect, Microsoft Word, or Nisus Writer is the presence of a rich macro language. Using WordPerfect as an example, let's see how writing your own macros gives you the power to add features that the developers left out. (Microsoft Word users should check out the "Word on WordBasic" sidebar for help in learning how to customize Word 6.0.) / **BY GREGORY WASSON**



Speed up any macro by using this command as the first line of code; it turns off screen refresh while the macro runs. It's especially time-saving in long macros.

This macro won't work if you write `Open Document (DocumentName)`, but it will work if you assign a generic variable. The generic variable keeps track of the document even when it's closed.

INTUITIVE HANGING INDENT

Some users find WordPerfect's method for making a hanging indent counterintuitive. (In case it's new to you, a hanging indent creates a paragraph in which the first line of text starts farther to the left than the following lines.) This macro makes placing a hanging indent as easy as using a keyboard command equivalent.

```
Display (Off)
Select Paragraph
Left ( )
Indent
Back Tab
```

See the "First Things First" sidebar for instructions on how to enter code and run macros. Before you run this macro, place your cursor in the paragraph in which you want the hanging indent. After you run the macro, you can adjust the indent by simply moving the tab marker on the ruler.

THE REVERT COMMAND

Many programs, including PageMaker and BBEdit, let you change an open document back to what it was when you last saved it. To give WordPerfect this revert capability, enter the following code into a macro:

```
Assign (Var01;DocumentName)
Close
Open Document (Var01)
```

If you run the macro after the document has been moved, a dialog box will prompt you to locate it.

WELL-PLACED DIALOG BOXES

This macro lets you put dialog boxes wherever your cursor sits — ideal for those who have large monitors but don't want to have to mouse around to get to dialog boxes. This macro works only with WordPerfect dialog boxes, such as Go To (Option-F13), New Header/Footer (Command-Shift-H), and Word Count (Option-F3). It doesn't work with Apple dialog boxes, such as the Print dialog box.

This line makes an interactive window appear on-screen during the macro.



```
Menu (Var01;"Dialog Position";
{"Under Mouse";"Standard"})
Case (Var01;{1;Under Mouse;2;
Standard};cancel)
; This subroutine cancels the macro.
Label (cancel)
End Macro
; This subroutine makes dialog boxes
appear near cursor.
Label (Under Mouse)
Dialog Position (Under Mouse)
End Macro
; This subroutine makes dialog boxes
appear center-screen.
Label (Standard)
Dialog Position (Standard)
End Macro
```

You can make your macro code easier to read by entering descriptive text or blank lines between subroutines, but you must preface the extra text or blank lines with a semicolon. When a macro runs, WordPerfect ignores any line that starts with a semicolon. You can also leave these lines out.



The Word on WordBasic

YOU CAN USE Microsoft Word 6.0's programming language, WordBasic, to make Word do just about anything you want. But it's tricky if you don't have a background in BASIC programming. One shortcut is to learn from recorded macros by studying the WordBasic code they generate. But recorded macros can take you only so far; in many cases, the code needs to be modified to make a macro that works the way you want it to. Here are some examples of how written code can help when recorded macros fall short.

A Bold Macro

Trying to record a macro that simultaneously applies bold and italic formatting to selected text causes one of two problems: If you record the macro by using the Character dialog box, the macro will do too much — it will apply all of the selected text's attributes, such as font and size, rather than just bold and italic. A different problem occurs if you record the macro while using keyboard command equivalents — you end up with a macro that toggles the characteristics of the selected text but does not make it bold and italic.

The fix for both problems is simple. Record the macro, open the macro window (by choosing Macro from the Tools menu, selecting the macro's name in the list, and clicking on the Edit button), and get ready to edit. If you recorded the macro by using the Character dialog box, cut out all the code except the following:

```
Sub MAIN
FormatFont .Bold = 1, .Italic = 1
End Sub
```

If you used keyboard command equivalents while recording the macro, add code so that it reads as follows:

```
Sub MAIN
Bold(1):Italic(1)
End Sub
```

Adding parentheses forces a command, such as Bold, not to toggle.

Of course, you could simply write this code to begin with, but seeing the code from recorded macros can be a good learning tool.

A Macro That Toggles

What if you want a macro with a command that *does* toggle? Any command that you turn on and off with a check box won't toggle. This is exactly the case with smart (or curly) and straight quotation marks and apostrophes. Rather than record two macros — one that turns the command off and one that turns it on — write a routine such as this one to make it toggle:

```
Sub MAIN
ToolsAutoCorrectSmartQuotes
End Sub
```

The ToolsAutoCorrect code forces nontoggling commands to toggle, by checking the current characteristic of the text and changing it.

If you want additional examples of what can be done with WordBasic, download the file WRDBSC.SIT from ZiffNet/Mac. The file includes an in-depth set of lessons as well as step-by-step instructions on assigning macros to key commands, menu bars, and tool-bar buttons. / Sharon Zardetto Aker

First Things First / entering and using WordPerfect macros

BEFORE YOU CAN GO WILD writing the world's best macros, you have to figure out how to enter the code. To place our macro code or your own customized code into your copy of WordPerfect, follow these steps:



1. From the Tools menu, choose Macro, and then choose Record (don't worry; the actual recording won't happen as a result of this step).
2. Type in a name for the macro in the resulting dialog box.
3. If you want this macro to be available in any WordPerfect document, choose Library (USA) from the Save In pop-up menu. If you want to use the macro only in your current document, choose that document's name from the pop-up menu.
4. If you want the macro to be activated by a keyboard command equivalent, click on the Assign button and type the key combination

into the resulting dialog box. If you want to access the macro via a menu, make sure the Show Macro in Menu box is checked.

5. Click on New.
6. Click on the macro window that opens behind the main document window.
7. Click on the Pause button, and type in the text of one of the macros from this article or one of your own.
8. Finally, click on Save, and close the macro window.

To run the macro, you can use the keyboard command equivalent you assigned to it or choose its name from the Macro sub-menu, on the Tools menu.



SPACEY CHARACTERS

There are certain characters you can't normally get in WordPerfect, such as em and en spaces, both of which are typographic elements used in desktop publishing. (An em space is sometimes used as an indent. It is generally as wide as an uppercase M in the font you're using.) Here's a macro that lets you enter an em space into a WordPerfect document. Before you run the macro, place your cursor where you want an em space to appear.

```
Left (Select)
Copy
Assign (Var00;Clipboard)
If (Var00=" ")
Delete
Else
Right ( )
End If
Kerning (Move Apart;
FontSize)
```

If you want an en space, just replace the last line of the macro with this one:

```
Kerning (Move Apart;FontSize/2)
```

This line assigns the contents of the Clipboard to a variable. In this case, the variable is the character to the left of your cursor.

This line of the code ensures that the size of the em space will match the font size of the surrounding text.

You can use calculations to determine the size of a character.

PRINT CURRENT PAGE


Ever wish you could print only the page currently on your screen? This macro does it for you, so you never have to reach for the Tab or number keys. All you have to do is put the cursor on the page you want to print and run this macro.

```
Print Options
(PhysicalPage;PhysicalPage;1;Document;
Every Page;Forward;Print Overlay)
Print (Document)
```


This command lets you alter how pages print, giving you more flexibility than you get with the Print dialog box.

Don't Stop Now

Besides adding features to WordPerfect, these macros give you a good idea of how written code translates into action. If they've only whetted your appetite, check out our more complicated set of macros on ZiffNet/Mac, *MacUser's* on-line service. The filename is WPMACR.SIT. (See the end of this article for information on accessing the on-line file.)

If you're ready to strike out on your own, turn to WordPerfect's WP Macro Help (on the Help menu in the upper right corner of the screen when WordPerfect is open) for a thorough explanation of macro code. If you didn't do a full install, you may need to get WP Macro Help from your installation disks, but you're sure to find the effort worthwhile. Soon you'll be making magic with macros of your own design. 

Contributing Editor Gregory Wasson kissed Microsoft Word goodbye when version 6.0 came out and now entrusts his jobs to WordPerfect and its macros. Contributing Editor Sharon Zardetto Aker is patiently waiting for Microsoft to deliver a faster version.

 You can find the programs referenced in this article in the MacUser and ZiffNet/Mac areas on CompuServe and eWorld. See page 4 for instructions on accessing ZiffNet/Mac.



MOBILE MAC / BY SHARON ZARDETTO AKER



RAM Ramp-Ups

Buying RAM for a PowerBook isn't like buying it for a desktop Mac. Here's how to get the right RAM, right from the start.

WHEN IT'S UPGRADE TIME for your PowerBook's memory, you may be surprised at how many questions pop up. Can your PowerBook accommodate more RAM? What kind do you need? How much will it cost?

Where should you buy it? Who should install it? Are there any special glitches in your particular PowerBook model? And does your knowledge of desktop-Mac RAM apply to your PowerBook?

Let's start with the last question first, since the answer is, No, not really.

This Is Not Your Desktop Mac

With PowerBooks, you can forget about SIMMs (single in-line memory modules) and their individual snap-in connectors. PowerBooks use a single *memory module*, or *board*, whose chips are not arranged in a row. In fact, the chips themselves are different from those used in desktop Macs:

Instead of the desktop-standard *dynamic* RAM (DRAM), PowerBooks use either *pseudostatic* RAM (psRAM) or *self-refreshing dynamic* RAM, depending on the PowerBook model. These types of RAM draw less power than standard DRAM chips, a big consideration in a battery-driven computer.

But the acronym that PowerBook users most need to remember when it comes to memory is *TSOP* (thin, small-outline package). The chips on a memory module, like those on a SIMM, are rectangular insectoids, anchored to the

board by stubby legs. But a TSOP's thin body and shorter legs let a board fit more easily into a PowerBook. How to identify a TSOP? It's thinner than the board it's attached to, whereas other chips are thicker than the board.

PowerBook Upgrade Basics

Now that you have a little background, let's tackle the basic questions:

Can my PowerBook accommodate more RAM? If so, what kind do I need?

See figure 1 to find out the RAM configuration for your specific model. You should also keep in mind that PowerBooks have a certain amount of *on-board* (permanently installed) memory, and an upgrade adds to that amount. So, for example, a 6-MB board is the maximum capacity you can add to a PowerBook 170, which has 2 MB on-board



ILLUSTRATION / JAMES O'BRIEN

POWERBOOK SECRETS / opening a 500-series PowerBook

IF YOU'RE SIMPLY installing memory or a hard drive (not installing a modem, which is worth paying someone else to do), a 500-series PowerBook is one of the easiest models to open. Note that, although all the screws you'll remove are T8s, there are three different types — so keep track of what goes where. And be sure to take antistatic precautions.

First, empty both battery bays. Turn the PowerBook upside down and remove the two screws nearest the center label. Then turn the PowerBook upright and take out the two screws under the I/O door. Open the PowerBook. With your fingers or a flat-bladed screwdriver, lift the front edge of the keyboard; then pull it forward until it clears the back of the case. Don't disconnect the two cables at the lower right; just carefully turn the keyboard over, and place it to the right of the PowerBook.



Next, remove the skinny piece of plastic (about 7 inches long) directly behind the keyboard and below the hinge for the lid. Lift it slightly, shift it to the right about a quarter inch, and pull it out.

If you're installing memory, you also need to take off the EMI shield, a perforated metal plate, by removing its three screws. Replacing this shield can be tricky; you'll need to get every tab along all four of the shield's sides inside the metal frame. You should also replace all the screws before tightening them. Otherwise, you may not be able to align both side screws.

Putting the rest of the PowerBook back together is basically the reverse of opening it. However, of the two screws that go under the I/O door, be sure to replace the one nearest the SCSI port first. If you replace the other one first, you could warp the center base cover. / Rich Wolfson

PHOTOGRAPHY / LEON

and an overall limit of 8 MB.

Don't worry too much about the type and speed of your memory chips (since a reputable company will generally send the right memory for a given model), except in one respect: Insist on TSOPs. Some models can accommodate slightly thicker chips, but it's not worth taking the chance.

How much will the RAM cost? Where should I buy it? Who should install it?

The price for PowerBook RAM varies from \$26 to \$43 per MB, depending on the model and how much memory you order.

You can buy your memory from any reputable memory merchant, such as Tech-Works (800-532-9936 or 512-794-8533), ChipMerchant (800-426-6375 or 619-268-4774), or Newer Technology (800-678-3726 or 316-685-9368). Look through the ads in *MacUser* for other suggestions, making sure to choose a company that offers a lifetime warranty. Also, if you're not maxing out your PowerBook memory on the first go-round, make sure the company will buy back the board when you're ready to buy one with more memory on it. If you're not up to the installation yourself — either because you don't have the tools or because you'd just rather not mess with it — find an authorized service center to do it for you. It usually costs about \$50.

Stringent 100-Series Specs

When you're buying memory for a 100-series PowerBook, don't worry about trying to find memory that meets Apple's chip-height specifications. In fact, only one board meets the company's specs for the 100-series PowerBooks — Apple's own 4-MB board. And a 4-MB board added to the 2 MB on-board gives you just 6 MB total — not enough to be worthwhile. What's special about the Apple module? Its chips might be called VTSOP, for *very thin*, etc.; they're wafer-thin, because they've been ground down from standard TSOPs. But many of us have used nonspec memory modules in our 100-series PowerBooks for years and can verify that they work.

160/180 Glitches

Although boards for 100-series PowerBooks do not need to meet every spec, here are some little-known requirements PowerBook 160 and 180 memory boards *should* meet (discovered courtesy of New

figure 1

PowerBook RAM / how much, what kind to add?

PowerBook model	RAM on-board	Maximum RAM	RAM type	RAM speed
100	2 MB	8 MB	pseudostatic RAM	100 ns
140, 145, 170	2 MB	8 MB	pseudostatic RAM	100 ns
145b	4 MB	8 MB	pseudostatic RAM	100 ns
150	4 MB	40 MB	self-refreshing DRAM	85 ns
160, 165, 165c, 180, 180c	4 MB	14 MB	pseudostatic RAM	85 ns
520, 520c, 540, 540c	4 MB	36 MB	pseudostatic RAM	70 ns
Duo 210, 230, 250	4 MB	24 MB	self-refreshing DRAM	85 ns
Duo 270c	4 MB	32 MB	self-refreshing DRAM	85 ns
Duo 280, 280c	4 MB	40 MB	self-refreshing DRAM	85 ns

York's terrific Tekserve Macintosh repair shop; 212-929-3645). First, a memory board for the 160 or 180 needs to have a cutout large enough that the board won't bounce against a screw located toward the left rear of the PowerBook. If the cutout is too small, the screw head can wear down the covering on the board and cause a short circuit. Another requirement is that 160 and 180 memory boards not be so thick that they interfere with the CPU's foam heat sink, which must touch the bottom of the keyboard to function.

It's tough to weed out these problems when buying; manufacturers always say their boards will work. But in troubleshooting, forewarned is forearmed.

Bracing News About 150s

The PowerBook 150 also has a few memory-related idiosyncrasies. To start with, it's the only non-Duo to use self-refreshing DRAM. In fact, 150s generally use Duo memory boards, although you need an adapter to plug them in. The adapter is usually included with the memory board, but you need to make sure it includes two pieces: the adapter itself, which plugs in to the socket on the motherboard, and a gray plastic bracket (the *expansion-board brace*) that keeps the memory board from bouncing around — a foam cushion is *not* as good.

The brace poses a challenge for memory boards with capacitors between the chips. The capacitors prevent the brace from resting against the board, and the pressure on the components can eventually break them. The solution is to snip V-shaped wedges into the underside of the brace, so that it clears the board's obstructive components.

Some memory boards made specifically

for the 150 include the adapter on the board, but they still need the brace and don't include it. My advice: Spring for Apple's \$11 PB150 Memory Adapter Kit (part #M3179LL/A) to get the brace, and discard the kit's adapter if you don't need it.

Finally, some 150 memory boards are a bit too long. Make sure your installed board doesn't touch the CPU's heat sink.

The 500: TSOPs on Top

If you're buying memory modules for a 500-series PowerBook, don't panic if you get a few non-TSOP chips — as long as they're properly placed. The chips on the bottom of the board can be thicker without interfering with the modem, but the ones on top absolutely must be TSOPs or they'll hit the bottom of the keyboard.

PowerPC Memory Speculation

Will the memory you add to your 500-series PowerBook still work when you upgrade to a PowerPC chip? Apple initially said it wouldn't. However, when 500-series owners weren't happy about "wasting" as much as \$1,000 on nontransferable memory upgrades, Apple started saying that current memory *will* be compatible with a PowerPC upgrade. Hmm . . . did Apple go back to the drawing board and redo the specs for the PowerPC? Or are they just hoping to figure out something to pacify us by the time the upgrades are actually available? I think the jury's still out on this one. ☹

Long ago, Sharon Aker paid \$1,000 to upgrade her 128K Mac to 512K. At those rates, her current desktop Mac's 20 MB of RAM would cost over \$50,000. More recently, Rich Wolfson paid over \$700 for a 6-MB upgrade for his PowerBook 100 — but he didn't have to pay anyone to install it.

NET TRAVELER / BY MICHAEL SWAINE



News(groups) You Can Use

Once you find the right Usenet newsgroup, you can converse with people around the world — about almost anything.

YOU SAY YOU LOVE TO CHAT about the *X-Files* TV series? Why not visit the show's Usenet newsgroup, appropriately called `alt.tv.x-files`? Got a little problem with tanks in the square? Chinese students became Usenet

correspondents during the Tiananmen Square incident in 1989. Pick a subject, and if somebody is passionate about it, there's probably a newsgroup where it is being discussed.

Usenet newsgroups are collections of messages on one theme — what would be called a forum or message board elsewhere. Newsgroups are organized in a hierarchy, revealed in their names: The `alt.tv.x-files` name means that *x-files* is a group within the subdivision *tv* of the main category *alt* (alternative). Other main categories include `sci`, for science; `soc`, for social issues; and `rec`, for recreation. There are thousands of newsgroups, some moderated — meaning that one person selects the messages that will appear — others unmoderated, so anything gets in. Moderated groups often contain announcements, press releases, or other substantial material, whereas unmoderated groups host more conversations, arguments, and musings on the subject at hand.

Here are some starting points for newsgroup exploration.

The Newbie Four. Visit `news.announce.newusers` for an introduction to newsgroups and their policies and procedures, `news.answers` for answers to frequently asked questions about groups, `news.newuser.questions` to pose your own queries, and `news.announce.newsgroups` to learn about the latest groups.

Mac Appeal. Explore the `comp.sys.mac` hierarchy, where you'll find groups discussing

hardware, applications, databases, communications, and more. You can even buy or sell a Macintosh in the `misc.computers.forsale.mac` hierarchy (*sed ca-veat emptor*).

Providers and Community Resources. Many Internet service providers have their own newsgroups that carry notices about system downtime and support.

These can prove to be the most important groups you access. You'll also find that more and more geographic regions (such as the San Francisco Bay area) and communities (such as Santa Cruz, California) have newsgroups carrying news of community affairs. These are great groups to visit if you're planning to relocate or take a vacation, assuming that your service provider carries them.

Personal Passions. There's no way to pick the best of the special-interest newsgroups, but every Internet traveler should have a couple of favorites. From `alt.fan.rush-limbaugh` to `alt.fan.noam-chomsky`, from `soc.singles` to `soc.rights.human`, there are newsgroups for all passions.

Getting What You Want. America Online, CompuServe, and other on-line services are expanding their Internet support rapidly. If you make use of such a service, check for newsgroup access. On America Online, exploring newsgroups is a simple matter of

clicking through a series of hierarchical folders.

If you have SLIP or PPP access, get a newsreader application, such as InterNews or NewsWatcher, which are available at `ftp://dartmouth.edu/pub/mac/` and `ftp://ftp.acns.nwu.edu/pub/`, respectively. These applications will show you all currently available groups and let you subscribe (so you can see all messages posted to the group). You can also use these applications to search for groups that interest you.

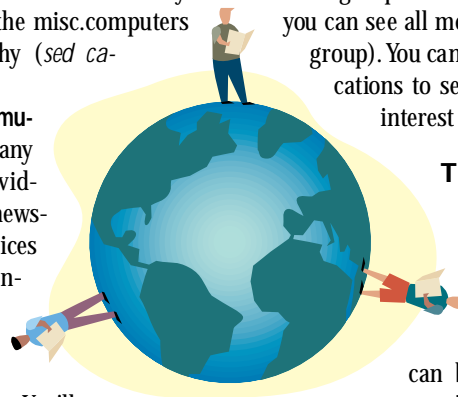
Tip of the Month

Get newsgroup information by e-mail. All the best information about Usenet newsgroups can be located in news-

groups. There's an appealing intellectual economy to this arrangement, but if you're a Usenet newbie, it's like being told that the instructions for opening the box are in the box. Luckily, there's a way around this Catch-22. Simply send e-mail to `mail-server@rtfm.mit.edu` with a blank subject and the words `send Usenet/news.answers/news-newusers-intro` in the body of the message. You will get a good introduction to newsgroups by return mail.

Don't Know Usenet from Uzbek?

MacUser maintains a list of frequently asked questions (FAQs) about the Internet, *MacUser* itself, and this column specifically at `faq@macuser.ziff.com`. *MacUser's* World Wide Web address is `http://www.macuser.ziff.com/~macuser/`. You can reach me at `traveler@macuser.ziff.com`. ☺



BY CHRISTOPHER BREEN AND BOB LEVITUS



Help Folder

A stern warning about storage compression, where to turn for help with error messages, and what to do if a file gets too fat to open.

Make Your Watermark

BOB: The old gray matter must have been faltering for me to have left out Working Watermarker (\$49.95) from our discussion of creating watermarks (Help Folder, March '95, page 129). Thanks to Steve Intolubbe, of Manassas, Virginia, for reminding us of this fine product from Working Software (800-229-9675 or 408-423-5696). It lets you print watermarks on documents created with any program, lets you print to a PostScript or QuickDraw printer, and gives you control over the darkness of the watermark. It has always worked flawlessly for me.

Compression Caution

Q. I installed Golden Triangle's TimesTwo to double my hard disk's storage space. The drawback is that TimesTwo won't let me reformat my disk, and I can't figure out how to remove the program. Is there a way to do it?

Jonathan Carlson
via the Internet

CHRIS: Hoo boy, I hate to break it to you, but solving this problem is not simple. You'll get no help from Golden Triangle, which has gone the way of the Studebaker.

The reason you can't reformat your disk is because when you installed TimesTwo, it

took over your disk completely and planted its own driver deep within the bowels of your SCSI device. This driver chuckles rudely in the face of reformatting. To get rid of it, you have to reinitialize your disk. First try to do it with the Apple HD SC Setup application on your Disk Tools floppy. If that doesn't work, try a commercial utility such as FWB's Hard Disk ToolKit. Be sure to back up your disk first, because reinitializing wipes it clean.

This brings me to a general warning: I may be superstitious, but I'd go back to writing with a lump of coal on a piece of bark before I'd use a driver-level compression program. If you've installed one of these things and something goes haywire, every bit of data on your disk will be at risk.

If you want automatically smushed data, use a file-level compression program such as Symantec's AutoDoubler, Now Utilities' QuickFiler, or Aladdin's SpaceSaver.

BOB: If you can afford it, the best solution to disk-space problems is to buy a higher-capacity drive. Compressed files slow down your Mac.

Deep-Freeze Hard Drive

Q. Last summer the hard drive in my Mac LC gave up the ghost, but I applied ingenuity to revive it. I seemed to recall that heat reduces the life of a drive, and thinking that cold might extend it, I removed the drive and put it in the freezer for a couple of hours. I then put the frigid drive back in the case and took the opportunity to clean the rest of the components, and to my delight, my faithful friend started up just fine.

What do you think?

Bob Howard
Conway, SC

CHRIS: I'd never let you work on my car.

BOB: File this one under Really Bad Ideas.



CHRIS: Here's why: When you gave your drive the cold shoulder, you temporarily addressed any thermal problems you may have been having, but unfortunately, you also introduced a new problem. Try this illustrative experiment: Toss a beer mug in the freezer. Wait ten minutes, remove the mug, and set it on the counter. Notice the water on the glass? That's the same variety of water that appeared inside your hard drive after you pulled it from the freezer. Getting water inside your hard drive is generally considered a Really Bad Idea.

BOB: So bad it will stop your drive cold.

CHRIS: Although you may have been having a thermal problem, I suspect that a dubious power or SCSI connection was the real culprit. If your drive wasn't hosed before, it certainly will be soon.

BOB: Back up your data immediately, dump the drive, and save the freezer for beer mugs and Kool Pops.

Errorspeak Made Easy

Q. I'm often bothered by error messages that pop up on my screen, but I don't know what to do about them. Where can I get a listing and explanation of these error codes?

Mike Quesnel
Columbia, MD

Write to Help Folder/Tips

c/o MacUser

950 Tower Lane

18th Floor

Foster City, CA 94404

Don't want to wait for an answer?

Post your question on ZiffNet/Mac, MacUser's on-line service, and get a reply from Bob (76004, 2076) or Chris (72241, 1036). We pay \$25 - \$100 for any undocumented tips we publish. Send them to Chris.



figure 1 / To decode the mysteries of error codes, you can begin by using shareware products such as Easy Errors. But Apple's list of error codes gives pithier explanations. If you really want in-depth information, check out the book *Sad Macs, Bombs, and Other Disasters*.

BOB: There are a couple of sources. The freeware programs Easy Errors (see figure 1), by Dave Rubinic, and System Errors 7.0.1, by "Dr. Pete" Corless, give you lists of error codes. But you may find the terse descriptions — ID 01 = bus error, ID 02 = address error, ID 16 = floating point error — less than helpful.

To get better insight into what causes errors and to find out how to deal with them, you will need a copy of Ted Landau's *Sad Macs, Bombs, and Other Disasters* (Reading, MA: Addison-Wesley, 1993). It's worth every penny of its \$24.95 suggested retail price.

CHRIS: I agree that Ted's sage advice is well worth the investment, but you may be able to get free information from Apple regarding error messages. Apple publishes a document, alluringly titled *20238 Mac Sys Errors.dp.*, that offers a fairly comprehensive and easy-to-understand explanation of the most common errors. This little beauty doesn't exactly go into loving detail about every error message, but the price is right and it's easy to retrieve — either call AppleFax at 800-505-0171 to have the document faxed to you, or download it from CompuServe's Apple Support Forum (Go APLSUP) or by anonymous ftp at ftp.info.apple.com/Apple.Support.Area/Apple.Fax.Documents.

If you don't already have one, be sure to download a copy of the Common Ground MiniViewer, which you'll need in order to view the on-line document.

Fat Files Need Slim Programs

Q. I use CompuServe Navigator to routinely save my e-mail to an archive file on my hard disk. When the file gets big, I start

a new one — usually. I guess I haven't been paying attention lately, because the current file has swollen to something over a megabyte. I'm not able to open it with Microsoft Word (even though I devoted 12 MB to the program), and WordPerfect opens only the first part of the document. What do I do now?

Edward Tophers
Fort Dodge, IA

CHRIS: Open it with Microsoft Works. Because Works doesn't contain all the gewgaws found in Word and WordPerfect, it can actually use the memory devoted to it to open humongous files such as yours.

Take your pudgy file, load it onto a floppy, and find someone who has Microsoft Works and a fair amount of memory — say, 20 MB. Open the Get Info box in Works, and give the program as much memory as you can spare. Then open the file in Works, and prepare to wait a very long time. When the file finally appears, hew it into manageable chunks and paste the pieces into new documents.

BOB: You may have to resort to another method to open it if the problem is actually that your file is corrupted. I suspect that it is. After all, a 1-MB text file should not be choking Word or WordPerfect, especially with 12 MB allocated.

I'd turn to the wonderful CanOpener utility, from Abbott Systems (800-552-9157 or 914-747-4171). It can open any file, damaged or not, and rescue text or pictures. I've had good success with it.

Rescuing Orphaned Documents

Q. I've been bothered for years by the prompt that tells me I can't open a certain document "because the application program that created it could not be found." Is there any software that will let me open my documents anyway?

Bob Chaplin
via the Internet

BOB: Your wish is Apple's command — sort of. System 7.5 upgrade kits include the MacLinkPlus translators, from DataViz. These translators work in concert with System 7.5's Macintosh Easy Open technology to virtually eliminate those pesky "application could not be found" messages. If you buy and install a copy of System 7.5, all will be well.

Believe it or not, the translators are *not* included with new Macs, even though these Macs come with System 7.5 preinstalled. If you want the translators, you'll have to spring for a copy of MacLinkPlus separately — an extra hundred bucks for what other users get free. Whose bright idea was that?

CHRIS: There are some inexpensive alternatives to the DataViz translators. Shareware programs such as Adam Stein's Jump Start! and John L. Hayes' AppChooser help you ascertain which applications can open your orphaned documents (you can get the shareware from most on-line services). No, they don't work as automatically as Easy Open — you have to tell these control panels which application to use to open orphaned documents — but unlike Easy

TIPS / PageMaker

TEXT WRAP AROUND TEXT

Although PageMaker lets you wrap text around a block of text, such as a sidebar, you have to first convert the block of text to a graphic. That makes the text uneditable. Here's a way to work around this problem:

On the pasteboard, format the block of text. Using the Rectangle tool, draw a rectangle just large enough to surround this text. From the Element menu, select Text Wrap, and set it so that the body text will flow around the rectangle on all sides. Select both the text and the rectangle, and drag them to the desired location on the page. When you place the body text, it will flow around the rectangle and the block of text just as it would around a graphic.

To hide the rectangle, simply select None from Line, on the Element menu. You can still edit the text, but beware: If the text becomes too large for its enclosure, PageMaker will push the text outside the rectangle and you'll have to resize the box and re-place the body text.

Geoff Hart
Pointe-Claire, PQ, Canada



TIPS / System Maintenance**PRAM-RESET SIMPLIFIED**

The trouble with resetting the PRAM (holding down Command-Option-P-R at startup) is that in addition to fixing some problems, it also changes your custom settings for control panels to their default settings. So you have to open each control panel and customize the settings again. Here's how to simplify that process:

Create a new folder, and call it something like Reset PRAM. Put in it an alias of each control panel you'll need to open. Include the Chooser if you usually keep AppleTalk turned off.

Each time you reset the PRAM, just open the folder, highlight all the contents, and open everything with a double-click. All the control panels will now be ready for you to change and close.

See the figure in this sidebar to see which control panels you're most likely to need in the Reset PRAM folder.

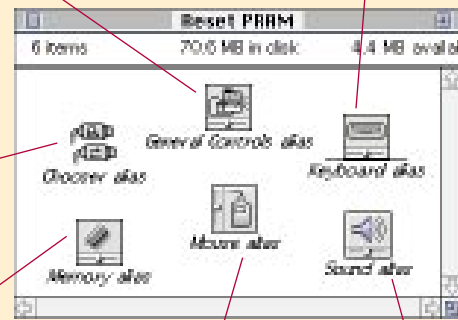
Joseph Holmes
New York, NY

COMMONLY CUSTOMIZED CONTROL-PANEL SETTINGS

Check the cursor-blink and menu-blinking settings.

Check the key-repeat-rate and delay-until-repeat settings.

Check the AppleTalk setting.



Check the 32-bit-addressing and disk-cache settings.

Check the tracking and double-click settings.

Check the alert-sound setting.

Open, they don't force your Mac to rebuild the desktop when you turn them on. One feature Jump Start! has that neither Easy Open nor AppChooser has is that it works with System 6.

For those who want to go the commercial route, Now Software's Now Utilities (estimated street price, \$90) offers application substitution as part of the Now Menu component, and like Jump Start! and AppChooser, Now Utilities lets you choose which program will open a document — even if the document wasn't created in that program. You can, for example, open all your America Online text files from within your favorite word processor by simply double-clicking on their icons.

Deciphering Downloads

Q. I've been using a friend's PC to access CompuServe and download Mac applications. But these files change to unusable text documents on my Mac. Can I use these files?

Marcus Grisham
via CompuServe

CHRIS: Marcus, you sly son-of-a-gun. The obvious solution is to go on-line from your Mac and start paying your own connect-time charges — but since you're mooching off a PC user, more power to you!

Generally, when Mac files are pushed through modems, they're converted into the MacBinary format (a file format that non-Mac computers can use to store Mac files). A Mac downloading such files knows how to convert them from MacBinary back

to their own sweet selves, but a PC just leaves them looking like mangled text.

Fortunately, there are a few ways to make these files usable. The most obvious is to take them back to your Mac as they are and decode them with StuffIt Expander or Compact Pro (both shareware).

BOB: Using StuffIt Expander is by far the easiest solution. Just drag the downloaded files onto the StuffIt Expander icon, and it instantly decodes them with no further intervention on your part.

CHRIS: You can also connect your Mac and the PC via modem and, with the MacBinary switch in your communications software flipped firmly to On (actually, it ought to be on by default), transfer the files from the PC to your Macintosh. Your communications

program will translate the files to blissful wholeness.

The final option is more expensive, but since you've got this sucker paying your CompuServe bill, what's another \$80? Here's the pitch: Tell your friend a PC user needs a utility called MacSee to be completely happening. This baby takes Mac files downloaded to a PC and translates them back into something that is Mac-serviceable. The shareware version works only on 16K and smaller files, so your job is to get your friend to pay REEVEsoft (803-654-7378) for the full version. ☒



You can find the programs referenced in this article in the MacUser and ZiffNet/Mac areas on CompuServe and eWorld. See page 4 for instructions on accessing ZiffNet/Mac.

TIPS / DeltaGraph Pro**CENTERING GRAPHICS**

You can quickly center charts and other graphics on a chart page by selecting the objects you want to center and pressing Command-arrow-key (any arrow key works).

DATA HELP

If you know what kind of chart you need but aren't sure how to set up the data for it, use DeltaGraph's Sample Data to get started:

Starting in Chart view rather than in Data view, click on the Chart Gallery button on the command bar. Select the chart you want from those displayed in the Chart

Gallery, and select Use Sample Data from Plot Options. Click on OK to return to the chart page. Select the chart, and click on the revise-data icon in the Chart View command bar to substitute your own data for the sample data on the data page.

INTERRUPT DRAWING

If you've turned on the Interrupt Drawing option in the Drawing Preferences window, you can interrupt redraw simply by holding down the mouse button rather than by clicking on Stop in the navigation bar.

Tech Support
DeltaPoint Software



Dvorak Psychic Friends Network

THE HOME-COMPUTER MOVEMENT IS booming. I have taken the next step and formed the Dvorak Psychic Friends Network

just for this audience. We have some great psychics working 24 hours a day on your computer problems. There's no reason to even think of going to a repair shop for one of those expensive evaluations when one of our psychics can tell you in a minute what's wrong with your machine. And there's more!

The Dvorak Psychic Friends Network can also advise you on your next computer purchase and what software is best for your psychic needs. When you call the Dvorak Psychic Friends Network, one of our carefully chosen counselors will tune in to your essence and determine what's best for you.

Forget those superstores with brain-dead salesmen, the walking zombies of the netherworld. In fact, to become a computer salesman nowadays, you have to pass several tests to prove your worthiness. First, you must give two pints of blood to the store owners (if you have any blood in you) to assure the management that you will remain woozy while on the job and unable to fully communicate. Second, you must take an aptitude test, which must then show that you are best suited to being either a used-car salesman or a projectionist at the Rialto. And finally, you must have no real interest in computers. With people like this at the retail stores, the need for the Dvorak Psychic Friends Network is obvious.

Here, listen to what some of our customers have to say about the Dvorak Psychic Friends Network:

Lori "Sunshine" Waxman, Pocatello, Idaho: "I was having a lot of trouble with my Performa 600. The programs kept telling me there wasn't enough memory. I called the Dvorak Psychic Network and my personal counselor, Esmeralda, told me to get

more memory for my computer. I couldn't believe the problem was that easy to solve, but she did it! The Dvorak Psychic Network is absolutely fabulous."

Tina Merryweather, Meathook, Colorado: "One day I came home and went to turn on my computer and nothing happened. I freaked. The machine had run fine for months. I called the Dvorak Psychic Friends Network, and they suggested that something or someone had unplugged the machine. I looked at the plug, and apparently my cat, or possibly an evil spirit lamenting the destruction of the goddess Earth, had loosened it. I plugged it back in, and the machine worked fine and hasn't skipped a beat since. Thank the earthly spirits for the Dvorak Psychic Friends Network. What would I do without them?"

Bob Frankerman, New York City: "Hey, I never believed in this psychic crap before, but I have to tell you nobody could solve my problem until I got a personal counselor from the Dvorak Psychic Network. I couldn't decide if I should switch to a Windows machine from a Mac, and my personal counselor said Mac! And that's what I did. It's amazing. I'm so happy now. Thank you, Mr. Dvorak and your Psychic Friends Network."

The Dvorak Psychic Friends Network has scoured the earth to find the most powerful and empowered world-class and certifiable psychics anywhere. None of these people are computer experts — they don't have to be. Almost every psychic we called told us they knew we were going to call. That's how good

these people are. They don't need to know anything about computers because computers have a collective unconscious that radiates through the psychic blue-light energy these people tap into for their answers. That's all it takes. And their answers are guaranteed to be right.

Let's listen in on a conversation between psychic Madge Benks and a customer just calling in.

MADGE: Hello, this is the Dvorak Psychic Friends Network. The forces of beyond have chosen me to be your counselor. Your name is Jill, is that correct?

WILLIAM: No, it's William.

MADGE: Oh, I'm sorry. A crosscurrent in the psychic stream. *Jill* sounds like *Bill*. What can I do for you, *Bill*?

WILLIAM: It's William.

MADGE: What can I do for you? What problems are you having?

WILLIAM: My mouse cursor won't move after I boot.

MADGE: William, touch the machine with your right

hand and relax. Close your eyes, and think beautiful thoughts. Think about when the mouse worked.

WILLIAM: Yes, I'm doing that. And I'm thinking good thoughts.

MADGE (eyes clinched tightly closed): I sense a missing aspect to the wholeness of your computing experience. Something isn't right. The connection, the psychic connection, no. The mouse connection. Is the mouse plugged in, William?

WILLIAM (long pause): Well, I'll be darned. It wasn't plugged in. Thank you, Madge, ever so much.

It's just that easy! The new home-computer users will be looking for answers, and the answers are as close as your phone. Call 1-900-55-LOSER.

Hey, if I don't do it, somebody will! ☹️

