

SPECIAL PREVIEW: DAYSTAR'S FAST CLONE, TEKTRONIX'S NEW COLOR PRINTER

MAY 1995 / \$3.95

Mac User

SPECIAL REPORT

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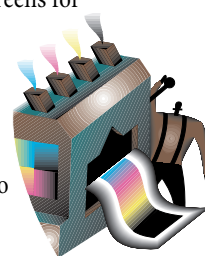
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POSTMASTER: Send address changes to

MacUser, P.O. Box 56986, Boulder, CO 80322-6986. Second-class postage paid at New York, NY 10016, and at other mailing offices.

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Printed in the USA

LETTERS

Super Story

TED LANDAU'S article "Six Super Fixes" (February '95, page 124) was sent direct from silicon heaven. My custom icons had turned drab. I kept getting "application not found" messages when I was looking at the application sitting there on my hard disk. I was frustrated.

Then I read your article. Section 1, Detonate the Desktop, could have been written just for me. I got on-line, downloaded TechTool, and ran it, and my problems were solved. Thanks!

Jim Vetter
jimv@tiac.net

THE TIMING of your February issue couldn't have been better. I spent two frustrating days getting a "type 1 error" message whenever I tried to open Microsoft Word 5.1. I disabled or reinstalled everything I could think of, tried to reach Microsoft ("help lines closed for the holidays"), and got enough suggestions from my local repairperson to keep me busy for weeks. Then I received your February issue and read "Six Super Fixes." In ten minutes, I had found and fixed the problem. (Fix number 4: Purge Bad Preferences Files.)

Who says it's silly to send the February issue in December?

Jack Bush
via the Internet

Write to Letters

c/o MacUser
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To send your letter electronically via the Internet, MCI Mail, CompuServe, or ZiffNet/Mac (our on-line service), see "How to Reach Us," on page 4. All letters become the property of MacUser, and we reserve the right to edit any letters we print. Include a return address and a daytime phone number. If you write to us on-line, please specify whether you want your electronic address printed.

Byte Back

MAGGIE CANON, you're right! It will be a long time before we see people tucking flat-panel computer displays under their arms instead of newspapers ("Byte, Book, and Candle," February '94, page 17). Like you, I love my computer, but I also love to get away from it sometimes and into a good book or a good newspaper.

I've been in the newspaper business for most of my life, and I'm tired of hearing people say my world is an anachronism. Computers aren't killing newspapers but are, indeed, sustaining them. Our two dailies here in Seattle have been just jam-packed with page after page of advertisements for PCs and Macs. It's a bit ironic, don't you think?

Bruce Sherman
via ZiffNet/Mac

MAGGIE CANON'S COLUMN in the February issue is right on target. The great seminal achievements of the human race are fire, agriculture, movable type, and — for lack of a better term — digital media. Each of the earlier inventions revolutionized the way we think about ourselves and our society. The latest one will do the same, with consequences that we can hardly imagine today.

Gutenberg, unknowingly, set in motion the forces of the Reformation and the Renaissance. Today a new information explosion will change us in fundamental ways we haven't yet dreamed of. We won't be able to engineer it — it'll happen in spite of us. Thanks for the great work (and the MacUser World Wide Web URL in the column!).

Brian Neuenschwander
neuen@thorin.uthscsa.edu

Send In the Clones

I ENJOYED YOUR article "Here Come the Clones" (February '95, page 76), but there's one important point missing from the article: service and support of these clones. As an employee of an Apple Authorized Service Provider, I encounter dozens of different models and configurations. The repair



OPEN FOLDER

It's a weird world out there, but our letters have gotten a lot weirder since we began accepting messages via Internet e-mail last year. The letters came in gradually at first and then turned into an avalanche. These days MacUser receives nearly five times as many e-mail letters as those of the "snail mail" variety, much to the relief of our mailman's sore back — and our overworked typing digits.

Appending an e-mail address to your letter to MacUser has become so commonplace, it's even fashionable. This month we received a note from Chris DeRose of Lauderhill, Florida, that included a request for us to print his e-mail address. The strange part is that Chris' letter came to us via the U.S. Postal Service. For the record, his address is lwunderY@aol.com. Which makes us wonder why he didn't just send it to us electronically and save himself a stamp.

Nobody needs to know your name in the e-mail world. Hence the letter we got from someone known only as "Noble Gas," who not so nobly wrote, "Bill Gates has all of his employees' keystrokes on all computers monitored. . . . Gates is insane." Another writer, who didn't even leave a pseudonym, mused, "Has anyone noticed that Camille Paglia and Carl Sagan look like they were separated at birth?"

Temper, temper. Although it might be healthy for our readers to direct their anger to the folks behind PCs, non-PC feminists, and astronomers who have recently sued Apple, let the experience of Kurt Glaesemann be a lesson to you all. Thrilled by the controversy surrounding the bug in Intel's Pentium processor, Kurt decided to jump into the fray on the Internet newsgroup comp.sys.intel. But then he posted a message comparing the Pentium bug to being shot: "Being shot is rare and affects relatively few people, but if you're the person who gets shot, it really sucks." Kurt says his comment was misread as a death threat against Intel president Andy Grove, causing the FBI to send an agent to Kurt's Ames, Iowa, home. That'll teach you to mess with Intel. After all, haven't you noticed that Andy Grove and Bill Gates look like they were separated at birth?

ASK DR. POWER MAC

I PLAN TO PURCHASE a PowerBook 520 in a few weeks. Will I still be able to use any extra RAM I buy after I've upgraded the PowerBook to PowerPC?

George Smith
via the Internet

/ The answer is a qualified yes. The PowerBook 500 series' upgrade to the PowerPC is likely to involve swapping the processor daughterboard, not the motherboard, so you should be able to keep your RAM. But since most PowerPC-native applications require more memory to run, you may want to consider getting a 12- or 16-MB memory upgrade to get the most out of your PowerPC PowerBook.

I'VE DECIDED to buy a Power Mac for writing and using various Mac and PC software, including games. Which one would you recommend, and what PC software can you run on the Power Mac 6100 with MS-DOS and SoftWindows?

Neil Radhan
Jeddah, Saudi Arabia

/ Your best bet for running both Mac and PC software on your Power Mac is Apple's Power Mac 6100 DOS Compatible system, which includes the DOS Compatibility Card (New on the Menu, January '95, page 35). This system looks like the standard Power Mac but contains an Intel 486/50 chip that supports the PC Sound Blaster standard, which many games utilize. Currently, SoftWindows emulates only a 286 and does not provide a rich sound emulator that delivers the full game experience. The DOS card comes with MS-DOS 6.22 and Windows 3.1.

WILL THERE BE an upgrade card for the Quadra 605 once the PowerPC 603 chip comes out?

Scott D. Campbell
sdc-inc@fox.nstn.ca

/ We've received many questions about upgrading low-end Quadras to the PowerPC 603 chip. Because the 603 is designed to offer the best speed in a small, low-power chip best suited for PowerBooks, it's actually *less* powerful than the 601. However, by the second half of this year, the 100-MHz 603e — a new version with larger caches — will appear and will equal the speed of the 100-MHz 601. This chip may appear at the heart of new low-end upgrades, but why wait for the speed of the PowerPC when you can upgrade today? Apple and DayStar Digital offer an upgrade card (New on the Menu, February '95, page 29) that fits into the space occupied by the 68040 processor. Although the card will not provide as much speed in the Quadra 605 as it does in other Quadra models, it should provide a two- to three-times speed improvement when running native applications.

guidelines provided by Apple are plentiful. Imagine my fear when I read that there will be dozens more "Macs" that may not conform to Apple's service plans!

Macs (except PowerBooks) are very easy to fix, because Apple designed them that way. If clone makers end up being able to keep within Apple's design specifications or exceed them, then all should be smiles. But if the clone companies subcontract out, who will watch the quality control, maintenance, and service programs? And who will pay for them?

It just seems humorous that a company that has such a good, often mimicked product wants to let others attempt to mirror it. Sure, it may be flattery, but can the clone makers possibly make better Macs?

Ed Sikorski
macanix@aol.com

OS-War Veteran

I ENJOYED READING John Rizzo's "Report from the OS Wars" (February '95, page 121), and I'm glad John agrees that the introduction of the DOS Compatibility Card for the Power Mac 6100 series is good news.

In fact, the DOS Compatibility Card offers a better value than the article suggested. In addition to the 486DX2/66 processor, VGA chip set, 16-bit Sound Blaster module, and ODI network driver, the card includes both MS-DOS 6.22 *and* Windows 3.1. Customers who buy the Power Macintosh 6100 DOS Compatible system get an even better deal on the DOS Compatibility Card component than those who buy the card stand-alone.

Keep up the good work educating your readers on their ever expanding choices as well as on how Macs stand out even more than before by providing new features to fit into diverse computing environments.

Dave Daetz, Apple Computer
daetz@applelink.apple.com

Fingering Painter

IS IT POSSIBLE to both agree and disagree with your review of Fractal Design's Painter 3.0 (February '95, page 40)? I agree that Painter is a powerhouse software graphics product with a somewhat cumbersome interface. But you were much too kind in defining Painter's documentation as "inadequate." It is *woefully inadequate* and appears to have been prepared with no

thought to integration, an abhorrence for procedure and thoroughness, and a penchant for ambiguity. The small (4.5 x 7.5 inch) size of the manual just seems like a deliberate attempt to make the documentation appear fuller and more comprehensive than it actually is.

Frank Dombroski
San Antonio, TX

How-To Praise

JANET ASHFORD'S graphics How-To column lets me glimpse the *techné* — the virtue that accumulates with developed skill — of graphics on the Mac. Even if my own needs have little relation to the realms you explain, over time the columns build up an understanding of how artists like Daniel Pelavin ("Blends Versus Gradients," February '95, page 111) use tools like Illustrator. The column teaches me how to look over the shoulder of people making beautiful, persuasive things, and it inspires me to try my hand.

David DeBus
La Jolla, CA

Brass Tacks

I HAVE SOME objections to Christopher Breen's review of Coda Vivace Personal Accompanist (February '95, page 65). The author says that "Vivace is an ideal addition to school music programs. It should be in every music classroom, from junior high to college." But Vivace caters only to woodwind- and brass-playing musicians, not singers, violinists, violists, cellists, bassists, guitarists, pianists, and percussionists. In fact, woodwind and brass players constitute only 15 to 25 percent of a school's music students. Serving only a small percentage of the students is a poor use of money.

And speaking of money, Vivace's initial cost of \$2,295 is twice the amount most band, chorus, and orchestra teachers have in their budgets. For \$2,295, a school music program could hire a professional accompanist to serve all its students for two or three years. Using Vivace requires the purchase of accompaniment tapes, at \$30 to \$80 a shot. At this point, Vivace is a very expensive "boom box" for a school music program.

John Bulger, Orchestra Director
Chesapeake, Virginia, Public Schools
via the Internet

/ The maker of Vivace currently has a program for string players in development. And in California, where I've had my teaching experience, most music programs focus on choir and concert band. Except for the percussion section, a band is made up entirely of brass and woodwind instruments. Vivace is pricey, but have you priced a student-model French horn lately? And Vivace can serve a lot more students than a single band instrument.

Saying you can hire an accompanist for three years for the cost of Vivace is optimistic at best, and you can run Vivace for as long as you have the power turned on. Vivace also allows students to play along with full orchestral arrangements — and what budget can afford an orchestra for rehearsals? If Vivace is just a “boom box,” show me one that listens to what you play and adjusts its tempo accordingly.

/ CB

Script Rewrite

I MUST SAY that with your article “Publishing with AppleScript” (January '95, page 109), you've shown a very interesting way to have our computers do our work for us. But calling AppleScript the “sleeper product of the year” may be just a little bit of an overstatement.

Both PageMaker 5.0 and 4.2 have scripting capabilities that allow you to import graphics, size them, input type, change font size, and many other things. Using them, I've been able to cut down the amount of time I need in order to create a 400-page, two-color catalog by weeks. You should have mentioned these built-in capabilities in the article.

Howard S. Pinsky
via ZiffNet/Mac

What About Me?

I NOTICED in the Power Mac Update, February '95, page 29, that you included the LC 520 in the list of machines upgradable by use of the Apple Macintosh Upgrade Card and the DayStar PowerCard 601. However, you also printed that only 68040-based machines will be able to use the upgrade cards. Which is true? I own an LC 520 that came with an “Upgradable to Power Macintosh” sticker on the side of its box, yet Apple and DayStar say I must upgrade to an LC 575 first.

Ted Boggs
tedb@awod.com

/ Apple included the LC 520 and 550 (and the corresponding Performa) models on the list of machines

that are upgradable to PowerPC with the Macintosh Upgrade Card. However, these machines have a 68030 processor, so owners of these machines must upgrade to a 575 motherboard first. Checking with a local Apple reseller, we found the 520-to-575 upgrade for \$839. Add this to the cost of a PowerPC card, and you come up with a price tag of almost \$1,500 — nearly the cost of a 6100/66 model (the monitor and keyboard *are* extra). Our conclusion? If you can make the investment, it would probably be worthwhile to sell your LC 520/550 and buy a Power Mac 6100./ SJS

Cracked Windows

I HAVE TO CHUCKLE whenever I read an article about Windows emulators for the Macintosh (see *New on the Menu*, February '95, page 28). At least you are forthright enough to mention that users cannot run Windows applications that require 386 Enhanced mode. However, saying that SoftWindows for Macintosh is “incompatible with some Windows applications” is tantamount to stating, “This bicycle cannot be ridden on some freeways.”

Most real-world, full-featured Windows applications require 386 Enhanced mode and have for the past couple of years. For the retail price of SoftWindows, your readers could probably purchase a completely reliable secondhand 386 40-MHz system and run *all* Windows applications.

Larry Jandro
ljvideo@netcom.com 

CORRECTIONS

In “**A Removables Feast**” (February '95, page 94), the point at which optical systems surpass the price per megabyte of SyQuest systems should have been given as 5 *gigabytes*. In addition, we incorrectly stated the length of Iomega's warranty on the Bernoulli 230 Transportable drive. The correct warranty length is five years; Iomega's drive is the only product in the article covered by such a lengthy warranty.

The correct phone numbers for Nomai (*New on the Menu*, March '95, page 27) are 800-556-6624 and 407-367-1216.

The name of Bungie Software, maker of Marathon, was spelled incorrectly in “Eddy Watch” (March '95, page 87).

The correct price of theTypeBook (“Type Tamers,” March '95, page 106) is \$50.

The shareware program MacSnoop was incorrectly identified as a commercial product in the March '95 Help Folder (page 128). You can get it from on-line services.



Life in the Big City

T HIS COWTOWN JUST AIN'T BIG enough for your dreams. So you pack your PowerBook, saddle up

Old Paint, and move to the big city: San Francisco, New York, Chicago, the Internet. "The Internet?" you say? Not enough congestion and concrete to qualify? Well . . . what else is missing? You have a huge, diverse population; fast pace; lots of traffic; activity 24 hours a day. You have danger: the on-line world's seamy underbelly, trash in the streets, and people you don't want to meet in a dark alley. And there's another danger lurking on-line that you should know about: the far-reaching hands of government regulators, their fingers itching to conquer the wilds of on-line communities and establish rules and order and waste sites and tract housing.

Whether you're smack in the middle of the highway (you have a direct Internet connection) or taking a connector route such as CompuServe or America Online, you are likely to run into the same kinds of dangers and problems. And unresolved problems create an opportunity for a government agency to step in and regulate. If ground rules — lane dividers and traffic codes — need to be laid on the info highway, the best path is for a group of leaders from the Internet community and on-line services to convene and work together to self-police. Leadership implies hierarchy, and although hierarchy is anathema to some members of the on-line community, leadership is what is needed — and quickly.

Let's consider several of the issues that inspire government regulators to want to step in. There is the issue of security and encryption, which could be (and has been) a column unto itself. But what about some of the less obvious aspects of on-line life that politicians might be tempted to cite as public hazards?

Take on-line "addiction." Stories abound of individuals who have let their lives degenerate while they're lost on Internet benders. Do we need our access controlled to save us from ourselves? It's interesting to compare this addiction with, say, the average American's five-hour daily television fix. Can it be that people are turning off the tube and tuning in to the World Wide Web? You can bet that the prospect of losing consumers' valuable discretionary hours will get the attention of those whose political lives depend on the pabulum and propaganda dispensed by the corporate-owned TV networks.

Then there is the dramatic gender imbalance on-line, a serious structural flaw (although, admittedly, not one that's liable to cause much concern on the part of the government). Nearly 90 percent of the Internet's users are said to be male, and the figure is not much better among on-line services. Moreover, it appears that the tired model of male-dominated discourse has replicated itself larger than life on-line. Some women are learning to participate vigorously, signing on under gender-neutral names until the training wheels come off. And, down the road, the Internet could provide tremendous opportunities for women to organize, lobby, do business, and debate.

Finally, there is the blatant problem of sexual predation. This is where it gets very tempting to allow Uncle Sam and the sheriff's posse to step in and save us from the on-line world's creepy crawlers. Stories

about on-line stalkers, child pornography, and molesters leap out in the headlines; they tend to drown out First Amendment discussions and open the door for Jesse Helms and company to charge in. So should the government establish codes of decency? *No*. Should on-line services and Internet providers be considered mere conduits, as the phone companies have been? *Maybe*. But if, as with on-line services, you take on limited control of content, doesn't that make you at least partly responsible for what gets posted?

Again, there is a critical need for the on-line community to address the issues before the government does. The anarchy of the Internet and the relatively uncensored discourse on on-line services is a great part of the on-line world's appeal.

But we need to grow up and see that as the Internet hits the mainstream, the on-line world can no longer be a wild, untended garden. We need to do two things: (1) establish self-governing bodies that agree on standards and official codes of conduct and (2) work together to develop sophisticated, easy-to-use screening methods for employers, parents, and other consumers who need to control what comes onto their employees' desktops or into their children's rooms — people who need to access the sea of data through a faucet, not a fire hose. Waiting for the *Father Knows Best* patrol — government regulators and their corporate counterparts — to establish the ground rules could render the dangers *and* the rich promise of the information superhighway irrelevant. ☒

Stories about on-line stalkers, child pornography, and molesters tend to drown out First Amendment discussions.



At Last, The 1993 Column

AFTER I BOUGHT THREE TUXES at an insurance-salvage store and accepted formal evening

wear into my daily life, I finally understood and appreciated The Tuxedo Concept. I now realize that tuxedos are wonderful. I'd wear one to bed if I weren't worried about scuffing my patent-leather dress pumps. So if you ever find yourself presented with the opportunity to buy formal wear for \$22 a throw, I say go for it. There's really only one disadvantage: dealing with the constant inquiries of curious onlookers who don't understand The Concept. Even at the laundromat, you get so much unwanted attention wearing a tux that it's sometimes hard to concentrate on separating your whites.

I'm telling you all this because it leads quite smoothly into a similar problem with my Newton MessagePad. Everywhere I go, curious people who've never seen a Newton up close are drawn to mine just as drivers of pickup trucks are to moonlit woodland UFO landing sites. Don't get me wrong; I'm thrilled to share the gospel of this megaginchy gizmo. Nonetheless, those five minutes spent demonstrating Newton technology to a dealer at a comic-book convention don't bring me any closer to finding a copy of *Superman's Girlfriend Lois Lane Annual #2*. So having seen a need for a basic overview — and having realized to my abject horror that in the two years since its introduction, I haven't written about the Newton even once — here's my attempt to make the Newton-unhip somewhat less so.

The best way to explain the grace of the Newton is to bring up an old Jimmy Stewart movie, *The Flight of the Phoenix*. Jimmy is piloting an immense cargo plane, ferrying oil workers across the desert. The plane crashes in that area of deadly turbulence known as The End Of The First Reel, a hazard that has downed many an aircraft in its

day. After they have been stranded for a week and have deduced that a rescue won't arrive before their water runs out, they come to a stunning realization: Not only does the cargo plane happen to contain Ernest Borgnine and a dozen other B actors who are accustomed to manual labor, and not only is the plane loaded with light-industrial and welding equipment but they also had the forethought to be carrying an aeronautical engineer! So over the next few nights, they hammer and saw and hack away at the cargo plane, taking away just the critical pieces they need in order to build a small plane barely sophisticated enough to get them to safety.

And there you have the Newton, in a nutshell. It's no substitute for a PowerBook, but then again, if you needed a PowerBook, or if it were a viable option, you'd have brought it. Take a PowerBook, and remove just enough capabilities to make it compact and handy but not so many that it becomes a mere electronic organizer. Need a keyboard? *Well, no. It's not like I'll be word-processing on the thing.* How about a big, slow, power-hungry hard drive? *Sure, jettison that as well. I'll need just enough room to store some vital info.* Would you like a full-sized screen? *Actually, yes. That'd be lovely.* Well, you're the boss . . . but if you'll settle for one half as large, I can build you something the size of an index card or so. *You're right. Skeezix the big screen.*

This "just enough to get the job done" attitude also describes most Newton software. I

don't need a word processor, but I do want a simple notepad program for jotting down info and ideas as they strike me. And when I'm in the checkout line at Tower Records, I couldn't care less how my T-bills are doing. I don't need Quicken (although a Newton version of Quicken recently shipped), but I do want to make a note of how much dough

I've just dropped and see how much I have left to spend on dinner with my sweetie. Nomadic Technologies' Accountable lets me do so quickly and cleanly. But unlike a basic pocket organizer, the Newton has sufficient flexibility so that if I get bored and decide to log on to my

UNIX host to catch up on the MST3K newsgroup, all I need is PocketCall and that one phone jack they forgot to screw a cover over at the library.

For most popular functions (databasing, spreadsheeting, document processing), there is indeed a full-featured Newton program available, but the main idea is still simplicity. Numerous Newton users have told me they've never gotten so much out of their desktop applications — contact managers, personal-finance programs, and the like — as they have since their Newtons gave them the ability to access and update their most critical information anywhere. Most Newton applications do take advantage of the ability of the Newton Connection Kit (NCK) to move data back and forth, and this method works fine. It's not as slick as it's made out to be, however. NCK puts your Macintosh through a lot of behind-the-scenes heavy lifting, which means that plugging a modest pile of data in to your Newton's list

PROBLEM:

All your friends have jumped off the Empire State Building but you're not sure if you should too.

SOLUTION:

Let Andy give you a push.

manager can take literally an hour if your hardware isn't up to snuff. Yet, if you were to biff me in the skull and hoark my Newton — let me just state that I'm not for a moment requesting that you actually do so — you'd find that it contains a 5,000-item catalog of comic books; my last three or four *MacUser* columns; and copies of whatever I'm writing at the moment, so that I can read and edit while waiting in lines here and there.

Am I running a bank of Crays at home? Nope, it's just that several alternatives to NCK fulfill one of the Newt's most exciting capabilities: Just as a cheap and easy-to-use ice chest can keep a human heart safe and viable (if less than 100 percent functional) while it's on its way to a transplant site, programs such as Apple's Bookmaker and David Fedor's freeware Paperback can bolt a reader engine onto the back of a plain file to turn it into a stand-alone, readable Newton "book." Like the icy heart, that word-processing (or database or spreadsheet) document loses much of its functionality when placed in the artificial support system

known as the Newton, but the goal is simply to be able to have the thing with you. Arms, legs, a brain — luxuries that can all be jettisoned.

OK, all the above is just dandy, of course, but I know very well that at the top of every paragraph, you were thinking, "But what the Niflheim is the deal with the Newton's handwriting recognition?" Well, since I'd have to walk into the next room to get a Bible, I'm instead putting my left hand on the 1995 edition of *Roger Ebert's Video Companion*, which is just as thick and happens to be right next to the chair. I now state that handwriting recognition works great for me. At first, I was so frustrated that I very nearly put a Newton-shaped dent in the wall, but after a week, the Newt became accustomed to my scrawl and now messes up maybe one word in every paragraph. Nonetheless, I can't deny that most people find the Newton's handwriting recognition seriously rash-inducing. Oh, sure, it's great to have your own pocket-sized I-Ching to consult — if you scrawl something in without due care, the Newton responds with

some vaguely oracular text to reflect on — but this is a less than attractive feature when you open your Newt at the airport and find that you're supposed to pick up your boss at gate # Inc.

I always finish my Newton Pitch with the same warning: Either there's a hole in your life that your Newton can spackle perfectly, or you're not leading a Newton-compatible lifestyle; people either go absolutely bonkers for it ("I'd sooner leave the house without a lung than without my Newton" — actual quote from a friend, two weeks after purchase) or they don't. For that reason, I always recommend that you buy a Newt only from a source that will let you return it for a refund if you and the Newton don't hit it off.

A final note: Unnamed three-letter agencies have finally permitted me to release Eastwood, a free set of plans for converting a police tactical holster into an advanced Newton holster, which I originally mentioned in the September '94 issue. Now available on ZiffNet/Mac and at fine salons everywhere. 📄

NEW ON THE MENU

COLOR PRINTERS /

The Future of Corporate Color

Tektronix Phaser 340 combines fast speeds and high resolution.

WHAT BUSINESS USERS want in a color printer is everything: fast print times, great print quality, and network flexibility. That's what color laser printers promise. Now toss in low-cost consumables, pleasing color, and a sub-\$5,000 price tag, and you're describing the new Tektronix Phaser 340, possibly the most intriguing color printer for business yet.

The Phaser 340 employs a unique architecture that combines the best of inkjet and laser printing along with Tektronix's solid-ink technology. Solid-ink crayons are melted down and then sprayed onto a rotating drum; the drum transfers the image directly to the paper. This eliminates the time it takes for a print head to move back and forth across the page as it does in ordinary inkjet printers — or even in Tektronix's current Phaser 300i solid-ink printer. But unlike color laser printers, the Phaser 340 bypasses the step of first applying toner to a moving belt before transferring the toner to the drum and finally to the paper.

The result is impressive print speeds: four pages per minute, as opposed to two to three pages per minute for color laser printers and up to four minutes per page for most color inkjet printers.

Because it uses solid-ink crayons instead of toner cartridges, adding more ink is a simple, no-mess process. Simply drop in as many as three ink sticks per color tank to print a total of 3,000 pages at 5-percent coverage. Prints cost about 11 cents per page, according to Tektronix.

Out of the box with 8 MB of RAM, the Phaser 340 offers 300-dpi printing, but 600 x 300 dpi is possible with 24 MB of RAM. It prints to plain letter-sized paper and transparency media. A 200-sheet letter-sized paper tray is standard; a 500-sheet bin costs



PHOTOGRAPHY / GIAMPIERO BENVENUTI

\$495, and a 175-sheet transparency tray costs \$95. The PostScript Level 2 unit is powered by a 32-MHz RISC processor and contains parallel and SCSI ports. Networking options are extra: LocalTalk costs \$245, and Ethernet (EtherTalk or Novell NetWare) costs \$595, plus \$295 for TCP/IP.

The Phaser 340 is sold in two configurations: the \$4,995 Basic unit, which prints

300 dpi and has 8 MB of RAM and 17 fonts, and the \$6,795 Plus model, which prints 600 x 300 dpi and has 24 MB of RAM, 69 fonts, and job pipelining, which allows the printer to rasterize one job while printing another. The Phaser 340 can connect to Tektronix's \$1,695 Copy Station, which turns the printer into a color copier. 800-835-6100 or 503-682-7377. / Pamela Pfiffner

Connectix Doubles Your Mac's Speed

WHEN RAM DOUBLER, from Connectix, hit the shelves, memory-starved Mac users made it one of the most popular Mac utilities ever. Now, Connectix's next goal is to give Macs a big speed boost. Tentatively dubbed Speed Doubler, this system extension combines the simplicity of RAM Doubler with some sophisticated performance-enhancing techniques.

Disk Caching. To speed disk access, Connectix aims to replace Apple's inefficient uniform disk cache with its own, dynamically resizing cache. The disk cache is RAM set aside to store information recently read from your hard

drive, so that when it needs that data again, it gets it from fast RAM instead of from the slower hard drive. Connectix's cache monitors how much RAM your Mac is using and then adjusts how much of it can be turned over to your disk cache.

Faster Finder. Speed Doubler halves the time it takes to copy files, enables you to copy files in the background while working in other applications, and lets you perform several copying jobs at once. Throwing away files and emptying the Trash should also be much faster with the product.

EXCLUSIVE

Fast PCI Clones Coming

DayStar first to announce clone with multiple PowerPC 604 processors and PCI expansion bus.

RADIUS MAY HAVE GRABBED early headlines by preannouncing Mac clones for high-end desktop-publishing and -video professionals, but it's inevitable that other vendors will soon aim their sights at the same lucrative markets. And it comes as no surprise that Radius' first rival in the DTP clone arena is its longtime competitor in the accelerator market, DayStar Digital.

DayStar's offerings, however, are far from me-too. The company's tower-style Mac-compatibles will have the distinction of being the first clones fueled by the new PowerPC 604 processor. The 604 is expected to offer raw speed twice that of the 601 processor, found in Apple's current crop of Power Macs. DayStar's clones will also be the first to incorporate PCI, the high-speed expansion bus that will supersede NuBus in Power Macs due from Apple later this year.

DayStar will offer both 601- and 604-based models of its Mac-compatibles — but with a twist. The DayStar towers will be capable of supporting not just a single processor but multiple processors. Unlike today's desktop Macs, whose processors are integrated into their motherboards, DayStar will put its processor(s) on a daughtercard. The DayStar clones will come in a range of processor-card configurations: a single 100-MHz 601 processor, two 100-MHz 601 processors, two 100-MHz 604 processors,

Power Mac Boosts. Perhaps the biggest speed gain will come to Power Mac users working with programs written for the 680x0 processor. Apple's built-in emulator looks up the 680x0 instructions in a table, finds the equivalent PowerPC code, and executes the instructions. Speed Doubler compiles 680x0 instructions into PowerPC parlance on the fly. Converted instructions are stored for repeated use as needed by an application, providing a big speed boost over Apple's current emulator. Connectix intends to ship the product, which it plans to make 100 percent compatible with RAM Doubler, in April. \$99.95. 415-571-5100. / Jason Snell

or four 120-MHz 604 processors. Yow.

Of course, multiple processors require updated software to take advantage of them. Adobe Photoshop should be able to utilize the DayStar machines' multiprocessing capability immediately. DayStar will be able to deliver Photoshop multiple-processor support in a multiprocessing plug-in, similar in function to the native plug-in Adobe created to boost the 680x0-based Photoshop 2.5.1 to PowerPC speed.

DayStar's early adoption of PCI is key: PCI is expected to break the throughput bottleneck of NuBus (see related story, page 27). Using PCI, storage vendors will be able to deliver higher-throughput SCSI drives and arrays; video-display-adaptor vendors



will be able to speed up screen redraws, and Ethernet-adaptor vendors will be able to provide increased network performance.

With these innovations — PowerPC 604 chips, multiple processors, and PCI — DayStar's towers may well be the most powerful Mac OS systems money can buy when they ship in July. Base units will ship with 16 MB of RAM minimum and a 2-GB hard drive. Pricing and configurations were not available at press time. / Henry Bortman

Pioneer Targets Home with Its Mac Clone

A BIG NAME in consumer electronics has announced it's licensing the Mac operating system. Home-video and -audio giant Pioneer Electronics says it will produce multimedia Mac clones for the Japanese home market.

Pioneer cited Apple's integrated multimedia strategy as its reason for picking the Mac as the foundation for its first personal computers, which will incorporate Pioneer's popular audio/video products. Initially, Apple is supplying

hardware and software parts.

Pioneer plans to build a family of products on the Mac. First out: the Personal Computer MPC-GX1, based on the 66-MHz PowerPC 601 chip, and the Personal Computer MPC-LX100, based on the 33-MHz 68040 chip, both of which include 3-D speakers, a 4.4x speed CD-ROM drive, and Pioneer's software for controlling a separate CLD-PC 10 player for CDs and laserdiscs. Pricing was not available at press time. / PP

MacUser ZD LABS Power Computing's Clones / how fast are they?

BETA POWER COMPUTING HOPES to position itself as the primary supplier of Mac clones and of motherboards for other Mac-clone vendors. We used MacBench 2.0 to test two of its forthcoming models, one with an 80-MHz 601 and the other with a 100-MHz 601. (MacBench 2.0 reports normalized scores; longer bars are better.) We compared their speeds with those of Apple Power Macs with equivalent processors. In the Processor

and Floating Point tests, the 80-MHz unit ran neck and neck with the Power Mac 7100/80 and the 100-MHz unit performed similarly to the Power Mac 8100/100. Differences in Disk Indexes between equivalent models were due primarily to the differences in the hard-drive mechanisms installed in the tested units. These and the Video Indexes may change for the final shipping units. Product names, configurations, and pricing were not available at press time.

MacBench 2.0 Indexes				
	PROCESSOR	FLOATING POINT	DISK	VIDEO
	0.....50	0.....140	0.....15	0.....25
Power Computing clone (80-MHz 601)	37	118	7	20
Apple Power Mac 7100/80	37	117	9	20
Power Computing clone (100-MHz 601)	45	132	8	24
Apple Power Mac 8100/100	44	132	12	23

LASER PRINTERS /

HP Raises the Bar Again

Latest low-cost LaserJet packs a punch with fast print engine and 600-dpi resolution.

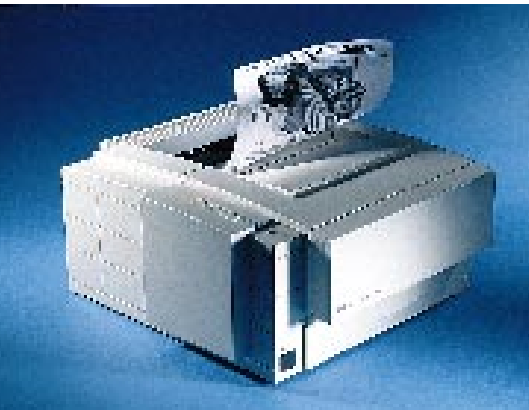
LET'S FACE IT: Hewlett-Packard's laser printers always seem to set the new price and performance standards for the industry, and the company's latest is no exception. The new LaserJet 5MP offers a fast print engine and high resolution at a price that's hard to beat.

at 6 ppm. The printer is powered by a 20-MHz RISC processor. Dual paper bins hold a total of 350 sheets of letter-sized paper. Its 100-sheet multipurpose tray with straight-through paper path accepts media ranging in size from index cards to legal paper, as well as transparencies and envelopes.

The PostScript Level 2 printer ships with 3 MB of RAM (expandable to 35 MB) and Adobe's Memory Booster technology for more efficient memory usage. LocalTalk and two parallel ports are standard; an optional JetDirect EX external print server provides Ethernet (\$399) or token ring (\$619). In offices with both Macs and PCs, it automatically switches among its simultaneously active ports as well as between PostScript and PCL when appropriate.

A whizzy wireless capability lets users with infrared devices print by beaming the printer. No need to connect your laptop to the network before printing that memo. This built-in IrDA-compliant feature will certainly dazzle owners of PC notebook computers (HP Omnibooks, perhaps?); Mac and Newton users will have to wait a bit longer.

For the green at heart, the Energy Star-compliant printer features a power-save mode that conserves energy when the printer is idle; HP also offers a toner-cartridge-recycling program. The LaserJet 5MP replaces the LaserJet 4MP. 800-752-0800. / Pamela Pfiffner



Compact and fast, HP's new LaserJet 5MP sports an infrared port for wireless printing.

Geared to the small-business market, the compact LaserJet 5MP satisfies on several fronts. First, it lists for \$1,299, with an expected street price of \$1,100. With its core 600-x-600-dpi resolution, it excels at text and graphics. HP's Resolution Enhancement technology (REt) refines text and line art, and its ability to produce 120 levels of gray at 106 lines per inch enhances photographic images.

The LaserJet 5MP's print engine is rated



COMMUNICATIONS /

Apple's Conference Call

IN THE FUTURE, we'll never have to leave our home office and those who work in high-rise buildings will never have to take another red-eye. A pipe dream? Apple doesn't think so, and it's got the goods to prove it. Later this year, Apple will release its QuickTime Conferencing system, a low-cost cross-platform, collaborative videoconferencing product.

Built on the QuickTime architecture, with a QuickTime Conferencing system extension, Apple's suite of products allows users to engage in point-to-point, multipoint, and broadcast videoconferencing across LANs such as Ethernet, WANs such as ISDN or the Internet, or even the upcoming ATM (Asynchronous Transfer Mode) networks. Users can collaborate on documents, capture digital video or audio, and record sessions for playback. The system is compatible with the H.320 codec standard, which enables cross-platform connections with PCs and UNIX machines.

Apple will sell its QuickTime Conferencing product in three configurations. The Apple Media Conference Kit, which includes the QuickTime Conferencing extension, the Apple Media Conference application, and a digital-video camera, is expected to cost less than \$200. The Apple Media Conference Kit Pro, which adds an H.320 compressor/decompressor and an ISDN card to the Media Conference Kit, will cost less than \$1,750. The Apple Media Conference System contains all the above plus a Power Mac 7100AV (16 MB of RAM, a 700-MB hard drive, and a CD-ROM drive), 17-inch monitor, keyboard, microphone, and external speakers. It will cost less than \$6,000.

Although the system does make videoconferencing more accessible to average users, QuickTime Conferencing has several requirements: System 7.1, a 68040 or better Mac with at least 8 MB of RAM (16 MB is recommended), Ethernet or another network interface, and digital-video-capture capabilities. 408-996-1010. / PP

MACUSER/ZMAC UTILITY OF THE MONTH



Desktop Wonderland

TIRED OF PASTEL-BLUE kitties? MacUser/ZMac's Mad ppatter! keeps your desktop lively, with randomly generated desktop textures. Just drop this control panel into your System Folder, and set it to create a new pattern at timed intervals or on startup. Mad ppatter! generates these textures from scratch, and like snowflakes, no two are alike. But if you're partial to a particular ppat (a desktop-texture file type), you can place it on the Clipboard or save it in ResEdit format (which many desktop-pattern installers read). You need System 7.0 or later; System 7.5 users can paste textures into the Desktop Patterns control panel.

Created by Jonathan Durkee, ZMac's Mad ppatter! 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). / Scott Love

POWER MAC UPDATE

New Power Macs Fix NuBus Problems

Upcoming PCI expansion bus offers better speeds for high-end users.

MOST MACINTOSH USERS never run into the limitations of Apple's eight-year-old NuBus architecture, but for those who are working with huge image or digital-video files, NuBus limitations can cause major headaches. Despite the PowerPC chip's horsepower, some Power Macs simply cannot deliver the same speed as Apple's former high-end model, the Quadra 840AV. That's going to change. By this summer, Apple will ship new Power Macs that include a PCI expansion bus, which will deliver much more speed.

NuBus, the Slow Bus. Like the high-end Quadras before it, the models in the first generation of Power Macs are designed around the NuBus 90 specification. Only the Power Mac 7100/80, 8100/80, 8100/100, and 8100/110 can perform nearly as fast as the Quadra 840AV, but they aren't quite able to keep up.

In the Power Macs, the NuBus 90 specification allows the bus to operate at 10 MHz when transferring data from the motherboard to a card or at 20 MHz when transferring data from card to card, for a maximum throughput of 38 or 76 MB per second, respectively. Actual throughput is usually much lower than this on most Macs, because of the overhead the NuBus controller chip imposes — except on the 840AV, which takes advantage of the 68040's **move16** instruction. The Quadra 840AV's NuBus controller can move data, such as a block of captured video to cached memory, without incurring the overhead of setting up the data transaction.

The PowerPC chip does not have an instruction similar to **move16** (a software instruction called **PBblockmove** provides a similar function). As a result, high-end Power Macs (80 MHz and above) are slightly slower than the 840AV. But the 7100/80 and 8100/80 are still able to achieve high throughput, because the NuBus operates at

10 MHz, in sync with the 40-MHz system bus, which allows these models to handle data in large blocks for good overall speed. Even though the 8100/100 (with a 33-MHz system bus) and the 8100/110 (with a 36.67-MHz system bus) lack a synchronized clock, these models have an improved NuBus controller that moves data in large blocks in spite of the inherent timing disparity.

The speed problems crop up on the low-end Power Macs (the 6100/60, 6100/66, and 7100/66), models that are crippled by a limitation of their NuBus controller chip, which does not handle block transfers because the NuBus (at 10 MHz) and the system bus (at 30 or 33 MHz) are not in sync. This slows down the NuBus to 3 to 4 MB per second on low-end machines, which is fine for 24-bit-video cards but un-

acceptable for capturing video or getting the most from a fast disk array.

PCI, the Better Bus. Now that you know more than you ever wanted to know about NuBus, get ready to catch the next bus, PCI. In the next round of Power Macs, Apple will be implementing the PCI-bus standard, which is widely available in the PC world. This bus can operate at 33 or 66 MHz, making the maximum throughput 252 MB per second — about seven times as fast as with NuBus. This is plenty of bandwidth for performing real-time video capture or transferring data over an FDDI network at 100 megabits per second.

Apple Computer has already signed up several longtime Apple developers such as Radius, known for video capture, and Farallon, known for networking, to offer products incorporating the PCI bus. Also, because Apple is implementing an open standard, several companies unknown in the Mac universe will bring their products to the Power Mac for the first time, including low-cost-video-card vendors

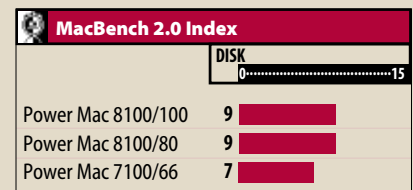
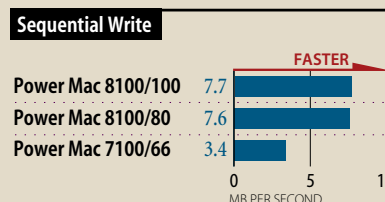
such as ATI and Matrox. For those who already have a substantial investment in NuBus cards, Second Wave intends to offer a PCI-to-NuBus bridge card that will let you install your NuBus cards in an external box and connect them to your new PCI-based Power Mac. / Sean J. Safreed



PCI cards (top), standard in the PC world, will soon replace NuBus cards (bottom), found in today's Power Macs.

MacUser ZD LABS Power Mac NuBus Throughput

We tested three Power Macs, using FWB's SCSI JackHammer NuBus card and a 4-GB disk array. System bus speed is the same on the 8100/100 and the 7100/66, but the 7100's lack of support for block transfers limits throughput to the disk array. This is most obvious in writing to the array, where the 7100's speed is half that of the 8100s. 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.



MULTIMEDIA /

Author, Author

Apple and Kaleida deliver cross-platform tools.

POINTING AND WAITING is the biggest drawback of a lot of multimedia content. But new tools from Apple and Kaleida enable CD-ROM developers to deliver more-responsive titles on Mac, Power Mac, or Windows machines.

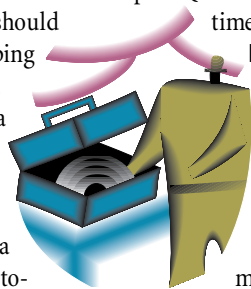
QuickTime VR. Apple wowed users with QuickTime VR, but titles featuring this interactive breakthrough are rare. That should change, now that Apple is shipping the QuickTime VR developer kit.

QuickTime VR composites a series of photographs into a panoramic scene that can be played back on Mac or Windows systems. The authoring kit includes a tool for stitching photographs together and a run-time engine that lets developers play back QuickTime VR in HyperCard 2.0 (or later) on the Mac or Director 3.1.3 (or later) on the Mac or Windows machines. Apple showed off several new directions for the technology, including a PowerPC-native run-time version for viewing full-screen panoramas (640 x 480 pixels), the ability to zoom in on interactive objects, and QuickTime 2.0 movies playing in a QuickTime VR scene.

The development kit costs \$2,000, and

royalties are 40 or 80 cents per copy, depending on the number of VR scenes used. Noncommercial use is royalty-free.

In a related development, Apple has upgraded the Apple Media Kit (including the \$599 Apple Media Tool and the \$995 Apple Media Programming Environment) to support QuickTime 2.0 and a Power Mac run-time player. \$1,195. 408-996-1010.



Kaleida Media Player. Kaleida Labs is shipping developer tools for the long-awaited Kaleida Media Player. Kaleida Labs is a joint venture of Apple and IBM, founded to create a platform-independent multimedia environment.

Kaleida is currently shipping the ScriptX Language Kit (\$795), an object-oriented development tool that includes the programming environment and several hundred preprogrammed objects. Developers use the language kit to create applications for the Kaleida Media Player (\$2,500, including an unlimited license to distribute the title). The Media Player runs on Mac and Windows systems. A PowerPC-native player should be available later this year. 415-335-2000. / Sean J. Safreed

Radius Edit Enhances VideoVision

MEETING THE NEEDS of professional video editors, Radius aims to supply a complete software tool for VideoVision Studio users, with Radius Edit, an application for VideoVision hardware.

Previewing video on an NTSC monitor is crucial for video editors. Edit's dual-display capability lets users cut video directly on an NTSC monitor while adding special effects within Edit on the computer monitor.

Radius Edit offers a rich set of titling tools, thanks to QuickDraw GX. Edit allows a video editor to create multiple title layers and use spline-based controls to animate text. The titling tools support PostScript or GX fonts with a variety of solid or gradient



Radius Edit gives you a dual-display capability, so you can preview work in progress on an NTSC monitor.

fills and shadowing, plus other text effects.

Edit is no slouch when it comes to cutting video either. In addition to standard wipes, dissolves, and fades, Edit offers several special effects, such as applying filters and animating the effects over time. It is possible to do most video editing without using any other software, although Edit is able to work with any material that was created in a QuickTime-compatible application.

The product will be available with Radius VideoVision Telecast and as a VideoVision upgrade in the first half of 1995. Pricing was not set at press time. 408-541-6100. / SJS

LEGAL DISPUTES /

Apple Sues Microsoft, Intel over QuickTime

MOVING TO SECURE its multimedia advantage, Apple has included Microsoft and Intel in a lawsuit alleging illegal duplication and distribution of Apple's QuickTime for Windows code. The suit claims that the two companies incorporated Apple technology to dramatically improve multimedia performance under Windows 3.1. Apple is investigating whether or not the code is in Windows 95, which has built-in video support. Microsoft denies the allegations.

In December, Apple filed suit against the San Francisco Canyon Co., a developer contracted by Apple to help port QuickTime to Windows and which later developed a Windows video-acceleration program for Intel. The suit claims that Intel used this code in the Display Control Interface (DCI) software it co-developed with Microsoft. Apple says its code is duplicated line for line in DCI, which is a component of Microsoft's Video for Windows. Third-party developers using the Video for Windows Developer Kit won't be punished — in fact, Apple has dropped all QuickTime licensing fees for developers. / Pamela Pfiffner



CD-ROM Safari

IF TRAVELING THE WORLD or tracking down the best brew is something you've always dreamed of, you'll want to check out these new CD-ROMs.

Wild Africa. Following on the heels of its popular Ocean Life series, Sumeria ventures onto dry land to capture the vistas of central Africa. The Wild Africa CD-ROM features the wildlife and ecology of three of Tanzania's national parks (Serengeti, Ngorongoro, and Tangire) and contains more than 60 minutes of video and 500 photographs (all original material) to take you on a virtual safari. All that's missing is Marlin Perkins. \$50. 415-904-0800.

ILLUSTRATION / JAMES O'BRIEN

Power Presentations

PRESENTING YOUR CASE in the business world these days often requires creating a striking multimedia presentation. Two new PowerPC-native presentation packages now offer powerful tools to help you quickly create professional-looking presentations.

Astound for Power Macintosh.

Making presentations look more like a seamless whole and less like a series of separate slides is one of the goals of the latest version of Gold Disk's Astound. Astound for Power Macintosh (which is also compatible with 680x0-based Macs) enables you to add sounds that play without interruption through several slides and offers a series of "slide markers" that let you create pauses with variable durations and jump points to other places in a presentation. Astound also offers two new powerful means of enhancing simple graphic objects: tweening



(simple morphing of objects) and extrusion (creating 3-D-style objects from flat 2-D figures). \$250; upgrade, \$80; upgrade from competing product, \$100. 408-982-0200.

mPower 2.0.1. Also now running native on the Power Mac is Multimedia Design's mPower. This product offers a unique approach to creating presentations: It presents you with a series of option buttons like those you might see in the window of a bank ATM.

As you move between slides and edit individual elements, the buttons change to reflect appropriate options for a given area. And in addition to supporting QuickTime, mPower can capture audio and video and bring it directly into a presentation, as long as audio- or video-capture hardware is installed. \$295. 800-921-9493 or 704-523-9493. / Jason Snell

Passage to Vietnam. Rick Smolan, creator of the *Day in the Life* series, takes the coffee table book a step further with Against All Odds Productions' *A Passage to Vietnam*. Smolan and 70 other award-winning photojournalists spent one week during the spring of 1994 recording the enormous cultural changes occurring in Vietnam. The CD-ROM features hundreds of stunning original photographs, an hour of full-motion video, and an interactive photo-editing session. The Virtual Gallery lets you view images and listen to celebrated photographers as they reflect on their work. Smolan himself pops up as your virtual tour guide. \$50; book/CD-ROM bundle, \$75. 415-331-6300.

Beer Hunter. The microbrewery revolution has transformed the lowly six-pack into a brew of character and distinction. In the Discovery Channel's *Beer Hunter* (available in June), beer aficionado and best-selling author Michael Jackson leads you on a quest for the top 24 beers from microbreweries across America. Learn the history of brewing and more through video clips, photographs, and text. It's a great way to belly up to the bar — without risking the beer belly. \$50. 800-762-2189 or 317-579-0400. / Kristin Balleisen

INFORMATION MANAGERS /

Control Your Workgroup

FROM THE BEGINNING, In Control provided users with the ability to manage their work with a sophisticated outliner, to-do-list manager, and calendar. Now the latest version of Attain's project planner, In Control for Workgroups, lets you use your outlines, to-do lists, and notes to collaborate electronically with other people in your office.

In Control for Workgroups uses System 7's file sharing as the glue that links users together. Creators of outlines can decide who has access to their files and can even choose to lock users out of sensitive areas of a file. Subscribers to a public file can change an outline's structure to fit their own needs without affecting the original outline structure. And traveling users can now work with their files off-line and have them automatically reconciled when they reconnect to the network.

Even with electronic collaboration, sometimes coworkers still need to have meetings. And although In Control for Workgroups isn't intended to function as a meeting scheduler like On Technology's Meeting Maker XP, its calendar features make it a viable scheduling alternative for small-office environments. \$149

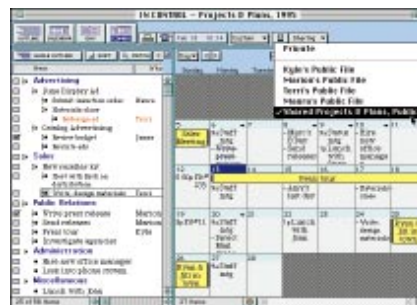
E-MAIL /

Unify Your In Box

E-MAIL JUNKIES may love the ease of sending memos electronically, but if you're a member of more than one on-line service, retrieving messages from your electronic mailboxes can be time-consuming.

Fog City Software's EMailer attempts to manage the e-mail clutter by enabling you to send all your mail from one application and file it all in the same place. EMailer knows how to send and receive mail (including binary-file enclosures) via CompuServe, America Online, eWorld, the Internet, and Motorola's Radiomail. You can program EMailer to automatically log in to your accounts at set intervals or specific times of day, and all new mail goes into one in box. EMailer's address book allows you to specify not only what a person's e-mail address is but also what service you'd like to use in order to send messages to them.

Unlike Qualcomm's Eudora, EMailer doesn't feature message filtering or Internet dial-in-scripting support. But for frustrated customers of several commercial on-line services, EMailer brings unity to the chaotic world of multiple mailboxes. \$80. 415-921-2478 or 76703.3031@compuserve.com. / JS



(volume discounts are available); upgrade from In Control 3.0, \$35. 800-925-5615 or 617-776-1110. / JS

The Skinny Mac

IT DOESN'T LOOK like a Macintosh, but it is. King Products' Miko uses the chip set from the PowerBook 500 series, combined with a color LCD touch screen, to create an interactive kiosk for multimedia presentations. In its smallest configuration, the kiosk can be as little as 9.5 inches tall, 17.5 inches wide, and only 2.25 inches thick — small enough to hang on a wall. 800-877-6456 or 905-625-1111. / JS



NEW & NOTABLE

HARDWARE /

▼ **NECAudioTower Speakers.** The built-in stereo sound of Quadras and Power Macs (and even sound from audio-CD players) gets the play it deserves from these 11-inch-high speakers. RCA and mini input jacks (which can be used at the same time), audio cables, and a headphone output jack are included. Balance, bass, treble, and power controls are located atop one speaker. Parking the speakers



next to your monitor is no problem, because they're shielded to prevent magnetic interference. \$99. 800-632-4636 or 708-860-9600.

ALPS GlidePoint. Fans of the PowerBook 500 series' TrackPad can now use their favorite input device on their desktop Mac. The GlidePoint, which uses the same technology as that in the TrackPad, also offers some features Apple didn't offer — such as the ability to double-click by tapping twice on the TrackPad itself. \$99. 408-432-6000.

MicroTech PowerRAIDs. Providing fast access to large amounts of information, these disk arrays are geared toward prepress and digital-video professionals and are available in both Fast and Fast/Wide configurations. The PowerRAIDs use the ATTO SiliconExpress IV SCSI card, which improves the SCSI transfer rate. PowerRAID systems are available in configurations ranging from 2 GB (\$4,186) to 8 GB (Fast, \$9,213; Fast/Wide, \$9,477), with each system including two hard drives and ExpressMirror software. 800-626-4276 or 203-468-6223.

DiiMO Technologies DiiMOCache. This series of cards can speed up Power Macs by adding a Level 2 RAM cache. Cards are available in RAM sizes of 256K (\$189), 512K (\$389), and 1 MB (\$589). 512-335-0421.

Samtron Star Power monitors. Energy-conservation features and flat-square screens highlight these new monitors, both of which offer on-screen digital controls and maximum resolutions of 1,152 x 870 pixels at 75 Hz. The SC-208DXL (\$1,600) is a 20-inch monitor, and the SC-726DXL (\$950) is 17 inches. 310-802-8425.

Electrohome ShowStar. A 575-watt light source enables this LCD projector to illuminate large screens at a resolution of 640 x 480 pixels. The projector also supports video input in all standard video formats and comes with a remote-control keypad for image adjustment. The ShowStar measures 25 x 30 x 14 inches and weighs in at 80 pounds. \$23,995. 800-265-2171 or 519-744-7111.

SOFTWARE /

Sculpt 4.0. The latest version of this 3-D-graphics program is PowerPC-native and offers an interface that's been redesigned to be more Mac-friendly. The program is available in various packages based on individual users' needs: modeling capabilities (\$1,995), added rendering capability (\$2,995), and animation tools (\$3,995). Byte-By-Byte. 512-795-0150.

Library of the Future. This CD-ROM contains the full text of over 3,500 works, from the King James Bible to the works of Shakespeare, as well as illustrations, maps, audio samples, and video clips. Related documents contain hyperlinks to one another, and the disc includes a text-search utility that lets you find a particular word or phrase anywhere on the disc. \$150. World Library. 714-756-9500.

LaserMerge Electronic Paper 2.0. This utility sits between your applications and your printer, giving you precise control over what you print. You can define templates, such as letterheads, that can be used when you print from any application; automatically add graphics and text to print jobs; and print multiple copies of a single document with user-defined changes (for example, a normal invoice for company records might also be printed a second time as a customer copy, with sensitive fields grayed out). \$95. MindGate Technologies. 615-937-8004.

▼ **Lost Mind of Dr. Brain.** Brain-teasing puzzles and wild humor highlight this multimedia CD-ROM designed for older children. Because the disc's problem-solving puzzles are randomly generated,



they can be replayed several times. Players can choose various levels of difficulty and receive help from a cast of animated characters. \$50. Sierra On-Line. 206-649-9800.

SneakerNet. This disk-driver utility treats removable hard drives as if they were removable media, automatically mounting them when you insert them. In addition, SneakerNet prevents your Mac from locking up when you add drives to or remove them from a SCSI chain without powering down. Five-user license, \$295. Transoft. 800-949-6463 or 805-565-5200.

Org Plus 2.0. Improved cross-platform compatibility and OLE support highlight the new version of this organizational-chart-creation utility. Org Plus now uses the same file format as the program's DOS and Windows counterparts, and OLE gives users the ability to edit charts created in Org Plus by double-clicking on that chart in an OLE-compliant application. \$140. Banner Blue Software. 510-794-6850.

MACINTOSH PRICE INDEX

THE UNITED COMPUTER EXCHANGE index reflects average selling prices of new and used Macs as of February 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)		• \$825
Performa 475 (4/160)	\$1,099	\$900
Performa 550 CD (5/160)	\$1,299	\$1,000
Performa 575 CD (5/250)	\$1,799	\$1,475
IIsi (5/40)		• \$400
IIfx (5/80)		• \$650
Ilfx (8/160)		• \$900
Quadra 605 (4/80)		• \$650
Quadra 610 (8/160)		• \$850
Quadra 630 (4/250)	\$1,099	\$900
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)	\$2,099	\$1,700
PowerBook 520c (4/160)	\$2,699	\$2,250
PowerBook 540 (4/240)		• \$2,600
PowerBook 540c (4/320)	\$4,199	\$3,800
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 or configuration

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



Macromedia FreeHand 5.0 / Plug-in support gives vintage draw program a big boost in functionality.

WE GAVE HIGH MARKS to last year's release of FreeHand, and this year's new version promises to be just as successful. FreeHand 5.0 may have a new owner — Macromedia purchased the product and its maker, Altsys, at the end of 1994 — but the latest release preserves the program's well-designed interface. Newly added support for plug-ins combined with the most flexible working environment you can find in a draw program make FreeHand 5.0 our No. 1 choice for illustration.

The most significant enhancement in

FreeHand 5.0 is its new plug-in architecture, which greatly expands the functionality of the program. FreeHand comes with its own collection of plug-ins, called Xtras, plus you can use any of the plug-ins available for Adobe Illustrator, including those from third-party companies such as HSC Software and BeInfinite Graphics.

FreeHand's Xtras fall into two categories: those that operate as filters and those that let you manipulate objects. We found Xtras to be great tools for creating special effects. Noteworthy are the 3D Rotation, Smudge, Arc, Spiral, Fish Eye, and Eyedropper Xtras. We especially liked the Fish Eye tool, which produces an effect similar to that of Photoshop's Spherize filter. The Eyedropper tool is particularly useful for building up your color collection — you can use it to select colors from placed TIFF images that you can then drop into your color well and apply to other objects.

FreeHand offers more flexibility for

configuring it to work the way you do than any other drawing tool, thanks to the program's extensive collection of Preferences settings. For example, you can turn off version 5.0's new color interface, if you prefer to work in black-and-white, as well as have the program either delete or preserve any object affected by a path operation. Another setting prompts FreeHand to automatically convert placed EPS files to an editable format (if the program can read the file) — a big improvement over the previous version, which required a time-consuming series of commands before you could edit placed EPS files.

Veteran FreeHand users will be glad to know that the Text Editor dialog box, eliminated in version 4.0, is back in version 5.0. The Text Editor makes it easy to edit text that appears in light colors, small point sizes, or as text on a path. You can opt to have the Text Editor display text in 12-point black type or formatted as it is in your document. If you like, you can use a Preferences setting to have FreeHand automatically bring up the Text Editor whenever you enter text. The Stroke Widths menu has also been resurrected in the new version for accessing standard line widths.

In Style

A real time-saver is FreeHand's overhauled Styles palette, which lets you create styles that work just like those in word-processing and page-layout applications. Unlike in the previous version, styles now apply to graphic as well as text elements, and you can easily distinguish between the two types, thanks to unique icons — a graphics icon or a paragraph symbol — in the Styles palette. The powerful Edit Style dialog box lets you make any change to a style from directly within the dialog box, a much faster method than first making changes in your document and then resetting the style. You can even drag a style's icon and drop it onto an object or text block to apply the style, so you can quickly and easily change objects and text. For the ultimate in formatting controls, you can create parent and child styles — when you change a parent style,

Reviews Rating Key

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

those attributes shared by the child style change but the attributes unique to the child style remain the same.

Color controls are also improved in FreeHand 5.0. For starters, new colors you create in the Color Mixer now appear by default with their CMYK values displayed, offering more information than the previous version's nondescript names. In addition, the Color Mixer now conveniently contains controls for creating tints, whereas you used to have to employ a separate tint palette. And the color well now displays colors as you mix them, showing the base color and the new color side by side, which helps make color editing more intuitive.

For modifying process colors in a single object or an entire document, FreeHand provides a tool similar to Illustrator's Adjust Colors plug-in. FreeHand's Color Control Xtra lets you adjust color by using the CMYK, RGB, or HLS color model. But what makes it better than Illustrator's tool is that you can see a preview of your new color before you apply it.

FreeHand also includes an Xtra for creating multicolor graduated and radial fills.



New Xtra tools in FreeHand 5.0 make it easy to create special effects for your drawings. We used the 3D Rotation tool to get the shadow on the Zuni warrior just right in one step. FreeHand's new dual-well Color Mixer helped us create the color for the shadow.

You can control the fill angle and use as many as 64 colors. In terms of this feature, however, Illustrator does FreeHand one better. It offers all the functionality of FreeHand's tool, plus it lets you apply a multicolor fill that spans multiple objects, so, for example, your fill can start with the first character in a title and end with the last — a common effect. With FreeHand, a fill is limited to each individual object, so each character in the title would contain its own separate fill.

We were glad to see that the few shortcomings in the previous version have largely been fixed in FreeHand 5.0. Zoom operations are no longer limited to 800 percent — the program now goes up to 25,600 percent, which facilitates precise editing of very small objects and intricate designs. The pasteboard area is vastly larger, enlarged from 4.5 x 4.5 feet to a whopping 22 x 22 feet. You can now have multiple views of a document open at once. Hopeless spellers need not despair — FreeHand boasts a new spelling checker. And the new Find and Replace command is a welcome addition for those working with text-heavy documents.

We enjoyed the new floating palettes introduced in FreeHand 4.0, but it's easy to clutter your screen with them. Thankfully, the new version lets you hide all palettes simultaneously with a simple keystroke. And now you can set individual layers to use either the

preview or the keyline mode — a must-have feature for editing complex illustrations. Last, FreeHand's redraws are as speedy as Illustrator 5.5's, although FreeHand makes it much easier to interrupt a redraw to edit an object or to pan and scroll.

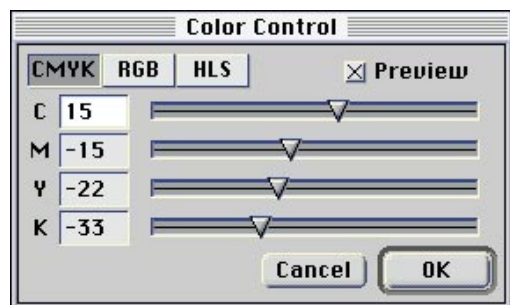
The one shortcoming that hasn't been addressed is FreeHand's manual. Although the reference guide is thorough, it explains only the basics. The tutorial is too short to be useful for novices, and it's missing basic lessons on Bézier-curve editing as well as advanced lessons on using path operations, such as Union and Intersect.

The Bottom Line

Designers will find FreeHand 5.0 as well suited to complex technical illustration as it is to graphically oriented page design. The program offers the ultimate in flexibility for customizing its work environment, and the new release beats the competition hands down for text-handling tools, which best even those in QuarkXPress and PageMaker for some tasks. With the addition of Xtras and support for Illustrator plug-ins, the new FreeHand takes a quantum leap in functionality. / Sean Safreed



Making changes to styles is much more convenient with FreeHand 5.0's powerful new Edit Style dialog box, which lets you change any element of a style without first making the change in your document.



The Color Control Xtra lets you adjust color, using the CMYK, RGB, or HLS color model. Best of all, you can see a preview of your new color before you apply it.

FreeHand 5.0

Rating:

Price: \$595 (list).

Pros: Superior interface. Comprehensive set of drawing tools. Plug-in support.

Cons: Multicolor graduated fills limited compared to Illustrator's. Mediocre manual.

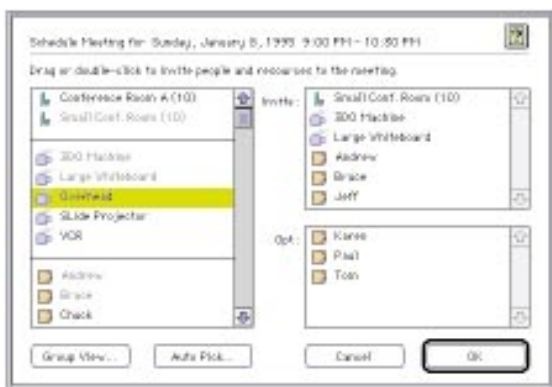
Company: Macromedia, San Francisco, CA; 800-288-4797 or 415-252-2000.

Reader Service: Circle #401.

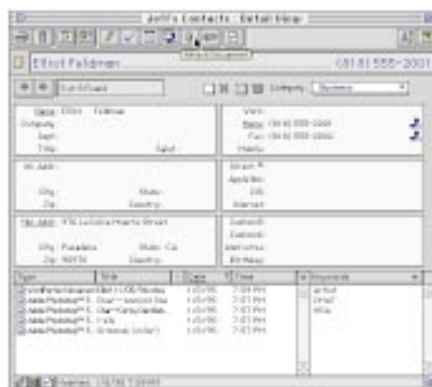
Now Contact and Up-to-Date / Dynamic PIM duo features networked contacts and group scheduling.

A CLASS ACT in the personal-information-manager category, the latest release of Now Software's contact manager and calendar program ties the two programs together more tightly than before. For starters, Now Contact & Now Up-to-Date (NUD) 3.0 are bundled together in the same box, although you can still purchase each separately, and the two programs now share a similar interface. In addition, each features a number of

breeze to set up. Once it's up and running, users add contacts from the server to their own contact files by simply connecting to the server and subscribing to any of the contact categories that reside there (Vendors or Company Employees, for example). Users then choose how frequently they want their contact files updated from the server as new contacts are added and existing contacts are modified.



Scheduling meetings and resources over a network is Now Up-to-Date's new forte.



Handy new tool bars have been added to both Now Contact (shown here) and Now Up-to-Date.

major new enhancements that will appeal to individual and networked users alike.

Now Contact

The first thing you notice about Now Contact, as well as Now Up-to-Date, is that each program sports a new look. The two programs now share many common interface elements, including handy new tool bars for quick access to commonly used commands and views. To help you remember the function of each tool, you can view its label by pausing your cursor on the tool's icon.

Links between contacts and calendar events are easier to create than before. To link a contact to a calendar event, you can simply drag the contact icon or name to your calendar and drop it on the appropriate date.

The most notable enhancement to Now Contact is the addition of network server software, which lets users share contacts over a network. Network administrators will find the Now Contact server software a

To share your contacts with your colleagues on the network, you assign the contacts to any of the public categories on the server. Any user on the network can view and change public contacts, except those posted to password-protected categories.

Any additions or changes you make offline (while traveling with your PowerBook, for example) to the public contacts in your file are automatically reconciled with the server version when you reconnect. Even better, to help you manage a contact file you maintain on both your desktop Mac and your PowerBook, Now Contact provides a Synchronize feature, which automatically applies changes in the most recently modified file to the other copy. The program even helps you keep track of the changes it makes to a file by attaching detailed notes to modified contacts.

Another nice feature is the Find Duplicates command, which searches for duplicate contacts and gives you the option of either merging duplicates into one record or

viewing a list of all duplicates.

Now Contact 3.0 also features beefed-up data-entry aids. After you've typed a few characters for a new contact's company name, for example, the program can fill in the rest of the name, as well as the entire address, based on existing entries for the same company.

Now Up-to-Date

The big news with NUD 3.0 is that it supports group scheduling over a network. Although it's not as convenient to use as group schedulers integrated with e-mail systems, such as Novell GroupWise, NUD nevertheless provides top-notch group-scheduling features. You can schedule resources, such as conference rooms and projectors, as well as meetings with your colleagues.

Once the program has guided you through the easy setup process, which connects you to a group-scheduling server and logs you in as a participant, you're ready to propose and accept meetings.

When your attendance is requested at a meeting, NUD informs you with an alert box. You can either accept or

decline a proposed meeting right then or postpone your decision until later. For those who are proposing a meeting, NUD provides several useful tools that help you find the best available meeting time. You can view a composite of all your invitees' schedules that shows you graphically when they're available to meet. Or you can use the Auto-Pick option to have NUD display a scrolling list of all available meeting times. Additional controls let you reserve personal times in your schedule so NUD won't make those times available for meetings.

To see who will be attending a proposed meeting, you look in the meeting's Event Info window. People who have accepted are listed with green check marks, those who have declined are marked with a red circle, and the names of those who haven't yet responded bear a question mark.

Version 3.0 also boasts a number of smaller enhancements. There's now a Calls event for tracking phone conversations, and you can even have the program time each

call. A calendar scrolling option gives you more flexibility for viewing dates in the Month and Multi-Day views than did the previous version — for example, in the scrolling Month view, you're now able to view any five-week period. And NUD's calendar-navigation tools have been beefed up, with the addition of the new Date/Time Picker, which lets you quickly and easily navigate your calendar with a few mouse clicks. And to jump right back to today's date, you simply click on a dot beneath the tool bar.

Overall, we were impressed with NUD 3.0, but we have a few complaints. One frustrating aspect of NUD's group scheduling is the fixed dialog boxes, which obstruct your view of your calendar and make it hard to make scheduling decisions. There's also no sure way to determine who planned a meeting — the original meeting maker's name appears in the event window only until someone else modifies a meeting detail, which causes that person's name to replace the meeting maker's. And in order to receive notice of a meeting, you must have NUD open (or set a reminder). Otherwise, to keep abreast of meetings, you have to remember to check your meeting notices on the Meeting menu. We also found NUD 3.0 a bit slow when updating calendars over Ethernet and decidedly slow over LocalTalk.

The Bottom Line

Now Contact & Up-to-Date's well-designed features, combined with network support for shared contacts and group scheduling, make the package a standout in the crowded PIM arena. Workgroups can expect a nominal to nonexistent learning curve for Now Contact's network features and only a slight learning curve for NUD's group-scheduling features. / Susan Janus

Now Contact & Up-to-Date 3.0

Rating: 

Price: \$99; separately, \$69 (estimated street).

Pros: Network support for shared contacts. Good group-scheduling features. Easy to learn and use.

Cons: NUD's fixed dialog boxes obstruct calendar views. NUD is somewhat slow when updating networked calendars.

Company: Now Software, Portland, OR; 800-722-5963 or 503-274-2800.

Reader Service: Circle #402.

Nakamichi MBR-7 / A simple, versatile CD changer that's truly affordable.

THE FIRST COMPUTER peripheral from hi-fi manufacturer Nakamichi carries over the elegance of its audio equipment to a seven-disc CD changer. And the Nakamichi MBR-7 is not only well designed but also easy on the wallet — the device is priced at an affordable \$499.

Refined Simplicity

The MBR-7 has a simple, spare design, consisting of seven retractable trays for the CDs, buttons that correspond to each tray, a headphone jack, and volume control. To load or remove discs, all you do is press one of the buttons and the corresponding numbered tray slides out.

As you insert a CD into the changer, the MBR-7's software caches its directory into RAM and mounts the CD on the desktop. You can have all seven discs mounted on your desktop at the same time, but be aware that if you insert several CDs at once, it can take a few minutes before you have control of your system again, since it takes some time to cache all the directories and mount the discs. And although you can have several discs mounted at once, you can use only one CD at a time, because the MBR-7 has only one CD mechanism. You probably won't want to share discs over a network, even though you can — if you do, the changer spends time continually exchanging discs when it has to access different discs for different users at the same time. The MBR-7 shines if you have a regular set of CD-ROMs, such as reference sources or clip-art libraries, that you need to access frequently.

The MBR-7's double-speed mechanism can read most popular CD formats, including CD-ROM, audio CD, and Photo CD. According to our MacBench 2.0 test results, the MBR-7 is almost exactly the same speed as a Mac's internal double-speed CD-ROM drive. And, thankfully, the changer is quiet.

The MBR-7 comes with an audio-CD DA called MBR-7 Remote CD, which has all the same standard functions as the AppleCD Audio Player, with a bonus: Clicking on the grow box of the MBR-7 Remote CD shows you all the tracks on all the audio CDs in the changer and lets you shuffle the songs

within a disc or among discs. You can even drag tracks from the Track List to the Play List if you want to play only a subset of the tracks. Unlike the AppleCD Audio Player, however, the MBR-7 Remote CD doesn't let you pause by pressing the space bar.



You can't beat the convenience of having access to as many as seven CD-ROMs with the \$499 Nakamichi MBR-7 CD-ROM changer.

The Bottom Line

Since double-speed CD-ROM drives are selling for less than \$200 and quadruple-speed CD-ROM drives are selling for as little as \$300, you might think \$499 for a changer is an extravagance. However, you'll think otherwise once you experience the convenience of having all your favorite CD-ROMs on your desktop and ready for action. And if you were to attach some nice speakers to the back of the MBR-7, you would probably have all the stereo you could ever want. In fact, the MBR-7 has started a trend in inexpensive changers — NEC will release a similarly priced CD-ROM changer using the Nakamichi mechanism by the time you read this. / Mark Frost

Nakamichi MBR-7

Rating: 

Price: \$499 (estimated street).

Pros: Affordable alternative for keeping a variety of frequently used CD-ROMs on the desktop.

Cons: Can slow Finder responsiveness as changer updates disc directories.

Company: Nakamichi; distributed by OCEAN Microsystems, Cypress, CA; 800-944-6232 or 714-898-1340.

Reader Service: Circle #403.

PHOTOGRAPHY / GIAMPIERO BENVENUTI

Tektronix Phaser 540 / Color laser printer delivers some, but not all, of the goods.

THE FIRST WAVE of color laser printers in the \$10,000 price range promised more than they delivered. But with the recent introduction of the Tektronix Phaser 540, things are beginning to look up. The Phaser 540 raises the bar in the color-laser-printer category for all the features you expect in an office printer — image quality, speed, and ease of setup and maintenance.



A Better Fit

The \$8,995 Tektronix Phaser 540 is an Adobe PostScript Level II printer that comes standard with 20 MB of RAM. It weighs a hefty 117 pounds but has a smaller footprint (26 x 19 x 19 inches) than its



The Tektronix Phaser 540 zips along at a much faster pace than competing color laser printers and boasts better-looking output.

rivals, the Xerox 4900, the Hewlett-Packard Color LaserJet, and the QMS *magicolor* — a plus for crowded offices.

The Phaser 540 is easier to set up than its competitors. The toner is contained in four separate cartridges — cyan, magenta, yellow, and black — that slide snugly into the printer. Each cartridge is rated for 6,500 prints. There's also an imaging unit and a fuser, each rated for 40,000 images.

The Energy Star-compliant Phaser 540 has a SCSI port, so you can connect a hard drive to it for font storage, and a parallel port. Optional Tektronix Phaser Share networking cards are available for EtherTalk, Novell NetWare, token ring, TCP/IP, and LocalTalk.

Not only is the Phaser 540 considerably faster than the competition but it also produces better-looking output on standard office paper than its rivals. You can choose

from three printing modes: 300-x-300-dpi continuous-tone Fast mode (continuous tone ensures smooth blends and photographic-quality output), 600-x-600-dpi Standard mode, and 600-x-600-dpi continuous-tone Enhanced mode. You need to install Tektronix's special \$1,198 16-MB SIMM to take advantage of Enhanced mode.

The Phaser 540 comes with TekColor Dynamic Correction software, for matching printed colors to on-screen colors or to SWOP, commercial, and Euroscale press standards.

Overall, the Phaser 540 offered the best color consistency of all the color laser printers we tested when printing multiple copies of the same document. It was also the best at maintaining color fidelity across print modes, although there's room for improvement in this area.

For text quality, the Phaser 540 was again the hands-down winner. We recommend printing at 600-x-600-dpi Standard mode for the best results — at that setting, the Phaser 540's text quality rivals that of 600-dpi monochrome laser printers.

In our speed tests, the Phaser 540 — which combines a powerful Adobe RIP and a well-designed engine — outdistanced its three rivals in every test. For monochrome printing, Tektronix rates the printer at 14 ppm in Fast mode. We clocked the printer at a respectable 10.5 ppm — about what you'd expect from a typical office monochrome laser printer.

When we tested the speed with which the engine handled color documents, the Phaser 540 printed ten copies of our Microsoft Word document (incorporating text and color business graphics) in about 3.5 minutes in Fast mode — shaving a full 45 seconds off the time of its closest rival, the Xerox 4900.

Printing our five-page color PowerPoint presentation in Fast mode, the Phaser 540 beat the HP Color LaserJet, its closest rival in this test, by a full 60 seconds. Next, we used a complex PostScript document — an Adobe Illustrator file containing blends and rotated text — to test the printer's processing muscle. In Fast mode, the Phaser 540

zipped through the test in a little more than 2 minutes, outpacing the next in line, the QMS *magicolor*, by about 30 seconds.

To test throughput and RIP performance, we created a 16-MB Photoshop file incorporating two scanned photographic images. The Phaser 540 took about 9 minutes to print it, whipping its closest rival, the Xerox 4900, by a full 5 minutes!

In general, we were most pleased with the speed/output-quality ratio we achieved in the Phaser 540's Fast mode. In Standard mode, the colors seemed flat and dull, and in Enhanced mode, the colors became too intense — browns looked too red, and grays tended to lean toward magenta or yellow.

One caveat that applies to all the color laser printers we tested, including the Phaser 540: Don't plan to print on both sides of a sheet of paper. Printer makers strongly advise against it, because it shortens the life of the imaging unit. Another shortcoming is that you can't use the Phaser 540 to print on envelopes or on media larger than 8.5 x 11 inches. We also encountered a minor bug that resulted in poorly printed black border lines for primary-color graphics, such as pie charts. To fix the problem, use any of the TekColor color corrections.

The Bottom Line

The Tektronix Phaser 540 is a big step in the right direction for desktop color laser printers. It offers respectable speed, and its output quality surpasses that of its rivals. But there are limitations to consider before you rush out to buy a Phaser 540. Color fidelity across print modes is not quite what it should be, and there are media restrictions — you're limited to printing on a single side of letter-sized paper, and you can't print on envelopes. / Tony A. Bojorquez

Tektronix Phaser 540

Rating: 4.5

Price: \$8,995.

Pros: Speedy performance. Excellent text quality at 600 dpi. Easier setup than with competing printers.

Cons: Poor color fidelity across print modes. Limited to printing on a single side of letter-sized paper.

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

Reader Service: Circle #404.

Read-It! 5.0 / With a new engine for better speed and accuracy, Read-It! is catching up fast with the competition.

WITH SOME UNIQUE and clever features that may make its competition turn green with envy and with a faster and more accurate engine that turns scanned documents into text faster than an overcaffeinated typist, Olduvai's new version of Read-It! is not only improved but also surprisingly good.

Revved-up Reader

A new interface, text-block and image-editing tools, an enhanced word processor, templates, and format retention are all impressive features in Read-It! 5.0, but the biggest improvement in version 5.0 is speed. Read-It! really sizzles.

Read-It! 5.0's speed now compares favorably with that of high-end OCR programs such as OmniPage, and although Read-It! 5.0 can't read text smaller than 9 points — as OmniPage can — it turned larger scanned text into editable text with an accuracy rate approaching 100 percent.

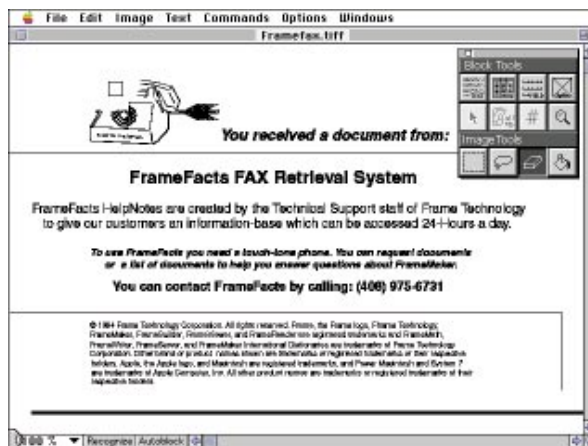
With Read-It!, you convert paper documents to editable text just as you would with any other OCR program. Read-It! recognizes scanned words and turns them into editable text, which it then flows either into its own word processor or into any open appropriate program, such as a word-processing or desktop-publishing program. To flow your text into a program other than Read-It!'s word processor, you can use the Send Text To option, which takes advantage of Apple events. Although Send Text To never worked reliably in version 4.0, it performed flawlessly for us in version 5.0.

Smart Zoning

Read-It! 5.0 is smart enough to automatically determine where the text blocks are on a page and to create zones for them. The program also has a floating palette of text-block and image-editing tools you can use to manually define text blocks and to clean up scans marred with scribbles, editing marks, and artifacts that might hamper the recognition process.

One of the best reasons to manually define text blocks is an outstanding feature in

Read-It! 5.0 that lets you create various settings for individual text blocks. For example, you can specify that the information in a block of tabulated financial figures should be recognized only as numbers so Read-It! will not mistake the numeral 1 for a lowercase letter l during the recognition process. You can also select the text blocks



A palette of editing tools in Read-It! 5.0 not only lets you define text and graphics blocks in your scanned document but also lets you remove marks and pictures that could hinder the recognition process.

for which you want to turn on format retention. Such features give you a remarkable level of flexibility. You can also save the settings and text-block layouts as templates for subsequent use on similarly formatted pages.

During the recognition process, you can retain not only the format of your page, including alignment between text and graphics blocks, but also text features such as point sizes, bold face, italics, underlines, and diacritical marks. The program now also offers batch recognition of TIFF images, which is particularly useful if you're using a fax modem to receive faxes. Additionally, for drag-and-drop recognition, you can drop TIFF-format scan files onto the icon of the ReadASAP utility, included with the program. But, unlike with version 4.0, you can't train Read-It! 5.0 to recognize hard-to-read or unique text. Olduvai reports that only about 2 percent of Read-It!

4.0 users found the training feature useful.

If you don't use the Send Text To feature, Read-It! 5.0 displays recognized text in its new word processor, which offers a dramatic improvement over version 4.0's barebones text editor. The word processor in version 5.0 gives you complete control over font, point size, formatting, tabs, text alignment, and more through its convenient ruler bar. You can also Command-click on any word in Read-It!'s word processor to see its scanned image, which makes correcting inaccurately recognized characters easier. The word processor saves the recognized

text as plain text and can read selected text aloud with Macintosh. It also has a spelling checker and find/replace abilities.

The Bottom Line

Olduvai has finally come up with a version of Read-It! that has features and speed that make it worth considering. However, the \$395 list price is a bit steep for today's OCR market. Olduvai should take a cue from Xerox Imaging Systems and lower its price to make Read-It! more competitive with the excellent

\$99 TextBridge OCR utility. Since Read-It! has some features TextBridge lacks, such as superior control over text blocks and the ability to create zone templates, a less expensive Read-It! would have the potential to give the Xerox program a run for its money, even if it continued to cost twice the price of TextBridge. / Gregory Wasson

Read-It! 5.0

Rating:

Price: \$395 (list).

Pros: Speed and accuracy dramatically improved. Automatically flows recognized text into almost any program via Apple events. Image-editing tools. Excellent control over individual text blocks.

Cons: Pricey. Trainability removed in this version.

Company: Olduvai, Miami, FL; 800-822-0772 or 305-670-1112.

Reader Service: Circle #405.

PowerCADD 1.0 / Native PowerPC version draws circles around 680x0-based predecessor.

POWERCADD 1.0, the PowerPC-native version of Engineered Software's PowerDraw, offers a good balance of price and performance. And as a high-end 2-D-CAD program, it provides some of the most complete production-drafting tools available for the Mac — proving that although the Mac market has fewer CAD programs than it did a few years ago, some of the best have clearly survived.

Speed Sketching

Using PowerCADD, we seldom, if ever, had to wait for our Power Mac to finish a task. On average, for common operations such as

nearly instantaneous redraws. Except for the difference in speed, PowerCADD and PowerDraw contain essentially the same features.

The new Overview window floats on top of your main window like a palette and gives you a thumbnail view of your drawing. When you hold down the Option key and draw a rectangle over a section of the drawing in the Overview window, PowerCADD fills the main window with the section you have selected in the overview window. You can't get that kind of control from conventional zooming and panning tools. PowerCADD also has a Status window, which tells you the percentage at which your drawing is magnified as well as your drawing scale. The Status window allows you to define how far an arrow key nudges your cursor or an object. The window also controls the number of drawing layers that the program displays.

The new floating Dimension palette will save professional designers a great deal of time by streamlining the chore of adding dimensions to drafts. You can change your dimension settings, including your tolerance deviations, from within this palette. You can also use this palette to specify the placement of arrowheads and text that marks spatial dimensions.

Object snap keys are now accessible directly from the keyboard. For instance, if you want a line to snap to the center of a circle, you hold down the C key and draw the line toward the circle; the line will automatically snap to the circle's center point. Although PowerCADD also has the object snap keys in the title bar of the main window, it's a nice convenience to have them accessible from the keyboard.

Clever Paste

Other nice touches include a Paste Special function, which, when used instead of the regular Paste command, attaches an outline of the object in your Clipboard to the cursor. This allows you to drag and position the

object *before* placing it, so you don't end up having to move an inappropriately placed solid object, which PowerCADD would have to redraw with each move.

When you scale drawn objects, you can rescale text at the same time — a great convenience over having to change point size and reposition text after each rescaling. You also have more control over creating and editing Bézier curves than you used to; indeed, PowerCADD's level of control over Bézier curves even rivals the kind of control you can get with Adobe Illustrator.

Proliferating Palettes

Because most of the changes in PowerCADD are added extensions and modules, your screen can quickly clutter up with floating windows and tool palettes — in just the standard configuration, you can open more than a dozen palettes. It would be useful if PowerCADD had some sort of tool-palette management such as the grouped and tabbed palettes in Adobe Photoshop 3.0, which let you group several palettes and turn them on and off easily.

We would also like to see PowerCADD take advantage of System 7.5's Drag Manager, especially for adding symbols to libraries. After being spoiled by draw programs such as ClarisDraw, which lets you copy an object into a library simply by dragging it to the Library palette and dropping it in, having to use cut-and-paste for the same function in PowerCADD felt cumbersome and outdated.

The Bottom Line

For Mac-based production drafting work, PowerCADD 1.0 is at the top of our list for its awesome speed and clever additions, although you'll need a large screen to handle all the palettes. / James K. Anders



PowerCADD 1.0's floating palettes and windows, such as the Dimension palette, the Status palette, and the Overview window, provide feedback and control without making you go to the menu bar.

creating object arrays and Bézier curves on 1- to 2-MB documents, PowerCADD running on a Power Mac 8100/110 was anywhere from five to eight times as fast as PowerDraw 5.0 running on a Quadra 700.

More specifically, we pitted PowerCADD on the Power Mac 8100/110 against PowerDraw on the Quadra 700, allocating 16 MB of RAM to each application on each machine. PowerDraw on the Quadra required 52 seconds to do a Reduce to Fit redraw of a large, complex 7-MB file. PowerCADD on the 8100/110 finished the same redraw of the same file in just a tick over 5 seconds. Most users working on more modestly sized drawings can expect

PowerCADD 1.0

Rating: 

Price: \$795 (list).

Pros: Workstation-class speed in PowerPC-native mode. Generally improved controls, including sophisticated zoom/pan tools, Status window, and Dimension palette.

Cons: Cluttered interface. Not Drag and Drop-aware.

Company: Engineered Software, Greensboro, NC; 910-299-4843.

Reader Service: Circle #406.

Apple PhotoFlash 2.0 / Inexpensive photo editor/browser covers the basics.

FORMERLY TWO well-integrated applications, an image editor and a browser that could also place pictures, Apple PhotoFlash is now a single program. It offers welcome additions, such as an easier way to catalog and browse through images, some basic color-correction features, and a lower price.

As with earlier versions, you can create a catalog that shows you a thumbnail of each image. However, version 2.0 lets you create several catalogs instead of putting all your images into one massive collection.

Navigating through catalogs is easier now. You can select a thumbnail image and have PhotoFlash search for all similar images. You can also use PhotoFlash's new sketch pad to paint a crude representation of the type of image you'd like to find. You can also search for images by their captions, which you can now add to images in a PhotoFlash catalog. However, you cannot add captions to Adobe Photoshop images or

save captions for images on locked volumes, including CD-ROMs.

You can take advantage of several pre-written AppleScript scripts that automatically place an image into a QuarkXPress, Adobe Systems' PageMaker or Persuasion, Microsoft Word, or Claris FileMaker Pro document. PhotoFlash also comes with prewritten scripts for other common tasks, including scripts for direct use of the Apple QuickTake camera.

You can now make basic adjustments to the red, green, and blue values in an image, a talent the original version lacked. Other than that, PhotoFlash's image-enhancement tools remain essentially unchanged. The program still doesn't have drawing or painting tools, but it has a good set of tools for removing dust and for cropping images. It also has basic filters for sharpening and blurring and for balancing exposure.


PhotoFlash can read several formats:

PICT, TIFF, EPS, JPEG, DCS, Photo CD, and Photoshop. It can save images in any except Photoshop and Photo CD, but it still can't directly convert RGB color to a CMYK format, although you can convert RGB to CMYK color by using one of the Photoshop plug-ins PhotoFlash now supports.

The Bottom Line

Adobe Systems' Fetch is a better cataloging tool and Light Source's Ofoto is a more powerful image-enhancement tool, but both cost hundreds more than PhotoFlash, whose image enhancement and cataloging, ease of use, and scriptability make it a nice choice for managing graphics. / Shelley Cryan

Apple PhotoFlash 2.0

Rating: 

Price: \$129 (estimated street).

Pros: Easy to use. Inexpensive. Scriptable.

Cons: Can't add captions to Photoshop images or images on locked volumes. No RGB-to-CMYK conversion.

Company: Apple, Cupertino, CA; 408-996-1010.

Reader Service: Circle #407.

MarcoPolo 3.0 / Turn your Mac into a nimble file clerk.

WHEN YOUR FILE DRAWERS are overflowing with paper and you're trying to remember if you filed one of your client's latest invoices by company name or by personal name, an electronic filing and quick-retrieval system could be just the thing to save you — and others in your workgroup — from hours of frustrated hunting. One such program, Mainstay's MarcoPolo, turns scanned paper documents into electronic images it files away under keywords you assign — if you use its OCR program, MarcoPolo even turns scanned paper documents into text you can search through.

Finding Your Way

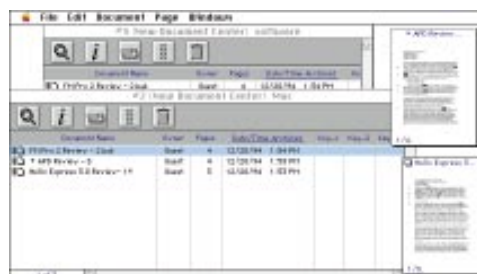
MarcoPolo 3.0 has the ability to create topic sets that make it easy to quickly find files by topic. But for those who need to search more broadly, MarcoPolo does complex Boolean searches with up to 64 keywords per search. Every file you place in a

MarcoPolo Document Center — a networkable file set up on a hard disk — can have up to 448 keywords assigned to it. You can also search for documents by the Document Centers they might be in, their filing date, and their owner — and if you've used MarcoPolo's OCR software to turn paper documents into electronic text, you can even have the program search for a document by the words that are in it.

Searching through all the files you've put away electronically does have its drawbacks. Although Mainstay says you can search through thousands of documents in just seconds, we found, using a PowerBook 540 and a Power Mac 8100/80AV, that it took more like a minute to search through a thousand documents (and 5 minutes through 10,000) for the ones we wanted.

Version 3.0 has a clever feature

called proxy archiving, which lets you give access to other people such as support staff so they can turn paper documents into MarcoPolo images and designate you as the owner. You can have multiple proxy passwords, with each password denoting a different kind of access. For example, you can have your secretary scan in press releases for you, but only you, with the master password, will be able to move a document into a different Document Center or add keywords to it. Proxy archiving allows you to create and maintain an imaging station that



MarcoPolo retrieves files by document name, by the name of the person who turned the paper document into a MarcoPolo image, or by the date the image was created.

includes a Mac with MarcoPolo installed and a scanner, and it makes it easy to delegate to others the task of turning paper documents into MarcoPolo images. Users who only need to retrieve, view, and print MarcoPolo documents can get all the access they need from the MarcoPolo client software, which costs \$100 per user.

Read My TIFFs

Also new in this version is MarcoPolo's document-scanning interface with built-in OCR. We found MarcoPolo's OCR, whose accuracy rate was well over 90 percent for most typewritten and printed text and over 95 percent for really clear text, to be on a par with that of other stand-alone OCR programs. MarcoPolo does not use unique characters to mark words it cannot recognize, so you can't search for and correct such words with your word processor. Instead, MarcoPolo saves unrecognized words as PICT files embedded in the text document. You can read these words on the page, but they're not text. Therefore, if you search for a document by a word contained within it and MarcoPolo has failed to convert the word to text, the program won't be able to find the document for you. Overall, MarcoPolo's OCR speed was in the same ballpark as that of Caere's OmniPage and Xerox's TextBridge. Unlike older OCR programs, MarcoPolo's OCR program keeps graphics together with text in a recognized document to help it retain its original look.

The Bottom Line

Is MarcoPolo worth its price of nearly \$900, particularly since you need to dedicate a hard drive (we recommend 1 GB) and probably a scanner to it exclusively? MarcoPolo won't replace your file clerks, since the IRS, among others, still insists on paper copies of important files. You'll also want a paper

backup, just in case your system goes down. And although Mainstay says MarcoPolo is appropriate for anyone, from individuals to corporations, we think this kind of system is practical only for large workgroups.

For such organizations, especially ones with a lot of documents that need to be managed, MarcoPolo is practical. If you're in a group that shares documents or you

frequently find yourself hunting through corporate credenzas for important memos and notes, MarcoPolo's ability to find anything for you, even when you remember only a date or a project name, can spare you hours of frustration. If your life is defined by electronic and paper disorder, using MarcoPolo is a well-conceived way to manage the encroaching paper beast. / Don Crabb

MarcoPolo 3.0

Rating: 

Price: \$895; MarcoPolo Client, \$100 (list).

Pros: Powerful document search and retrieval. Proxy archiving. OCR capabilities.

Cons: Slow for complex searches. Unrecognized words remain PICT files in text documents.

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

Reader Service: Circle #408.

GroupWise 4.1 / Novell sets a new standard for e-mail and workgroup scheduling.

TIRED OF JUGGLING four software programs for e-mail, personal calendars, to-do lists, and group schedules? Take heart — although you won't find an ideal solution for Mac networks today, an innovative groupware package from WordPerfect (now the Novell Applications Group) is hopefully a precursor of what's to come in Macintosh groupware applications.

GroupWise 4.1 — which replaces WordPerfect Office — requires a DOS, OS/2, NetWare, or UNIX server and uses DOS-



All the tools you need for e-mail, personal and group scheduling, and to-do lists are nicely integrated into one main window in GroupWise.

based administration tools, so it clearly isn't the ideal choice for Mac-centric networks. But what is noteworthy is that GroupWise does a smooth job of integrating group-scheduling, e-mail, and personal-time-management tools into a single application. Furthermore, GroupWise's client-software features truly shine in the areas of workgroup scheduling and remote access.

E-Mail

GroupWise's e-mail functions form the foundation of the application. One of the program's most appealing aspects is that you manage not only your messages but also your personal and group calendars and tasks all from one main window.

GroupWise's e-mail features are among the best we've seen. For instance, you don't have to be connected to the server to work with your e-mail messages or your calendar. If you receive lots of messages, you can use the powerful Filter command to help you manage your mail. You can choose to view only those messages that meet criteria you define in such categories as sender, CC:, date, and item status. For example, you can

create a filter that displays all urgent items that are more than ten days old. GroupWise also provides a Find command that helps you locate messages containing specific text entries.

What's more, you can automate mail handling with GroupWise's rules. You can specify that any message containing a particular word or combination of words be automatically forwarded or stored in a designated folder on your hard disk. For example, you can define a rule that always forwards mail from a particular user to a group address or automatically forwards all messages on a specific subject to a particular user.

GroupWise also provides routing capabilities, so you can have a message sequentially forwarded among a group of users. After the message is read by the first user on the list, it's automatically routed to the next user, and so on. Routing is especially useful when you need to make sure a document is read, modified, or accepted by a group of your colleagues.

If you have an assistant who plans your schedule, you'll welcome GroupWise's proxy feature, which gives another user access to your e-mail and calendar. You can control a proxy's access privileges by using a variety of options, including read-only. The privacy option lets you designate which items are to be viewed only by you.

An excellent spelling checker and thesaurus are built in to GroupWise, as is a nice feature that even lets you attach folders, as well as individual files, to messages. Recipients can open and view a variety of file types, even when they don't have the application that created them. GroupWise also provides a Trash icon you use to delete mail, and just as with the Finder, if you delete an item by mistake, you can recover it from the Trash.

GroupWise updates your user directories and exchanges updates among servers automatically, so you know your address book will always be current.

Scheduling

The personal-calendaring tools in GroupWise measure up quite well to those in dedicated calendar programs, but it's the workgroup-scheduling features that really stand out.

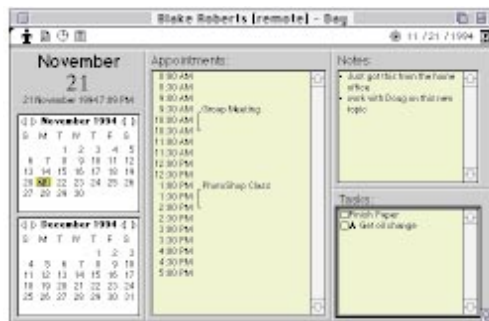
To propose a meeting via GroupWise, you use a message window that's tailored for scheduling. You select the recipients and the start and end times for the meeting and fill in the agenda details. When recipients accept or decline your proposal, GroupWise modifies their calendars accordingly and notifies you. GroupWise also lets you schedule resources such as conference rooms and projectors.

When you're scheduling a meeting with many participants, the handy Busy Search feature saves you time by determining when all the participants are free. You set the search criteria for duration, times, and days.

Just as easy as scheduling meetings in GroupWise is task management. The program's features let you assign to-dos not only to yourself but also to other users on the network. Tasks are carried forward each day in the calendar until they are completed.

Remote Access

We also liked GroupWise's handling of remote network access. The best aspect is that, unlike ARA, GroupWise doesn't require you to use a separate interface. And although the initial setup will be a little confusing to Mac users (you have to wade through a series of confusing dialog boxes



GroupWise's calendar features work well for scheduling personal events, but the program really shines for workgroup scheduling over a network.

and deal with domains and post offices), getting remote network access is a breeze thereafter.

There's certainly no dearth of useful features. We especially liked the progress-barometer dialog box, which accurately estimates file-transfer times. Even better, if transmission breaks down during a session, GroupWise is smart enough to pick up where it left off when the connection is resumed. Most other products force you to start over.

For our tests, we used a 9,600-bps connection and found remote-access speed to be quite acceptable — our 850K test file required eight minutes to transfer. GroupWise supports background processing, so you can continue working while you're sending and receiving files.

We weren't able to test it, but GroupWise provides an innovative Telephone Access Server option that converts text messages to audio messages, so users can phone in and hear their messages read to them.

Power Mac users running GroupWise may experience intermittent system freezes and crashes due to error type 11. Novell is addressing these problems with a software patch, called GWPatch, that is available electronically.

The Bottom Line

GroupWise 4.1 is an outstanding example of just how well groupware tools for e-mail and scheduling can be integrated. Although most network managers will find the current application — with its reliance on DOS, OS/2, NetWare, or UNIX servers — an unsuitable choice for Mac-centric networks, GroupWise's client-software features merit special recognition. / Blake Roberts

GroupWise 4.1

Rating: 

Price: Client/Administration Pack (5), \$695; additional client software, \$95 to \$135; NLM Server, \$2,495; DOS Server, \$495; OS/2 Server, \$1,495; UNIX Server, \$1,995 (list).

Pros: Excellent client-software features. Multiplatform support.

Cons: No Mac-based administration tools. Requires NetWare, DOS, OS/2, or UNIX server.

Company: WordPerfect, Novell Applications Group, Orem, UT; 800-861-2507 or 801-225-5000.

Reader Service: Circle #409.

Citizen PN60 / Lightweight, inexpensive printer compromised by quirky features.

WEIGHING IN at just over a pound, the 360-dpi Citizen PN60 appears to be a PowerBook-toting road warrior's dream.



Using thermal-fusion technology and monochrome or four-color cartridges, it can print on a wide range of media, from plain paper to transparencies, from envelopes to labels. And at \$399, it won't break your budget, even though you have to buy ink cartridges (except for the one included) and a NiCd battery separately. You can also buy adapters that let you run the printer off your car battery or print from a PC serial or parallel port.

Easy Setup

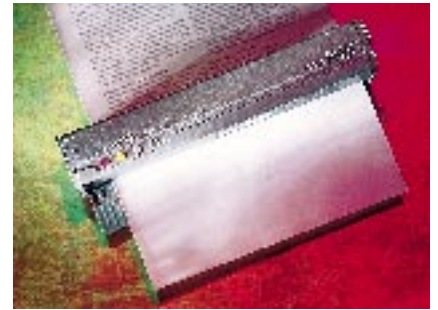
Following the Quick Start instructions, we were set up and happily printing within five minutes of taking the printer out of its box. We didn't even have to install drivers for the PN60, since it uses Apple's StyleWriter drivers, which are installed automatically with System 7.5. But if you need color, you'll have to use Citizen's inconsistent PN60 driver, which frustrated us by displaying alerts about error conditions *after* they'd been resolved and by failing to print black text in draft mode.

Slow Printing

Although the PN60's text quality was quite acceptable for documents with type sizes smaller than 12 points, it wasn't quite as good as the output you'd get with a 300-dpi laser printer or even with a Hewlett-Packard 300-dpi DeskWriter inkjet printer. When we printed graphics or text in larger point sizes, the PN60 printed in 1/8-inch-wide horizontal stripes, leaving visible lines through text and graphics. On the other hand, the printed text was water-resistant — notable since many small portable printers have been criticized for smeary output. Speed is another matter, however. Even when we printed in draft mode, a simple text document took about two minutes per page to print rather than achieving the rated engine speed of two pages per minute.

We were disappointed that the printer lacked the ease of use we look for in well-

designed Mac products. Using the single-sheet feeder and having to carefully align each page quickly became tiresome, as did having to put the printer on-line after feeding it each page. We had to look at the manual to find out that you have to flick a switch in order to get the battery to operate. Unless the battery's charge has dropped




Compact and portable, the Citizen PN60 doesn't add much load to your luggage, but it's not nearly as elegant or easy to use as a PowerBook.

below 10 percent (at which point it will recharge itself), you have to remember to press two of the five control buttons on top of the battery when you want to see how much charge the battery has left, and you have to press another two buttons to charge it up for, say, a long flight. Fortunately, the slim 80-page manual is clear, concise, and well organized.

The Bottom Line

If you occasionally need to print documents at the last minute while traveling, the Citizen PN60's small size and unsmearable print make it a worthwhile companion — even though you'll have to live with more than a few quirks. / Mark Bieler

Citizen PN60

Rating: 

Price: \$399 (list).

Pros: Compact. Inexpensive. Smear-resistant output.

Cons: Confusing hardware design for Mac users. PN60 driver erratic. Obvious striping in large text and graphics. Slow.

Company: Citizen America, Santa Monica, CA; 800-477-4783 or 310-453-0614.

Reader Service: Circle #410.

ElectricImage Animation System 2.1

PowerPC version supercharges rendering speed.

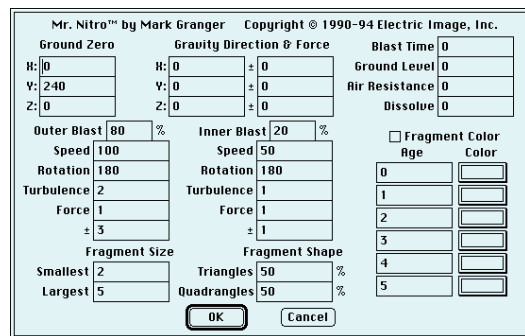
CHANCES ARE GOOD you've seen TV commercials created with the ElectricImage Animation System (EIAS), a Mac-based 3-D-rendering and -animation system designed especially for film and video professionals. The big news about the EIAS is that its most recent release, version 2.1, is PowerPC-native, which means the speed of the program's renderer has been significantly increased. But speed is only one of many reasons to upgrade — the new release also boasts a long list of slick new features.

You Get What You Pay For

The EIAS has always been the Mac's top-of-the-line 3-D-animation software, but its hefty \$7,495 price tag makes it a tough purchase decision, even for established artists and businesses. However, keep in mind that

although most 3-D Mac applications compete with one another, the EIAS competes with programs that run on expensive workstations from companies such as Sun and Silicon Graphics. Viewed from that perspective, the EIAS can look like a bargain.

In general, 3-D applications are measured by their modeling, texture-mapping, lighting, animation, and rendering prowess. The weakest aspect of the previous version of the EIAS was that it lacked a modeler, so you were forced to use a separate modeling program to create objects that you then imported into the EIAS for animation, surface mapping, and rendering. Although the new version doesn't provide a modeling environment per se either, it offers several good, albeit limited, workarounds that let you model simple objects from within the EIAS.



New plug-ins such as Mr. Nitro add a slew of special effects to the EIAS bag of tricks.



Broadcast-quality effects are the forte of the EIAS. The image shown here was created with the new deformation tools and was then subjected to the explosion effect in the Mr. Nitro plug-in.

The PowerPC-native version 2.1 and the 680x0-based version 2.0 each boast a new plug-in architecture that allows third-party developers to vastly expand the program's functionality. A rich selection of plug-ins already comes with the current version of the EIAS, including the incredible Mr. Nitro. Based on the parameters you set, it makes objects explode either into tiny dustlike particles or into giant pieces of glass. The Particle Generator plug-in creates water, fire, sparks, and other effects.

Although you can create some of these same effects with other 3-D programs, the EIAS is the only program that lets you animate the effects and control the forces involved in the process by entering custom values for gravity, velocity, weight, color, direction, turbulence, and volume.

A stunning plug-in for creating lighting effects, Lens Flare provides realistic animation of camera light refractions. You can adjust the size, lens type, rotation, color, and motion of the lens flare over time and preview a quick-shaded rendering of your scene in the camera view.

Texture Mapping

Texture mapping in the EIAS now includes summation mapping, which lengthens processing times but greatly improves image clarity by removing artifacts such as moiré patterns and jaggedness. What's missing, however, is a high-quality preview that lets you view the results after you've applied and positioned surface maps. The wire-frame preview currently provided isn't adequate, so you end up spending a lot of time rendering images just to view the results of your work.

Another new feature in versions 2.0 and 2.1 is support for Bézier curves. If you're already familiar with FreeHand or Illustrator, you'll have an easy time creating motion paths by manipulating and editing Bézier curves in the program's front, side, or top views.

An important new sound enhancement, which allows for precise synchronization between animation and sound, is the program's ability to import sound tracks and display them as waveform images in an EIAS timeline. As a time-based animation system, the EIAS uses the keyframe paradigm — you set the keyframes for an animation, and the EIAS creates the in-

As a modeling-environment substitute, the EIAS now provides a selection of scalable primitive objects — spheres, cubes, cylinders, planes, cones, and so on — that you can bend, twist, taper, shear, stretch, and ripple with the system's new deformation tools. You can even add Bézier splines to the objects. In addition to applying deformations to a single object, you can apply them to a group of objects or to a region within a group.


These new tools make basic modeling operations easy. For example, by selecting a straight cylinder, tapering it, and adding a twist, you can easily model a screw. Even better, you can *animate* the transformation process and save the results as a movie. The ability to deform simple objects into complex shapes and animate the process will make it much easier to create commercials that show dancing cereal boxes, bouncing soft-drink cans, and the like.

between frames. You can interactively set keyframes for audio as well as visual reference points, which is what enables you to create such well-synchronized animations. Moreover, the EIAS lets you animate every element in a scene, including object attributes such as color, by using keyframes.

The EIAS is a powerful tool for creating broadcast-quality effects, and the new PowerPC-native version improves rendering speed by a factor of 3 to 8. However, in addition to higher-quality texture-map previews, there are several items still on our wish list, including inverse kinematics, 3-D morphing, collision detection, ray-traced shadows, and straight EPS importation to Mr. Font. Furthermore, the interface for entering parameters for the Mr. Nitro and Particle Generator plug-ins could be more intuitive.

As you'd expect from an industrial-strength tool, the EIAS comes with a prodigious appetite for system resources. The PowerPC-native version, version 2.1, requires a Power Mac 6100 or better, 32 MB of RAM, and System 7.5 or later. However, because the program's renderer achieves its impressive speed by operating entirely in RAM, you may need more than 32 MB if you frequently work with large texture maps or use features such as environment mapping or shadow casting.

The Bottom Line

Of all the 3-D-animation programs available for the Mac, the EIAS is the fastest, most powerful, and easiest to learn and use. Priced at \$7,495, it's also the most expensive by a wide margin. However, for film, video, CD-ROM, and interactive-TV developers, the high-quality effects and fast rendering speed of the EIAS make it worth every penny. / Lynda Weinman 

ElectricImage Animation System 2.1

Rating: 

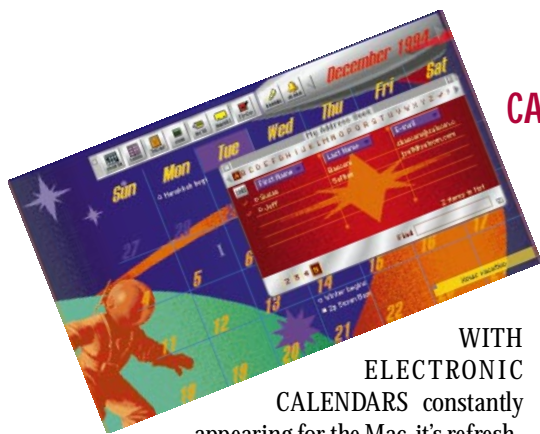
Price: \$7,495 (list).

Pros: Fast, high-quality rendering. Powerful plug-ins. Excellent control over animated elements.

Cons: Pricy. RAM-based renderer requires significant investment in memory. Limited modeling tools.

Company: Electric Image, Pasadena, CA; 818-577-1627.

Reader Service: Circle #411.



CAL and Espresso / Scheduling with style

WITH ELECTRONIC CALENDARS constantly appearing for the Mac, it's refreshing to see a couple of companies carving out unique niches in the low end of personal information management.

CAL Can Talk. CAL, from the Wallpaper folks, is a utility with a somewhat eclectic mix of modules: two calculators and two calendars. You can alter their color, background pattern, type size, and typeface.

The CALculator is a standard desktop calculator with some advanced features such as control over decimal places. Formula Editor lets you enter and edit complex equations before it solves them. Both calculators can read back your input and let you save a full audit of your entries.

The CALendar and Datebook work together as a basic calendar/scheduling system, with recurring events, banners, and alarms in a drag-and-drop interface. The

major flaw is CAL's lack of an address book.

CAL is a decent but strangely unfocused product with one claim to fame: the calculators' voice-input and -output features. CAL's voice-input capability on PlainTalk-equipped Macs might be attractive to people with movement disabilities. It needs only System 6.0.4 and 400K of RAM, a boon for low-end-Mac users. Overall, though, CAL is overpriced, and its calendar features are especially underwhelming.

Espresso — Calendars After Dark. Espresso, the latest effort from the folks who brought you the popular After Dark screen savers, offers ease of use, cross-platform compatibility, and entertainment value.

Espresso consists of four integrated modules: calendar, sticky notes, address book, and to-do list — all with support for drag-and-drop linking, recurring events, banners, and alarms. Calendars in most PIMs tend to be ho-hum, but in Espresso, you can set the window style to any of over 20 hotshot designer looks, some with animation. The FlashBack feature turns Espresso windows into your desktop pattern even when the program isn't running. You need a 256-color monitor to fully appreciate Espresso's beauty.

Espresso offers advanced features totally lacking in CAL. Most important, it has calendar synchronization for users who have desktop as well as portable machines, and it also offers calendar sharing over a mixed network of Macs and Windows PCs.

As much as we liked Espresso, version 1.0 has its share of shortcomings. Espresso adds three extensions to the System Folder, with conflicts a possible result. The program's use as a full-fledged PIM is limited: no autodial, no text wrap within the calendar, and no "smart" features (such as autoformatting and automatic field entry).

Balance Sheet. Neither CAL nor Espresso offers enough PIM punch to be seriously considered for professional use, but CAL offers a welcome alternative to the Apple Calculator DA, along with an adequate calendar/alarm system. With some fine-tuning, Espresso has the potential to become Berkeley's next best-seller — eye candy with a practical purpose. / Gregory Wasson

CAL — The Talking CALculator & CALendar ★★★ / Price: \$79.95 (list). Company: Thought I Could, New York, NY; 800-484-7103 (plus PIN code 0101) or 212-673-9724. Reader Service: Circle #412.

Espresso 1.0 ★★★½ / Price: \$69.99 (list). Company: Berkeley Systems, Berkeley, CA; 800-344-5541 or 510-549-2300. Reader Service: Circle #413.

SoundWorks by Henry Kloss / Top-notch quality, bargain price

ARE YOU STUCK in that all-too-familiar quandary: wishing you could expense a great pair of speakers but knowing that the ones officially listed as computer accessories sound like, well, computer accessories and that real hi-fi speakers are too big to hide in an office and too expensive to hide in an expense account? Take heart: SoundWorks by Henry Kloss eliminates this sticky Catch-22 once and for all.

As a desktop multimedia speaker system, SoundWorks' speakers are head and shoulders above the others we've tried. The fist-sized satellite speakers are magnetically shielded, so they can be safely placed anywhere around your Mac. There's only one control on the three components that make up the SoundWorks system: a bass knob on the subwoofer. Unlike with most other stereo systems, you don't have to adjust the bass level for each recording; you simply set the level to the acoustics of the room and then forget about it. Volume is controlled by whatever device the system is attached to, be it a computer or a Walkman. However, some may find the lack of volume control on the speaker unit itself to be a minor fault and inconvenience.

The SoundWorks speaker system appears

to have some minor weaknesses in its electrical shielding: Interference from other devices may compromise the sound. To be fair, not everyone's office is cluttered with Mac peripherals and the problem is easy to fix by plugging the SoundWorks system in to another outlet.

Superior Sound. Although the speakers sound great on your desktop, they really shine when you let them interact with an entire room. In a side-by-side comparison, it's hard to tell the difference between the SoundWorks system and a set of full-sized speakers in the same price range, except for the former's superior bass.

The system's only real shortcoming is at particularly high frequencies, which are clear but lack presence. That's not uncommon for such inexpensive speakers, and the problem was noticeable only when, for instance, we listened to opera diva Kiri Te Tanawa. Although the SoundWorks system's integrated amplifier doesn't enable you to crank up the volume to the point of pain, it has more than enough juice to fill an entire medium-sized room with sound.

/ Andy Ihnatko



SoundWorks by Henry Kloss ★★★ / Price: \$199 (list). Company: Cambridge SoundWorks, Cambridge, MA; 800-367-4434 or 617-332-5936. Reader Service: Circle #414.



Lode Runner: The Legend Returns

A blast from the past

IF YOU REMEMBER the Apple II, you undoubtedly remember Lode

Runner. The game's object was simple: collect treasure while avoiding your enemies, whose object was to turn you into a smattering of pixelated dust. Your success depended on quick thinking, nimble fingers, and a ground blaster for digging traps.

Mac Makeover. The Mac version has the same premise as the original but adds attractive graphics and an energetic soundtrack. With 150 screens, Lode Runner will entertain you as you climb, dig, fall, and run through the obstacle course of multiple levels, pits, soft and hard ground, and buried treasure. The program also has movement-inhibiting slimy muck, chain explosions, and treasure buried under multiple layers of dirt for further challenges.

After you've tired of all 150 screens, you can create your own with the terrain editor. This easy-to-use component works like a paint program, with its different parts on a palette. You simply point and click to place parts.

On the negative side, Lode Runner's full install is 11 MB, the 8-bit version is 9 MB, and the PowerBook version is over 4 MB. But otherwise, Lode Runner will provide hours of fun, without the eyestrain from a green Apple II screen. / Roman Victor Loyola

Lode Runner: The Legend Returns ★★★★★ / **Price:** \$49.95; CD-ROM, \$54.95 (list). **Company:** Sierra Online, Bellevue, WA; 800-743-7725 or 206-649-9800. **Reader Service:** Circle #415.

Rebel Assault / Star Wars interactive

REBEL ASSAULT takes place in the familiar, *Star Wars* movie universe, but it has just enough of a unique story line to keep it new. As Rookie One, a raw rebel pilot, you make your way from mercifully simple T-16 training runs on the desert planet Tatooine to a grand assault on the Death Star itself. In the 13 "chapters" of action and adventure in between, you fly a variety of ships in battles in space and on land.

Action Assault. The computer-modeled animation is fantastic. You and the familiar Imperial hardware you battle are drawn on top of prerecorded animated backgrounds. This means you can't break off an attack run on an Imperial Walker to get a closer look at the nearby rebel base, but there's enough "give" in your defined flight path to allow you to maneuver as needed.

Well-chosen selections from the movie's original sound track match the action well. The program has three levels of difficulty and a secret cheat mode, always welcome in an action game.

As you can guess, challenging the fundamental Dark Force of the Universe requires some major computing power. Although the game can credibly be played on a 16-MHz 68030 Mac (such as an LC II), Rebel Assault realistically requires a decent 68040 (such as a Quadra 605). / Andy Ihnatko



Rebel Assault 1.0 ★★★★★ / **Price:** \$49.95 (estimated street). **Company:** LucasArts Entertainment, San Rafael, CA; 800-782-7927 or 415-721-3300. **Reader Service:** Circle #416.

Practica Musica 3.1 / Learning music theory

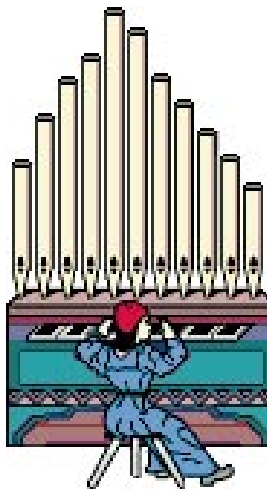
THE BEST MUSIC-EDUCATION program for the Mac, Practica Musica, now has a more colorful interface and new features that improve its usefulness in the classroom. This classic program uses a series of music games that test your ability to recognize and write pitches, intervals, scales, and chords.

This updated version has additional new rhythm exercises and includes ear-training exercises that teach you to recognize chords as well as individual notes. Teachers are likely to love the new version, because it lets them create custom exercises and lets as many as four students keep track of their scores and achievements individually on a single disk.

You interact with Practica Musica through a microphone, if you have Wildcat Canyon Software's Autoscore (see review, March '95, page 67), or a keyboard (the Mac's own typing keyboard, a musical keyboard hooked up through MIDI, or Practica Musica's on-screen musical keyboard). Practica Musica has 16 activities that teach

you music theory, from playing notes to recognizing various chord progressions by ear. Each of these activities has four levels of difficulty; a fifth level lets you customize the exercises for greater difficulty or more-specialized training. For example, you could set up your exercises to concentrate solely on the Phrygian mode in the Scales and Key Signatures activity.

Interactive Music. Like any good teacher, Practica Musica praises you and gives you more-challenging material when you master a certain exercise. Conversely, if you're struggling with a lesson, the program politely backs down and gives you easier puzzles until you're ready for more-difficult tasks. Practica Musica comes with its own textbook, *Windows on Music*, which covers the kind of material found in first-year college music-theory classes.



If you use your Macintosh to create sounds in Practica Musica, you may have problems with certain accelerator cards or with programs that use sound, such as After Dark. If you have a MIDI interface and a musical keyboard, we suggest using them with Practica Musica, because this not only gets around such problems but also gives you more-precise input.

Practica Musica 3.0 continues a tradition of music-training excellence from Ars Nova. Musicians, from amateur to professional, will discover that the applause it gives you when you successfully complete an activity is by far the program's smallest reward. / Christopher Breen

Practica Musica 3.1 ★★★★★ / **Price:** \$140 (list). **Company:** Ars Nova Software, Kirkland, WA; 800-445-4866 or 206-889-0927. **Reader Service:** Circle #417.

Arrange 2.0 / Flexibility, power, and complexity

WITH DATABASE FEATURES that let you manage your contacts, calendar, and to-do items in ways most other personal information managers can't, Arrange transcends most of its competition in power and flexibility. But these features also bloat the program and make setting up and using an Arrange database an intimidating task.

Three-in-One. Arrange's main window consists of three sections: a table of contents, a topic area, and a shelf. The table of contents lists what is in your Arrange database, including the main categories, called topics, of information, such as your schedule, your contacts, or your notes. Each individual record, called a note, in each topic appears in its topic area.

Unlike most other PIMs, which force you to enter information into a predefined set of fields, Arrange lets you put whatever fields you need into each note. Arrange supports nine kinds of fields, including the popular text and number fields as well as check boxes, pop-up lists, and time and date fields.



Each note can have any number of fields; for instance, to accommodate information about a particular contact, you might use a name field, a telephone field, and an e-mail field; for another contact, you might simply have a name field, an address field, and a notes field. You can create and customize fields. The shelf database generally keeps templates of notes, perhaps for an "Internet contact" note you might have created that has fields only for a name and e-mail addresses or for a "job interview" note with company name, company contact, company address, time, date, and directions.

Also, unlike other PIMs, Arrange is an object-oriented database. You can link notes to each other with more control than other PIMs give you. For example, when you enter a person's last name in an appointment note, Arrange automatically links the item to that person's record in your Contacts list, so you have instant access to your information about that person. When you update a linked note, all the information in the linked records is also updated automatically. You can fully customize the way Arrange sets up links, so it can link records based on matching information in any two fields in any note the way you prefer.

This version includes numerous interface enhancements. Most notably, Common Knowledge has expanded Arrange's calendar features, added alarms, and added tools that let you create custom forms for displaying and printing information.

If you only want to organize your schedule, contacts, and to-do items, Arrange's complexity and sophisticated tools would be overkill. But for those who have to organize and sort information that doesn't fall into the traditional fields and categories ordinary PIMs give you, Arrange is a powerful tool that lets you not only organize your schedule but also customize the way you use it. / Joseph Schorr

Arrange 2.0.1 / Price: \$349 (list). **Company:** Common Knowledge, Palo Alto, CA; 800-954-3800 or 415-325-9900. **Reader Service:** Circle #418.



Putt-Putt Goes to the Moon Preschool playmate

PARENTS SEARCHING FOR the ideal program for their preschooler should look no further than Putt-Putt Goes to the Moon. This second Putt-Putt effort, from Humongous Entertainment, finds the cute purple convertible traversing the moon for the missing parts to a rocket that will take him home to earth. Putt-Putt, with his sweet voice and big eyes, is a gentle, encouraging playmate who will charm children and adults alike.

Just as in most other games for young children, each screen hides lots of click points that trigger surprise animations. Putt-Putt's odyssey requires exploration, cooperation, and simple puzzle solving. Putt-Putt collects rocket parts by playing Alien Tag, rescuing a moon creature, and solving puzzles.

Moon Adventures. Like all other good adventure games, Putt-Putt Goes to the Moon rewards creative thinking. Additionally, even after all the rocket parts have been successfully accumulated, there's plenty of fun to be had at such silly locales as a beauty shop for aliens and the Cosmic Dust Diner.

Navigation is fairly simple in this program, although a couple of the puzzles may require some gentle help from a parent. Although the graphics are primitive, young children will nonetheless be enchanted by the lovable and delightful Putt-Putt. / Joe Holmes

Putt-Putt Goes to the Moon ⚡⚡⚡⚡ / Price: \$39.95; CD-ROM, \$44.95 (list). Company: Humongous Entertainment, Woodinville, WA; 206-485-1212. Reader Service: Circle #419.

What's the Secret? / Science made easy


PARENTS WHO WANT to give their children science basics will appreciate 3M's CD-ROM *What's the Secret?*, which is based on the Emmy Award-winning TV show *Newton's Apple*. Isaac Newton — or Newt, as he now prefers to be called — guides you to the 11 sections, or “questions,” such as Why do bears hibernate?, What makes my heart beat?, and Can you see a frog croak?



Vivid Video Clips. Each section uses teaching tools such as time lines, illustrations, and do-it-yourself science exercises to teach the basics of physics, biology, and even elementary geometry. The highlights of this CD-ROM, however, are the video clips from the TV show. For example, concepts such as inertia, centripetal force, and friction are demonstrated by a stomach-churning movie of a roller coaster.

The CD-ROM requires at least a 68030 machine, but the QuickTime movies were choppy on our IICI and the program was generally slow on anything less than a Quadra. Furthermore, *What's the Secret?* deals with only a select number of topics, so if you want a completely comprehensive, multidisciplinary guide to science, you'll want to look elsewhere. Nonetheless, *What's the Secret?* can definitely keep the curious engrossed and entertained.

/ Kristin M. Balleisen

What's the Secret? ⚡⚡⚡ / Price: \$59.95 (list). Company: 3M Learning Software, Minneapolis, MN; 800-219-9022 or 612-737-8706. Reader Service: Circle #420. 



Demo versions and QuickTime movies of selected programs mentioned here are available in the MacUser and ZiffNet/Mac areas on CompuServe and eWorld. See page 4 for instructions regarding on-line access.

Making the **INTERNET** Connection

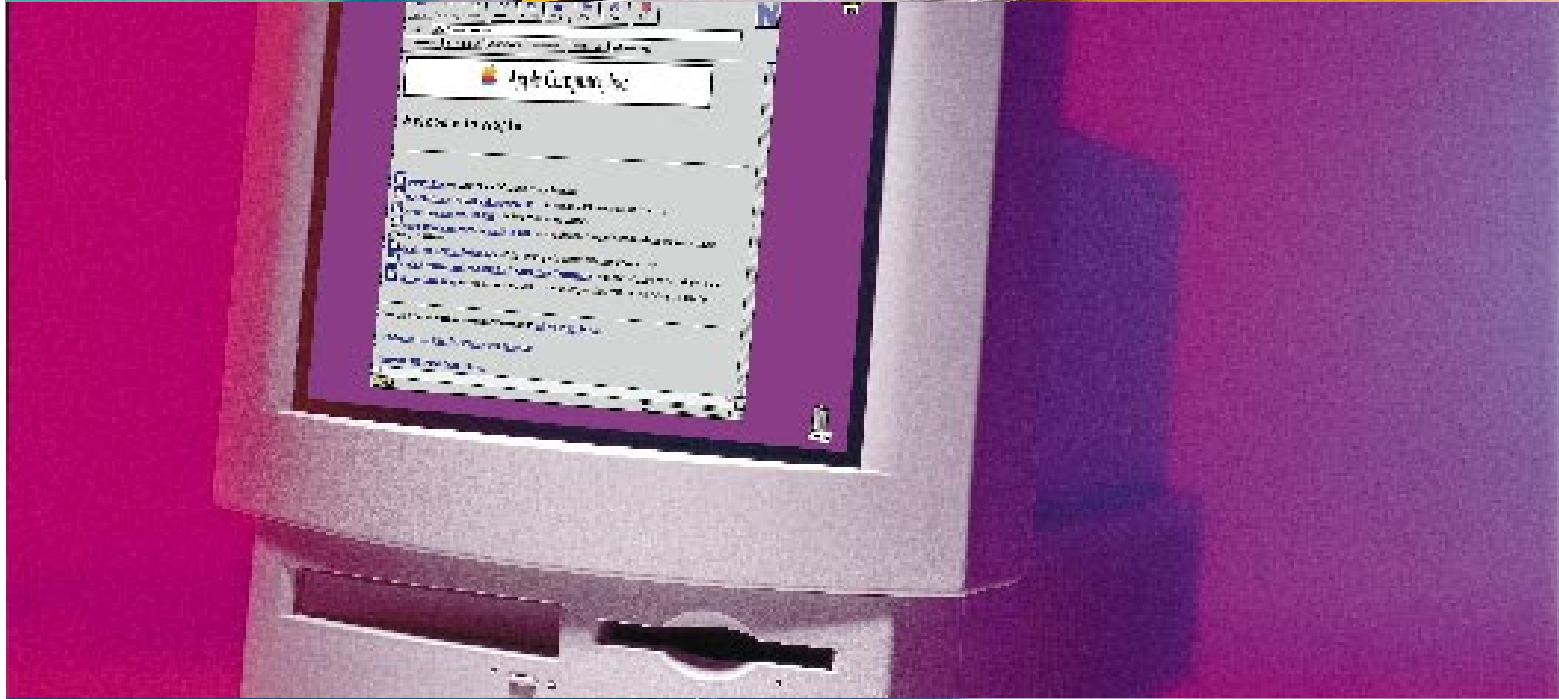
The Internet offers incredible riches — but first you have to make the right connection. Here's the rundown on the best ways to get onto the Net.

By Adam C. Engst

WHO HASN'T HEARD OF THE INTERNET?

The mass media harangue us daily with reports about its incredible size, skyrocketing growth, and utter trendiness. For the most part, however, enthusiasts ignore the challenges faced by ordinary people who try to use the Net. To most folks, the riches of this glamorous information superhighway, Infobahn, I-way — or whatever you want to call it — lurk right around the corner, tantalizing but out of reach. Easy to access? Easy to navigate? Uh, yeah — and we've got an infobridge to sell you.

Fact is, the highway's open and traffic is heavy. Now *is* the best time to get on — if you know how. If you don't get on now, you may find the pace too fast farther down the road. The problem is that there are many ways to make the jump into cyberspace — and figuring out which one is right for your particular needs is critical.



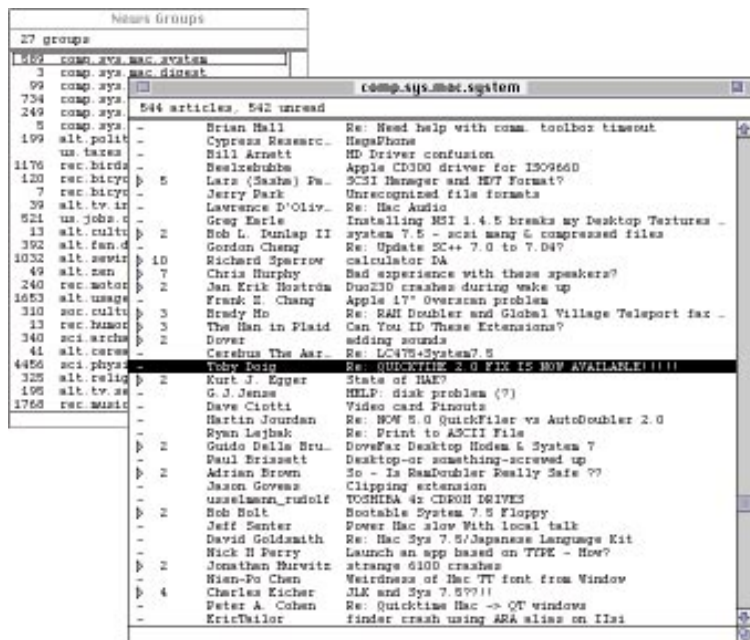


figure 1 / ▲

With more than 9,000 newsgroups on the Internet — at last count — there's no shortage of discussion on just about any topic. Using NewsWatcher (shown here), available free at <ftp://ftp.acns.nwu.edu/pub/newswatcher/> or from your friendly neighborhood user group, you can build a list of groups you want to read regularly. Mac users, for instance, might subscribe to groups in the comp.sys.mac hierarchy.

Unfortunately, there's no tech-support line for the Internet. The Net fits Gertrude Stein's famous description of Oakland, California: "There's no 'there' there." Remember, the Internet was purposely designed to have no central location, so that it could survive a nuclear attack. Seriously. The Internet isn't anywhere; it's everywhere.

Basic Communication

So what is it that attracts millions of otherwise sane people around the world to spend hours in a place that doesn't really exist? Simple: Everything that happens on the Net boils down to two things — communication and information. As our society becomes more information-driven, the importance of the Net increases.

The most basic form of communication on the Internet is *e-mail*, or *electronic mail*. It's also the lowest common denominator of being considered "on" the Internet. If you are able to send e-mail to people on the Internet and receive e-mail from them, consider

yourself part of the Internet community — if only by absentee ballot.

Discussions about specific subjects occur in two places: in *mailing lists* and in *Usenet newsgroups*. Both make it possible for large (or small) groups of people to contribute their thoughts and read the contributions of others. With about 6,000 mailing lists and more than 9,000 Usenet newsgroups — at last count — it's unlikely that any subject you could name wouldn't have some representation.

To join a particular mailing list, all you need to do is send an Internet e-mail message to the *list server* for that list, which is a software program that automates most of the mailing-list housekeeping, such as adding and deleting subscribers. The exact wording of the message you must send will vary, depending on what software is being used to manage the list. If you're not sure, you can try sending the word **help** to get instructions on how to subscribe. Often, for instance, subscribers can select a *digest* option, which collates multiple messages into a single document, to keep individual messages from flooding your mailbox. You can use any Internet-capable e-mail software (such as QuickMail, if your site has an Internet gateway), or any of the major on-line services to subscribe to mailing lists.

How do you find out about mailing lists? However you can. No central, completely up-to-date list of lists exists. Some books list the addresses of popular mailing lists. Other lists of mailing lists are sprinkled around the Net in places such as *World Wide Web* (WWW) pages, such as this searchable list: <http://alpha.acast.nova.edu/listserv.html>. Of course, to read Web pages, you need not only an Internet hookup but also access software such as Netscape Navigator or Mosaic.

Usenet newsgroups are a bit more organized. Usenet is a part of the Internet that is devoted to sharing messages about specific subjects. By using a specialized program such as NewsWatcher, you can read messages posted to a newsgroup or post your own messages. Traffic on popular newsgroups is quite high — some groups get hundreds of messages every day.

SAVVY CONNECTIONS / NINE QUICK TIPS FOR HOOKING UP

YOU CAN GET INTERNET ACCESS from three sources: Internet providers, on-line services, or your office network. Here are some practical tips for making each type of connection.

INTERNET PROVIDER

- 1. CHOOSE A PROVIDER WITH MAC EXPERTISE.** Ask whether tech-support personnel are familiar with Mac tools such as MacTCP, InterSLIP, and Eudora. Providers may give you this Internet-access software and store the most recent versions and support files on their UNIX machines.
- 2. LOOK FOR A FLAT MONTHLY RATE.** If you're

frequently on-line, a flat monthly fee can save you lots of money over using hourly-rate services. Flat-rate providers are getting harder to find. Snap this kind of account up if you find one.

- 3. FIND USEFUL SCRIPTS.** It's sometimes necessary to modify a log-on script to get Eudora to work with an Internet account. Look in your provider's Mac-support directory for a Eudora script that supports your provider's system. Just drop it into the Eudora folder on your Mac.

ON-LINE SERVICE

- 4. IF YOU PLAN TO USE E-MAIL EXTENSIVELY,** make

sure your service does not charge for messages sent and received via the Internet. CompuServe, for example, charges 10 cents for each Internet message received; America Online, eWorld, and Delphi don't charge at all. If you subscribe to mailing lists via CompuServe, find out whether each list has a digest option, which combines messages submitted over the course of a day or two into one large message.

- 5. GET HELP.** Most on-line services provide their own Internet support forums for new users, which are often identified as "newbie" forums. Don't hesitate to use these message boards and

Sign-up scenario:

THE SALES REP

Services desired:

E-MAIL, NEWSGROUPS

Suggested provider:

WORLDLINK

Estimated monthly cost:

\$29

Trudy, a sales rep for a large manufacturer of widgets, wants to use e-mail to communicate with clients and coworkers during her many business trips. She is also interested in retrieving newsgroup discussions that relate to widgets, and she wants a couple of recreational newsgroups to read on her PowerBook 160 during those long hours on the plane.

Even though America Online and CompuServe both offer Internet e-mail and news, neither is ideal. Cutting costs is important in the highly competitive widget business, which eliminates CompuServe's heavily surcharged 800 number from consideration. America Online also has access numbers around the country, but perhaps the best approach is to use

WorldLink, a \$30 program from Internet developer InterCon Systems (sales@intercon.com) that's linked with an account from widespread Internet provider PSI (all-info@psi.com).

WorldLink is limited to e-mail and news (and limited support for ftp via e-mail) but carries with it numerous access numbers from around the world. It also works off-line, so Trudy can retrieve all her e-mail and news and read it on the plane or in her hotel room without being connected. WorldLink's interface is excellent and offers some filtering to help Trudy manage large numbers of messages. Even better, WorldLink has a flat rate of \$29 per month no matter how much data (well, under 50 MB) Trudy retrieves.

Sign-up scenario:

THE CONSULTANT

Services desired:

E-MAIL,
NEWSGROUPS,
MAILING LISTS, FTP
AND GOPHER SITES,
WORLD WIDE WEB

Suggested provider:

LOCAL SLIP/PPP
PROVIDER

Estimated monthly cost:

\$30

Based in Chicago, Harold is a classic Mac consultant, from his PowerBook 540c to the "Pentium Happens" bumper sticker on his Miata. Although Harold does a fair amount of general Mac consulting, he's found that doing disk recovery and giving basic Mac lessons have paled for him recently. He's decided to move more into 4th Dimension database development while retaining his longtime clients.

For them, he needs to have access to the latest system updates that Apple releases, and he wants to follow some of the general Mac discussions that pass through Internet mailing lists and the burgeoning comp.sys.mac hierarchy of newsgroups, including comp.sys.mac.databases.

For his new specialty of 4th Dimension development, Harold wants to get involved with a 4D-specific mailing list (he could send e-mail to majordomo@isig.mit.edu with the words `subscribe 4d` in the body of the message) and wants to be able to download files from the Info-Mac Archive's directory of 4D files at (to name one site) ftp://

ftp.hawaii.edu/mirrors/info-mac/Development/a4d/.

Although America Online might barely meet Harold's needs, it's not a great source for the latest Apple updates. And at 14.4 kbps, it could get expensive to download the latest version of LaserWriter 8, for instance, which is also readily available at Apple's big Internet ftp site, at ftp.support.apple.com. Harold also expects to use e-mail and newsgroups heavily, but like all consultants who bill by the hour, he can't afford to spend unnecessary time on unbillable research.

The right approach for Harold is to get a full SLIP or PPP account with a local Internet provider, and in a major metropolis such as Chicago, he'll have no trouble finding one in the \$30-per-month range that will provide all the time he can use. Freeware and shareware MacTCP-based applications such as Eudora, Anarchie, Netscape Navigator, and NewsWatcher provide the easy-to-use interfaces Harold appreciates and the power and speed he needs.

Sign-up scenario:

THE TEACHER

Services desired:

E-MAIL,
NEWSGROUPS,
MAILING LISTS, FTP
AND GOPHER SITES

Suggested provider:

AMERICA ONLINE

Estimated monthly cost:

\$30

Jerry is a high-school teacher in a rural town. He'd love full Internet access for finding information about his subject, biology, not to mention e-mail and appropriate discussion groups. Unfortunately, living where he does, the only local access number is for SprintNet, which enables him to call America Online and eWorld.

In Jerry's case, eWorld simply won't cut it, because eWorld limits him to participating in Internet mailing lists and chops messages into 7K chunks. America Online, on the other hand, would give Jerry easy access to all the biology- and teaching-related mailing lists and newsgroups such as the bionet hierarchy. Even better, Jerry can use ftp, gopher, and WAIS (Wide

Area Information Servers) via America Online to search for files and information related to whatever topics he's covering in class, such as classic drosophila (fruit fly) genetics experiments.

Since the World Wide Web is the graphical-publishing method of choice for Internet projects, Jerry would, in an ideal world, use the Web to search for this information at sites such as the Carthew Drosophila Lab at http://flies3.bio.pitt.edu. But until America Online provides World Wide Web access, the service's limitations are offset for Jerry by the more reasonable rates that result from the availability of local access numbers.

conference areas to ask questions. That's what they're for, and you will usually find people who are more open to questions than the folks who frequent Usenet groups such as comp.sys.mac.comm.

6. WATCH YOUR SPEED. Because on-line services get their newsgroups, ftp sites, and gopher feeds through gateways, and because these services often don't support the high modem-data-transmission rates that most Internet providers do, your transfers and searches will take longer than comparable transactions with a direct Internet connection. Stay away from

newsgroups with hundreds of new messages each day, and note the file size *before* you begin an ftp session.

NETWORK ACCESS

7. IN A LARGE CORPORATION OR UNIVERSITY, you may already have an IP (Internet protocol) address assigned to you. Ask your system administrator if you can reach the Internet from your Mac. The administrator can configure MacTCP and may help you with mail, news, and other services.

8. WITH AN IP ADDRESS, you may be able to use

ftp, gopher, and the World Wide Web without a mail or news-server account. All you need is a network connection, MacTCP, and access to an Internet gateway.

9. IF YOU USE QUICKMAIL, Microsoft Mail, or some other LAN mail package, you may be able to send and receive messages via an Internet mail gateway and your LAN e-mail software. Ask your system administrator about the company's policy on use of the e-mail system, however. Some companies require that you use Internet mail and other services for official business only. / Shelly Brisbin

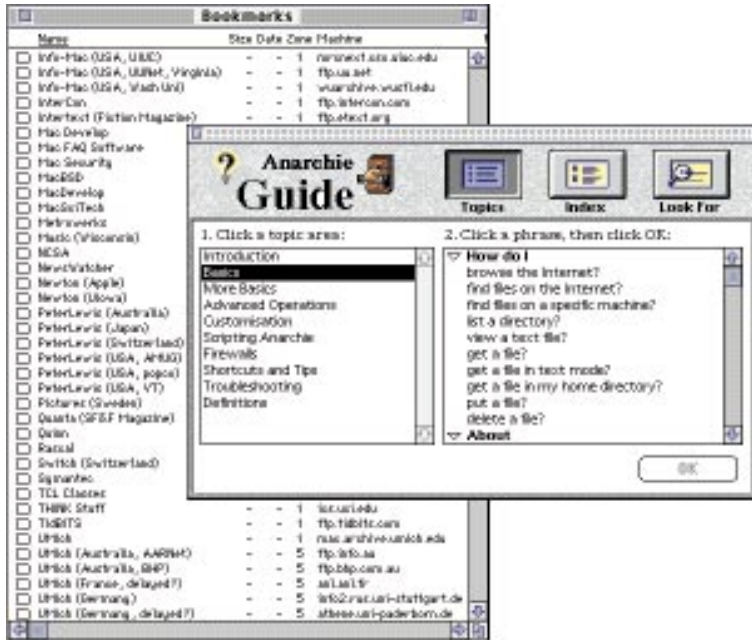


figure 2 / ▲
Ftp sites are a gold mine of useful files, utilities, images, and data. One of the best ways to access this cornucopia of information is by using Anarchie. This easy-to-use \$10 shareware program even features a thorough Apple Guide help system.

Mailing lists and newsgroups are like electronic communities you can join — and they're collectively one of the most appealing aspects of the Internet. Although commercial on-line services offer similar forums for public discussion, the much greater number of people on the Internet means that a group or list devoted to almost any conceivable subject hosts a reasonable number of interested people.

Information

The Internet also contains a phenomenal amount of archival information, much of which can be readily accessed by anyone who has the right tools. File retrieval via *file transfer protocol* (ftp) holds the title for the most data transferred on the Internet. Think of ftp simply as a method of copying files; you retrieve files from a remote Internet machine to your hard disk via ftp the

same way you copy files from a floppy to your hard disk. If you're using *Anarchie*, one of the best ftp programs (and one that's available only for the Mac), downloading is as simple as dragging a file from an Anarchie window to a Finder window.

A more futuristic and graphical way to get information from the Internet is to browse the World Wide Web. Thanks to the popularity of "browsing applications" such as Mosaic and Netscape Navigator, the Web has become host to the fastest-growing traffic on the Internet. Although in many ways it seems random and chaotic, the Web contains a mind-boggling and ever increasing amount of information, which is organized by hypertext-linked screens of text and graphics called *pages*. Since Web browsers can easily access information that has been stored on *gopher* servers (an older method of publishing information on the Internet), it has become the information source of choice for millions of people.

Basic Connections

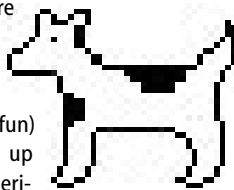
So what are the best ways to get connected? In a way, getting connected to the Internet is like getting a telephone. Your phone at your office is paid for by your company, but you might buy a phone for your home and sign up with the phone company for service. Either way, you can't do it all on your own — you need a service provider of some sort, whether it's your employer, your school, an on-line service, or a dedicated Internet-access provider.

Given a choice, most people would opt for a connection that somebody else pays for. Many (if not most) people on the Internet get access through their business or their school. Of course, if you're using a company account, you and your employer must come to an agreement on what constitutes reasonable use of the resource. Your boss may not understand why subscribing to the David Letterman Top-10 mailing list (topten-

OFF THE BEATEN TRACK / THE LIGHTER SIDE OF THE INTERNET

DAVID LETTERMAN AND CAPTAIN KIRK are as much a part of the Internet as all the business, scientific, and educational resources serious types such as Al Gore swoon over. Don't let anyone fool you — more than anything, the Internet has the potential to steal away your time as you explore some of the sites featuring less than vital (but fun) information. So you won't end up thinking that the Internet is all serious business, here are some high points of the Net's sillier side.

Apple's sense of humor has never been in doubt, but one glance at the Dogcow Nest



proves that some of Apple's best and brightest have a little too much time on their hands. Located at URL <http://www.info.apple.com/dev/dts/dogcow.html>, the Dogcow Nest is a Web archive devoted to the mythical hybrid that lives in the Page Setup dialog box. Included are technical notes covering the genesis of the dogcow (whose name is Clarus — sound familiar?) and even a link to the dogcow's call — "Moof," of course. **Seeing how much coffee is currently**

in a coffeepot in Cambridge, England, may be a fun technology demonstration (see <http://www.cl.cam.ac.uk/coffee/coffee.html>), but it's not very exciting. More interesting is checking out a live picture of an aquarium teeming with fish at the office of Netscape Communications, the makers of Netscape Navigator. To meet the cast of fishy characters, go to <http://www.netscape.com/fishcam/fishcam.html>.



If you don't watch enough television, you can now *read* about television on your Mac. The electronic publication Late Show

Sign-up scenario:
THE PARENTS

Services desired:
E-MAIL

Suggested provider:
AMERICA ONLINE

Estimated monthly cost:
\$9

Deborah and John have a simple — and typical — need: They want to communicate inexpensively via e-mail with their daughter, who attends a small college several thousand miles from home. Like many colleges and universities, their daughter's school provides a free Internet account and a computer for each student.

Deborah and John have a Performa 400 with a 2,400-bps modem — the Macintosh they bought for their daughter to use in high school. They're not particularly interested in

participating in discussion groups or browsing for information, so the best choice for them is probably eWorld or America Online. Each service offers software that is easy to set up and use, and unlike CompuServe, neither eWorld nor America Online charges extra for Internet e-mail. America Online's primary advantage over eWorld in this specific instance is that America Online splits up long Internet messages into 24K segments, as opposed to eWorld's smaller — and more irritating — 7K chunks.

Sign-up scenario:
THE FREE-LANCE WRITER

Services desired:
**E-MAIL,
NEWSGROUPS,
MAILING LISTS, FTP
AND GOPHER SITES,
WORLD WIDE WEB**

Suggested provider:
**LOCAL SLIP/PPP
PROVIDER**

Estimated monthly cost:
\$50

For Nancy, a free-lance writer who writes about science for leading magazines and newspapers, Internet access poses some difficulty. Nancy needs Internet access for databases of information and for discussion groups, both of which will help her research articles and track public opinion. At the same time, however, she must be able to share files with her editors at the various publications.

For external communications, publications use a variety of commercial on-line services, ranging from MCI Mail to AppleLink to CompuServe to America Online to Prodigy, so no matter what sort of Internet access Nancy gets, she'll need accounts on many of the major commercial services as well. Why? File transfer between the Internet and the commercial services (and thus among the commercial services as well, since they generally use the Internet as a transmission

vector) is a hassle. Sending plain text works fine, but with a binary file such as a formatted Microsoft Word file, problems can occur due to the size of the file and the fact that BinHex encoding, necessary for the transmission of binary files via e-mail, doesn't always work perfectly via the gateways to the commercial services. Simply put, file attachments work badly between the commercial services and the Internet.

But could one of the commercial services where Nancy already has accounts suffice for Internet access? If money were tight — as it often is for free-lancers — America Online might suffice, given its support for e-mail, news, ftp, gopher, and WAIS. However, since vast quantities of Internet information appear solely on the World Wide Web, full Internet access via SLIP or PPP would currently be ideal for Nancy's research.

Sign-up scenario:
THE SMALL-BUSINESS PERSON

Services desired:
**E-MAIL,
NEWSGROUPS,
MAILING LISTS, FTP
AND GOPHER SITES,
WORLD WIDE WEB**

Suggested provider:
**"INTERNET PRESENCE"
COMPANY**

Estimated monthly cost:
\$200

Larry, the founder of MacNovelties, a small business that makes Mac-related gifts and toys such as the ever popular MacPiñata, not only wants all the standard Internet capabilities, such as e-mail, but also plans to put his catalog on-line so he can sell over the Internet.

His decision — getting a full Internet account — is quite easy, since e-mail alone won't suffice and none of the commercial services that allow on-line ordering currently make such catalogs available to the Internet, which hosts far more users — and potential customers.

Larry's bigger decision is whether he wants to hire a network consultant to help him bring in a high-speed dedicated Internet connection and an Internet server, probably running UNIX for best performance, or if he wants to contract

with one of the many companies offering *Internet presence*. These Internet-presence companies already have high-speed connections, UNIX servers, expertise in creating graphical catalogs for the World Wide Web, and experience with handling on-line ordering, but they also charge significantly for their services.

For many noncomputer companies, though, working with such an Internet-presence company is the easiest and most cost-effective approach. How can you find companies and consultants that work in this field? If you already have access to the Internet (or can get help from someone who does), you can check out this directory of consultants on the World Wide Web: <http://www.commerce.net/directories/consultants/consultants.html>.

News (available on the Usenet newsgroup alt.tv.talkshows.late) is a weekly update on the latest in late-night talk shows. If you've been catching up on your sleep, be sure to read alt.fan.letterman.top-ten to keep current on David Letterman's latest top-ten lists. If you prefer your top ten delivered personally, you can also subscribe to Late Show News by sending e-mail to listserv@clark.net with the text `subscribe topten [your name]`. *Star Trek: The Next Generation* may have vanished from the airwaves, but it still rules the net. You



can spend hours supplementing your *Star Trek: The Next Generation* viewing via a massive Web site devoted to the show, at <http://www.ugcs.caltech.edu/~werdna/sttng/>. Of course, the Internet also caters to the literary arts as much as it does to talk shows and sci-fi series. The Internet hosts its own comic strips. Try Doctor Fun at <http://sunsite.unc.edu/Dave/orNetBoy/> at <http://www.interaccess.com/netboy.html>. And true nerds will want to catch up on the latest Dilbert at <http://narnet.gnn.com/gnn/arcade/comix/graphics/dilbert.gif>.

You can't get real food and drink through your Internet link, but virtual snacks are less trouble. Zima, that perplexing adult beverage, is on the Web, at <http://zima.com/>, as is Pizza Hut, at <http://www.pizzahut.com/>. Finally, if you find yourself asking, "With all that's available on-line, why go out into the real world?" there's only one place left to go: <http://oucsace.cs.ohiou.edu/personal/rbarrett.html>. It's a Web page called Webaholics Anonymous. / Jason Snell





figure 3 / ▲
The World Wide Web is growing faster than any other part of the Internet, thanks to its easy-to-use graphical interface and hypertext links. The Web is accessible by browser applications such as Netscape Navigator, from Netscape Communications, or NCSA Mosaic (freeware), shown here. You can access any Web page (the one shown here is *MacUser's*) by entering its *URL address* when prompted by the browser application. When viewing a page, you can navigate to other pages by simply clicking on underlined hypertext links.

request@clark.net) is essential to performing your job. (Try telling your boss that the Top-10 list *must* be important — it has more than 31,000 subscribers.)

If you want the unrestrained freedom of your *own* Internet account, the first, and often easiest, option is to work with a commercial on-line information service such as America Online, eWorld, CompuServe, or Delphi. These services have local access numbers throughout the country, reasonable rates, and varying levels of Internet access. Local or user-group bulletin-board systems may also provide a similar level of

Internet access, often for even less money.

For most people, however, it's easier — and, depending on the amount of usage, possibly less expensive — to obtain full Internet access by signing up for an account with a dedicated Internet-access provider. These accounts enable you to use several powerful Internet programs if your Mac is equipped with a control panel from Apple called MacTCP and either *SLIP* (serial-line interface protocol) or *PPP* (point-to-point protocol) software, which is available on-line and from user groups. Unfortunately, this sort of access is still somewhat limited outside metropolitan areas and can be expensive in some parts of the country. (For more on finding a dedicated Internet-access provider, see "Shopping for Internet Access," December '94, page 133 or ask an Internet-savvy friend to check <http://www.teleport.com/~cci/directories/pocia/pocia.html> for a list of providers around the world.)

Construction Ahead

One thing you can say for certain about the Internet is that it will keep growing and that, for the short term anyway, the number of ways to access it will only become more varied — or more confusing, if you prefer. Commercial on-line services, for example, continually one-up each other by announcing plans to expand Internet access. America Online claims that its World Wide Web browser will be available in early 1995, and Internet latecomer Prodigy topped that by announcing that its Web browser would appear in late January. CompuServe and Apple's eWorld have each recently lowered rates. eWorld also announced plans to add Internet services, presumably up to the level of America Online, on whose software eWorld is based.

System-software vendors such as Microsoft and

INTERNET PROVIDERS / THE NET IS A PHONE CALL AWAY

INTERNET SERVICE PROVIDERS OFFER you access to your account via a local telephone number, saving you long-distance charges. Some providers offer regional and/or national access, via local numbers in several area codes. Here is an abbreviated list of providers. The phone numbers are for

voice access, not dial-up. This list is not complete, and a mention here does not constitute a recommendation by *MacUser*.

For a more comprehensive listing of service providers, refer to the PDIAL or Nixpub lists, available on ZiffNet/Mac and other on-line services.

ON-LINE SERVICES:
America Online
 800-827-6364
CompuServe
 800-848-8199
Delphi
 800-695-4005
eWorld
 800-775-4556

SLIP/PPP SERVICE PROVIDERS:
NATIONWIDE
HoloNet
 510-704-0160
Internet Express
 800-592-1240
John von Neumann Computer Network
 800-358-4437

Netcom Online Communications Services
 800-501-8649
Performance Systems International (PSI)
 800-827-7482

EAST
Agate Internet Services
 207-947-8248
BBN Internet Services
 617-873-8730
Capcon Library Networks
 202-331-5771

Clark Internet Services
 410-995-0691
Digital Express Group
 301-220-2020
Echo Communications
 212-255-3839
FishNet
 610-337-9994

Sign-up scenario:

THE ENTREPRENEURS

Services desired:

E-MAIL, USENET GROUPS, MAILING LISTS, LARGE-FILE TRANSFERS

Suggested provider:

LOCAL SLIP/PPP PROVIDER

Estimated monthly cost:

\$50

After Robert got his business degree from Columbia University, he decided to go into the vacation-planning business, specializing in bicycle trips to his native Scotland. Leading them was easy, since he knew the area, but arranging everything from the States proved difficult until he brought his cousin Michael in as a partner. Robert handled all the business in the U.S. and led the trips, and Michael made hotel and restaurant arrangements in Scotland. Naturally, the cousins wanted some way to cut the high cost of international communication. Internet e-mail seemed to be the answer, since Michael could get an Internet account for 10 pounds per month in Scotland, and Robert could easily get Internet access in New York City. The question was, What was the best

way? America Online and CompuServe each provide reasonably cheap Internet e-mail, but Robert thought he'd possibly be sending large files to and from Scotland as he and Michael worked on brochures and whatnot, and neither CompuServe nor AOL can easily send files, particularly large ones, to the Internet.

So a SLIP or PPP account with one of the various New York providers makes the most sense for Robert, even though it may be a little more expensive initially. In addition, participation in the numerous discussion groups about locations such as Scotland, about biking, and about travel in general may serve as a way to gently spread the word about the cousins' vacation-planning services.

Sign-up scenario:

THE SHUT-IN

Services desired:

E-MAIL, NEWSGROUPS

Suggested provider:

AMERICA ONLINE

Estimated monthly cost:

\$9 MINIMUM

Three days before her 14th birthday, Melinda zipped when she should have zagged while sledding down a steep hill and suffered multiple fractures in both legs and her pelvis. Being laid up is bad enough for anyone, but spending months in bed is murder on a kid. To give Melinda something to do other than watch TV after she finished her homework, Melinda's parents figured they would get her a PowerBook and Internet access as a birthday present, so she could participate in discussion groups and chat on-line with other people during her months of convalescence. They weren't


too worried about the cost, but they wanted it to be as easy as possible to use, preferably with tech support. For them America Online offers the best combination of price, ease of use, and Internet services, most notably access to the k12 hierarchy of Usenet newsgroups, dedicated specifically to kids.

A word of caution, though: Parents are well advised to supervise Internet use by children such as Melinda. Even when accessed through an on-line service such as America Online, many parts of the Internet are unsuitable for minors.

Apple have announced their intention to build Internet tools in to new operating systems, and IBM has already built tools in to its OS/2 Warp operating system.

Some regional phone companies have finally started providing inexpensive ISDN (Integrated Services Digital Network) access for users in certain parts of the country, thus enabling snappier Internet access. Despite a higher entry cost, ISDN provides speeds four or eight times as fast as those of a standard 14.4-kbps modem, significantly smoothing the process of browsing through the increasingly graphical Internet (see

"ISDN: The Promise and the Pitfalls" on page 105 of this issue).

For now, however, it's still a wide-open electronic frontier, and smart travelers will figure out exactly where they want to go and how best to get there before they set out. Those who do will find the Internet to be a resource of incalculable worth. 

Adam C. Engst is the author of *Internet Starter Kit for Macintosh, Second Edition* and the editor of TidBITS, an electronic newsletter that reports on products and events of interest to Mac users (info@tidbits.com).



For more information about MacUser's presence on the Internet, send e-mail to faq@macuser.ziff.com.

MV Communications
603-429-2223

PSI Net Pipeline
212-267-3636

MIDWEST

CICNet BBB
313-998-6703

InterAccess
800-967-1580

Macro Computer Solutions
312-248-8649

Msen
313-998-4562

Prairienet Freenet of East Central Illinois
217-244-1962

StarNet Communications
612-941-9177

XNet Information Services
708-983-6064

SOUTH

The Black Box
713-480-2685

CyberGate
305-428-4283

Global Access VNet
704-334-3282

Internet Atlanta
404-410-9000

Nuance Network Services
205-533-4296

RealTime Communications
512-451-0046

Telelink
615-321-9100

Texas Metronet
214-705-2900

WEST

Colorado SuperNet
303-273-3471

Cooperative Library Agency for Systems and Services
800-488-4559

CTS Network Services
619-637-3637

Eskimo North
206-367-7457

Hawaii OnLine
808-533-6981

Internet Direct
602-274-0100

Portal Communications
408-973-9111

Teleport
503-223-4245

West Coast Online
707-586-3060

CANADA

HookUp Communications
905-847-8000

UUNET Canada
416-368-6621

UUNorth
416-225-8649

The *Cheaper* Sharper *^* Image

Don't settle for a small screen when you can get a large one without breaking your budget.

By Jim Shatz-Akin

TIME IS MONEY. Nobody knows that better than businesspeople. That's why they want to spend their eight hours a day analyzing financial spreadsheets, corresponding with clients, and preparing sales presentations. The only problem is that the monitor on which they view the applications they're using may be hampering productivity. Time spent completing monitor setup, fiddling with controls, getting rid of monitor-induced headaches, or dealing with repairs takes a slice out of the day. Proper care in the selection of a monitor can save time (and money) later on.

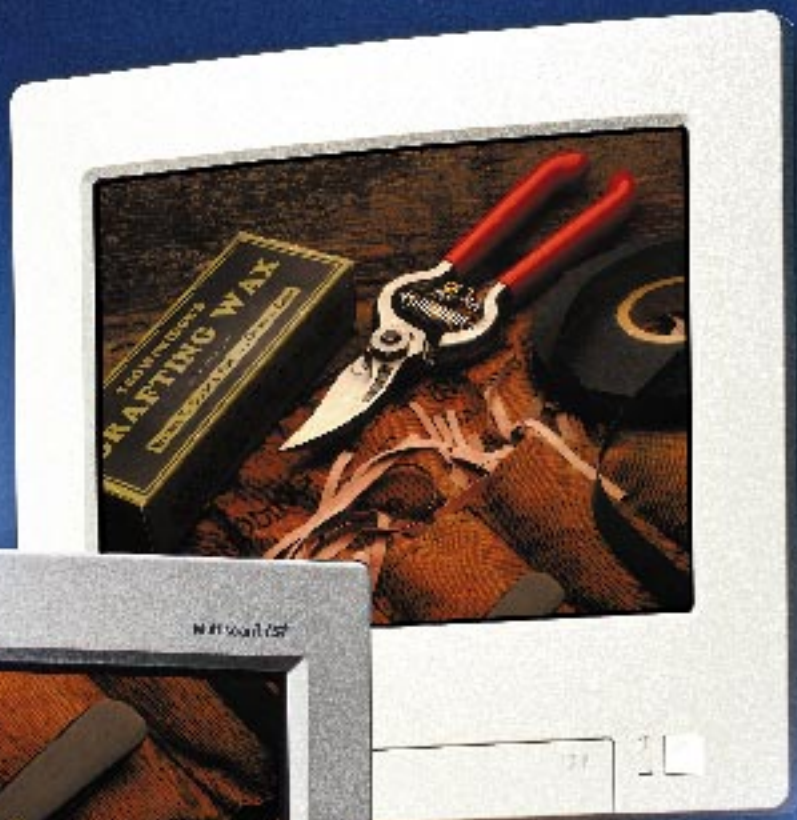
A business monitor should combine several characteristics: good image quality, intuitive controls, dependable customer service from the vendor, and a low price. To these requirements, we add a large screen area. Large display systems offer business users advantages such as room for juggling windows and built-in resolution switching. Consequently, 17-inch monitors are beginning to replace 13-inch monitors as the standard business display systems, especially as prices drop. Many 17-inch monitors now cost less than \$1,000, making them affordable for any office.

To help you sort through the competitive market of 17-inch monitors, we tested 28, chosen by vendors as the best in their product line for business use. All those we tested can provide a resolution of 832 x 624 pixels at a 75-Hz refresh rate (fast enough to prevent flicker). In addition, all can work at lower and higher resolutions, giving Macintosh users more flexibility than ever in how they view images.

Why Bigger Is Better

A big advantage of 17-inch monitors over smaller ones is that you have more room to maneuver. A 17-inch monitor gives you at least 50 percent more image area than the 14-inch variety. On a large display, business applications, tool bars, and palettes can remain open alongside an e-mail program and perhaps a group calendar. Instant access to these windows can increase your efficiency.

Another chief advantage of 17-inch monitors is that they can truly take advantage of being able to display multiple resolutions. Compared to 14-inch monitors, on which resolutions higher than the Mac-standard 640 x 480 pixels can produce text too tiny to read,



all the 17-inch monitors we tested can display 640 x 480 pixels, 832 x 624 pixels, and 1,024 x 768 pixels, at a 75-Hz refresh rate. Some can display even higher resolutions too.

Like all other multiresolution monitors, these 17-inch monitors work with either a Mac or a PC. The monitor's display capabilities

depend on the Mac's ability to send the proper video signals. All Macs that have video out support the standard Mac resolution of 640 x 480 pixels. The LC III, the PowerBook 100 series with video out, and the Duo Dock also support an 832-x-624 resolution. The Quadra, Performa, and LC 630 support these resolutions plus 1,024 x 768 pixels. The LC, Quadra, and Power Mac lines and PowerBooks with video out allow resolutions of up to 1,152 x 870 pixels.

A resolution of 832 x 624 pixels is standard for a 17-inch Mac display, because it offers WYSIWYG (what you see is what you get) screen images. Type and graphics appear at the same size on-screen as when printed. Generally, this is the best resolution for everyday tasks. It provides enough room to keep several windows open simultaneously, and type is large enough to read easily.

Nevertheless, it's sometimes handy to switch to a higher or a lower resolution. The lower, 640-x-480-pixel, resolution is standard for Mac 13- and 14-inch monitors. On a 17-inch monitor, this lower resolution is useful for creating presentations to be viewed on a smaller screen — you see what your audience will see. When you deliver a presentation, a resolution of 640 x 480 pixels on a 17-inch screen appears to magnify the image, so it's easier for a group to see. Also, most reference, instruction, and entertainment CD-ROMs are intended for viewing at 640 x 480 pixels.

Higher resolutions are useful for viewing documents that have large areas — for business users, this usually means spreadsheets. Switching to a resolution of 1,152 x 870 pixels, for example, lets you literally see the big picture and minimizes tedious scrolling across large documents, because you see a two-page spread all at once. Just be aware that the spreadsheet cells (and the numbers they contain) will be smaller and tougher to read than at a lower resolution. Several of the monitors we evaluated support resolutions as high as 1,600 x 1,200 pixels, which may appeal to users doing CAD (computer-aided design) or photo retouching, but this resolution is overkill for business use. Also, to get this extrahigh resolution, you need a special, expensive video card.

Note that as the resolution increases, your Mac's or your video card's ability to represent various shades of color decreases. All currently shipping Macs that have video out support a 17-inch monitor displaying 256 colors, which is adequate for most business documents — such as bullet-chart presentations, graphs, and charts — and for most multimedia CD-ROMs. If you need thousands or millions of colors at a resolution of 832 x 624 pixels, you may need to get an additional video card or a VRAM upgrade for your Mac.

Image Is Everything

The primary consideration in evaluating any monitor is image quality: If the image is blurry, distorted, or dim, looking at it for extended periods will be difficult — and potentially painful. To evaluate image quality objectively, we used two pieces of sophisticated lab equipment to conduct a variety of tests. We used a Microvision SpotSeeker III spot meter to test focus, sharpness, and distortion, and we used a Minolta Color Analyzer CA-100 to evaluate brightness and uniformity (see figure 2 for our results).

Focus. Without good focus, you can't get crisp text and spreadsheet lines. To evaluate focus, we performed an MTF (modulation transfer function) test, which measures the contrast of adjacent single-pixel-wide black and white lines. The screen image appears fuzzy

The Bottom Line

MacUser ZD LABS MONITORS WHOSE IMAGES LOOK GOOD and that offer well-designed controls were the Holy Grails we sought for this report. We rigorously tested each monitor to judge its most important characteristic: image quality. We also scrutinized ease of use and customer service, and for those of you who drive a hard bargain, we compared estimated street prices.

- ⊕ = OUTSTANDING
- = ACCEPTABLE
- ⊖ = POOR

- PRICE/PERFORMANCE
- CUSTOMER SERVICE
- IMAGE QUALITY
- EASE OF USE

★★★★½ **Sony Multiscan 17sf** ● ⊕ ⊕ ●
Excellent image quality and customer service, simple yet effective controls, and a reasonable price (\$999 list, \$895 estimated street) put the Multiscan 17sf at the head of the pack.

★★★★ **NEC MultiSync XE17** ● ● ● ⊕
Animated on-screen controls that are a delight to use make the MultiSync XE17 (\$1,020 estimated street) stand out from the rest. The monitor provides solid image quality as well.

★★★★	CTX 1785GM	●	●	⊕	●
★★★★	Nanao FlexScan T2-17	⊖	⊕	⊕	●
★★★★	Orchestra Tuba	⊕	●	●	●
★★★★	Panasonic				
★★★★	PanaSync/Pro C-1792P	●	●	⊕	●
★★★★	Radius PrecisionColor Display/17	⊖	●	⊕	⊕
★★★★	Samsung SyncMaster 17GLs	●	●	⊕	●
★★★★	ViewSonic 17	●	●	⊕	●
★★★★½	IBM 17P	⊖	●	⊕	●
★★★★½	Ikegami CF-17A	●	●	●	●
★★★★½	Mag MXP17F	●	●	●	●
★★★★½	Mirror ProView 17"	●	●	●	●
★★★★½	Mitsubishi Diamond Scan 17FS	●	●	●	●
★★★★½	Nokia Multigraph 447X	●	●	●	●
★★★★½	Optquest 4000TC	●	●	●	●
★★★★½	Philips Brilliance 1720	●	●	●	●
★★★★½	Sceptre CC-617GL+	⊕	●	⊖	●
★★★★½	Tatung CM17MKR	●	●	●	●
★★★★	ADI MicroScan 5EP	⊕	●	⊖	⊖
★★★★	Amdek AM/817E	●	⊖	●	●
★★★★	Apple Multiple Scan 17	●	⊖	●	●
★★★★	Goldstar 1725	⊕	⊖	⊖	●
★★★★	Iiyama VisionMaster 17	●	●	⊖	●
★★★★	Sampo AlphaScan 17g	⊕	●	⊖	⊖
★★★★	SDIS ErgoView 170	⊖	●	●	●
★★★★	Radius SuperMatch 17-T	⊖	●	●	●
★★★★½	Focus Lapis Color 17T	⊖	●	⊖	●

Listing is alphabetical within groups of equal mouse ratings.

Public Access / resolution-switching software for the masses

IT'S FREE, AND IT'S EASY. Display Manager, Apple's resolution-switching software, comes with System 7.5 and with every Apple monitor. Better yet, it's free from Apple's on-line forums.

An expanded version of the Monitors control panel that works in conjunction with extensions called Display Enablers, Display Manager lets you switch resolutions without restarting your Mac. Using it is as easy as opening the Monitors control panel, clicking on the Options button, and selecting a new resolution.

Display Manager works with all currently shipping Macs and Power Macs and with PowerBooks that have built-in video-out capabilities. It

also works with all Quadras, Centrises, and LC 400- and II-series machines that have video cards supporting resolutions higher than 640 x 480 pixels. If you have a third-party video card, check with the vendor to see if resolution switching works with the card.

Any multisynchronous monitor that supports standard Mac resolutions (such as those we reviewed) is compatible with Display Manager. To set up your system, you must attach an appropriate adapter, such as the Liberty Adapter (\$39.95), from Enhance (408-293-2425), to your Mac. You'll need to adjust the adapter's DIP switches as instructed for your Mac in order to get resolutions from 640 x 480 to 1,024 x 768 pixels.



1,024 x 768 PIXELS



640 x 480 PIXELS

Switch from the long

view to close up with Apple Display Manager's on-the-fly resolution-switching software. With each application you use, pick a resolution that gives you the best perspective on your work.

on monitors that have MTF values of less than 50 percent. All except the Iiyama VisionMaster 17 and the Sceptre CC-617GL+ made the grade, and even they only narrowly missed the cutoff. The top honors were shared by the Panasonic PanaSync/Pro C-1792P and the Nanao FlexScan T2•17.

Sharpness. Like focus, sharpness affects the crispness of images. A test for lack of sharpness, or misconvergence, measures misalignment of the electron beams that project onto the inside of your monitor's screen. These beams cause minuscule red, green, and blue phosphor dots to glow on the screen to create a picture. The effects of misconvergence — a colored "halo" at the edges of images — can be reduced with convergence controls. All the monitors we tested scored within our acceptable range of 0 to .2 millimeters. Ten monitors scored .1 millimeter or less, which is outstanding. The top scores went to the Sony Multiscan 17sf, the IBM 17P, and the Samsung SyncMaster 17GLs.

Distortion. A form of distortion called pincushioning manifests itself at the sides of the screen image by the inward or outward bowing of vertical lines, such as those in a spreadsheet. Nearly all the monitors we tested let you make adjustments for pincushioning. You'll want these controls, because distortion can vary after you switch resolutions and the problem tends to worsen as a monitor ages. In the bloom of youth, every monitor we tested had imperceptible pincushioning, well below the 25 mils (thousandths of an inch) we set as an acceptable level. On the heels of the Sampo AlphaScan 17g, which had the least distortion, at 8.13 mils, were the Optiquest 4000TC and the Mirror ProView 17".

Brightness. The greatest light a monitor can emit without losing focus is defined as brightness, or luminance, which is measured in units called footlamberts. A luminance of 25 footlamberts or more is ample for most work environments. But "extra" brightness is desirable to counteract natural dimming, which comes with age.

Having a reserve of luminance means that you can increase brightness as needed, thereby prolonging a monitor's useful life. Three-quarters of the monitors we tested were sufficiently bright, and the top-scoring Panasonic PanaSync/Pro C-1792P, Nanao FlexScan T2•17, and Nokia Multigraph 447X had brightness to spare.

Uniformity. Uniformity is the evenness of brightness across the screen. Nonuniform brightness can make the screen appear dirty or can distort colors. We tested each screen for variations in uniformity by measuring luminance at nine points. An average variation in uniformity of less than 10 percent is unnoticeable, and every monitor we tested fell satisfactorily below that mark. The best performers in this test, the Sony Multiscan 17sf and the Apple Multiple Scan 17, varied from perfection by 3 percent.

The Picture's Improving

In recent years, great strides have been made in image quality, particularly with larger monitors. Most of the monitors we evaluated met or exceeded our guidelines for good or acceptable performance in our tests, which means that their image quality is sufficient for most office situations. Honors for the best overall image quality went to the Sony Multiscan 17sf. Other top performers included the Panasonic PanaSync/Pro C-1792P, the Nanao FlexScan T2•17, and the CTX 1785GM. At the opposite end of the scale, the Sceptre CC-617GL+, the Focus Lapis Color 17T, and the Goldstar 1725 exhibited the poorest image quality, but even these monitors did not fall far below our standards.

Bear in mind that although our tests give an idea of the relative image quality of the displays, sometimes monitors of the same make and model vary widely. When possible, inspect each monitor you plan to purchase *before* you pay for it. Get a money-back guarantee, and if the monitor is subpar after your best efforts to adjust it, send it back for a replacement. To help you judge your monitor's

figure 1

Convenient Controls / well-designed controls enhance monitors

Controls are the real differentiator among the monitors we tested. Trust us; we spent a lot of time adjusting monitors, and we know good controls from bad.

1 Adjustments are easy and even educational with NEC's on-screen controls. Animated thumbnails illustrate how each control affects the monitor's image.

2 Pared down and clearly marked, IBM's digital front-panel controls surpass other digital — and even some on-screen — controls for ease of use.

3 The most schizophrenic controls are those of the Mitsubishi Diamond Scan 17FS. Its digital front-panel buttons are small, must be used in complex combinations, and have no labels. These were the worst digital controls we saw during our testing. But for \$19.95, Mitsubishi will sell you its Diamond Control Software Kit **4**, which makes adjustments a snap.

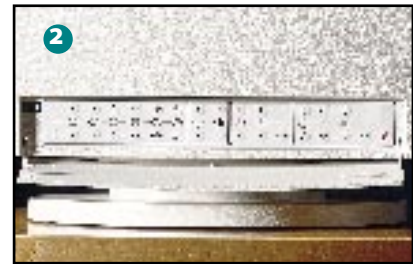
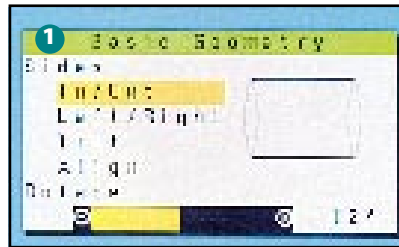


image quality — and adjust it to look its best — check out Screen Test 2.0, the monitor-testing utility developed by MacUser Labs and downloadable from ZiffNet/Mac (see end of article). You use the MacUser Screen Test to place test patterns on your screen that help you discern and correct distortion, misconvergence, and other display problems. (For more information, see “The MacUser Screen Test,” November '94, page 98.)

An Easy Adjustment

Since most of the monitors we tested have at least acceptable image quality, ease of use becomes a crucial factor in dictating what you should buy. Ease of use wasn't an issue prior to the availability of multiple-resolution switching, because after you made initial adjustments, you rarely touched the controls. For those who don't expect to switch resolutions, analog thumbwheel controls, such as those on the Sampo AlphaScan 17g, work fine.

With resolution switching, controls become more important, because you must resize and recenter the image area at each resolution. The advantage of digital controls, which operate from a microprocessor inside the monitor, is their ability to “remember” settings. After switching resolutions, push a button to reset the screen.

Whether you decide on analog or digital controls, make sure the monitor has all the adjustments you need. Every monitor we tested had brightness, contrast, and vertical and horizontal sizing and positioning settings. We suggest you look for a monitor that allows convergence and pincushion adjustments too. Additional geometry controls, such as rotation (which turns the image area clockwise or counterclockwise) and trapezoid (which controls the widths of the image area at its top and bottom) are handy but not necessary. Most business users can skip the expensive, advanced color-calibration features, which match colors on-screen to printouts. If you care about color matching, consider the Nanao FlexScan T2•17, which

ships with Colorific software. With Colorific and a set of color swatches, you set black, white, and several other colors by eye. The results are better than most offices will ever need.

Once you've settled on the controls you want, see how accessible and intuitive they are. Most digital controls work via buttons on the front of the monitor. Sounds accessible, but look closer. Small, close-set buttons can limit access to everyone except those with pencil-thin fingers. Is there one button or set of buttons for each function? Controls whose adjustment requires pressing two or more keys in combination can be a hassle for the less than dexterous. Are the icons or labels understandable? Searching through the manual to unlock the secrets of arcane symbols is not only tedious but should also be unnecessary.

Next, consider whether you want on-screen controls. You still make adjustments via the front-panel buttons, but control panels and an on-screen menu walk you through the adjustment process. The NEC MultiSync XE17 offers the best on-screen controls among the monitors we tested. It provides an easy-to-read menu you can move around the screen, and each control is accompanied by an animated thumbnail of the screen (see figure 1). The thumbnail image mimics the effects the control will have, so looking at it tells you what the *pincushion* control will do, even if you've never heard the term before.

On-screen controls are not *always* better than digital ones. The Samsung SyncMaster 17GLs, for example, has on-screen controls, but because it lacks an on-screen menu, you must press up to four front-panel buttons simultaneously to make a control window appear on-screen. Prior to that, you must consult the manual to find out which button combination to press! These annoyances negate the potential benefits of on-screen controls. Conversely, the Sony Multiscan 17sf and the IBM 17P have no on-screen controls, but each has large, intuitive front-panel buttons that are among the

finest we've seen — on-screen or off (see figure 1). To be certain a monitor's controls will suit your needs, you (or a delegation of workers from the department or workgroup that will be using the monitors) should test-drive the controls and make sure the functions you need are easily accessible.

Resolution Switching for All

A final ease-of-use consideration is how the monitor handles resolution switching. Historically, non-Apple multiresolution monitors have needed adapters to connect to the Mac and to tell the monitor which resolution to display. Each of a 17-inch monitor's Mac resolutions required a different adapter. Adapters are still necessary for connecting monitors to Macs, but the days of swapping them to switch resolutions are waning. Several monitors we tested ship with multiple-resolution adapters, such as the Liberty Cable Adapter, from Enhance Cable Technology, or the Unimac adapter, from Total Technologies. These products let you change resolutions by setting switches and restarting your Mac. Of these options, the Liberty Cable Adapter, which uses a large dial to switch settings, is easier to use than the Unimac adapter, which requires you to configure a bank of tiny, fragile DIP switches.

Far better than a universal adapter is software that "talks" to your Mac's video circuitry (or video card) and tells it which resolution to display. NEC and Radius have led the way in resolution switching. Their software (called, respectively, DPI-on-the-Fly and Radiusware) remains among the best options. Each lets you switch resolutions by choosing options from a pop-up menu you summon by pressing a key combination. The resolution changes immediately; you don't have to restart your Mac. Apple has also introduced its own resolution-switching software, called Display Manager. Like its NEC and Radius predecessors, it allows you to switch resolution without your restarting your Mac (see the "Public Access" sidebar).

Customer Support

A monitor that has a clear, bright picture and easy-to-use controls is terrific as long as it continues to function properly — but what if something goes wrong? Ideally, the vendor will be there to help, whether that means troubleshooting a problem over the phone or replacing or repairing the product under warranty. Look for at least a two-year warranty on parts, which are potentially more costly than labor, and find out at purchase time who handles warranty repairs — the dealer, the manufacturer, or an authorized repair center. Also, get a money-back guarantee to protect against rare factory lemons. A handy service that's catching on is cross-shipping. Some vendors will send you a loaner monitor the day you report a problem with a unit that's still under warranty, and they'll provide instructions on how to send the problem unit back prepaid. That kind of service minimizes office downtime.

Helpful tech support can also be invaluable. When a monitor won't start during setup or after you've upgraded your Mac, the right answer from a technician can save time and frustration. To discover the quality of tech support provided for the monitors we tested, we called the vendors anonymously and asked a series of questions concerning typical Mac-monitor problems. As in past monitor roundups, we found that several vendors were unfamiliar with the Mac and blamed problems on the Mac adapter. Many knew

Double Vision / *extend your monitor's life*

DON'T THROW AWAY THAT MONITOR you're about to replace. Hook it and your new monitor up to your Mac, and get two screens for (almost) the price of one. Use your old monitor to display application tool palettes, e-mail, and calendars and your new monitor to display your working documents.

You only extra expense will be a video card for your new monitor, unless you own one of these Power Macs: any 7100, any 8100, or the 6100 models with the optional AV card installed. These models are equipped with two video ports: a motherboard video port and one that can accommodate a VDS (Video Direct Slot) card. Because the video circuitry and the motherboard port share RAM access, your applications will slow by as much as 15 percent when you use the motherboard video port.

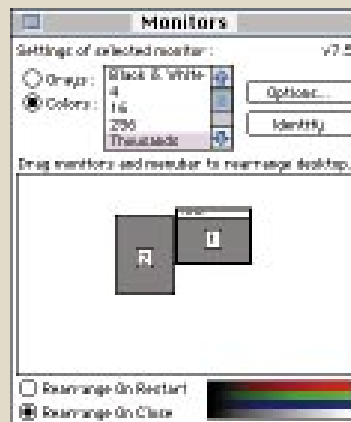
A small amount of speed is all you'll sacrifice, though. The motherboard port supports 256 colors at standard 17-inch resolution (832 x 624 pixels) as well as thousands of colors at standard 14-inch resolution (640 x 480 pixels). To use the motherboard port, you need a Power Macintosh Display Adapter, which is available from dealers for about \$30. Only the Apple AudioVision 14 Display comes standard with this connector.

For each Power Mac that has a VDS port, you have two video-card options: One supports AV capabilities, and the other doesn't. Each card does support millions of colors at standard 17-inch resolution (although you need to add extra VRAM to a Power Mac 7100/66 or 7100/80 to get millions instead of *only* thousands of colors). You don't need a special connector for a VDS card.

For all other Macs, you'll need a new video card for your new monitor. Focus Enhancements (617-938-8088) carries affordable video cards for most Macs. For \$339, you can buy a LapisColor 16 SE30, LapisColor 16 LC, or LapisColor 16 NuBus card. They all support 256 colors for resolutions as high as 1,152 x 870 pixels. With 832-x-624 resolution or lower, the cards support thousands of colors.

Just one word of caution: If you're using two monitors side by side and either screen image shakes, the monitors' magnetic fields may be interfering with each other. Move the displays a few inches from one another. If that doesn't solve the problem, you might consider getting a Jitterbox (\$495), from NoRad (310-605-0808). This handy device prevents external magnetic activity from interfering with the monitor it's protecting.

The Mac makes using multiple monitors easy and productive. Some *MacUser* editors have as many as three monitors on their desks (OK, we're spoiled). You're limited only by the number of video cards you can add to your Mac. / Jeff Pittelkau



You make final tweaks

for your dual-monitor setup in the Monitors control panel. Choose which monitor runs on which card, set bit depths, drag the menu bar to either monitor, and position the displays so the mouse moves smoothly between them.

figure 2



At a Glance / find your favorite features

The less you have to worry about installation, troubleshooting, and repair of a monitor, the better. Look for features that help you save time and avoid hassles, such as a variety of easy-to-use controls that allow you to adjust the monitor's picture. If the vendor includes a Mac cable or

adapter in the box, you'll be less frustrated when you try to set up your monitor. Toll-free tech support is also handy for any product. Try to find a parts warranty of two years or more; replacement parts are potentially your biggest expense.

	LIST PRICE	ESTIMATED STREET PRICE	DOT PITCH	APERTURE GRILL	SHADOW MASK	GEOMETRY CONTROLS	TRAPEZOID CONTROLS	CONVERGENCE CONTROLS	ROTATION CONTROLS	MAC CABLE INCLUDED
✓ Sony Multiscan 17sf	\$999	\$895	.25 mm	●		●			●	
Panasonic PanaSync/Pro C-1792P	\$1,099	\$890	.27 mm		●	●	●		●	
Nanao FlexScan T2•17	NA	\$1,270	.26 mm	●		●	●	●	●	
CTX 1785GM	\$1,049	\$810	.26 mm		●	●	●		●	
IBM 17P	\$1,260	\$1,190	.26 mm	●		●	●	●	●	
Radius PrecisionColor Display/17	\$1,299	\$1,100	.26 mm	●		●		●	●	●
ViewSonic 17	\$995	\$915	.27 mm		●	●			●	
Samsung SyncMaster 17GLs	\$949	\$885	.26 mm		●	●	●			
Apple Multiple Scan 17	\$1,069	\$970	.26 mm	●		●		●	●	●
Nokia Multigraph 447X	\$1,199	\$1,060	.25 mm	●		●	●	●	●	●*
SDIS ErgoView 170	\$1,399	\$1,170	.27 mm		●	●	●			●
Amdek AM/817E	\$839	\$810	.26 mm		●	●			●	
Philips Brilliance 1720	\$1,099	\$970	.27 mm		●	●	●			●
Mitsubishi Diamond Scan 17FS	\$1,069	\$980	.28 mm		●	●	●			
Mag MXP17F	\$1,299	\$925	.26 mm		●	●	●		●	
Radius SuperMatch 17•T	\$1,149	\$1,110	.25 mm	●		●				●
Ikegami CF-17A	\$799	\$775	.28 mm		●	●	●		●	●
Tatung CM17MKR	\$995	\$805	.26 mm		●	●				
✓ NEC MultiSync XE17	NA	\$1,020	.28 mm		●	●	●		●	●
Orchestra Tuba	\$669	\$625	.26 mm		●	●				
Mirror ProView 17"	\$899	\$899	.25 mm	●		●				●
Optquest 4000TC	\$849	\$790	.25 mm	●		●				
Sampo AlphaScan 17g	\$699	\$680	.28 mm		●	●				
Iiyama VisionMaster 17	\$799	\$785	.26 mm		●	●	●		●	
ADI MicroScan 5EP	NA	\$695	.28 mm		●	●			●	
Goldstar 1725	\$899	\$650	.28 mm		●	●	●			
Focus Lapis Color 17T	\$1,099	\$1,099	.26 mm	●		●		●		●
Sceptre CC-617GL+	\$759	\$680	.26 mm		●	●			●	

✓ MacUser RECOMMENDS

*Nokia includes an adapter for 832-x-624-pixel resolution only; call Nokia for a free multisync adapter.

so little about Mac system software that they couldn't help us switch from black-and-white to color, using the Monitors control panel.

Goldstar's tech-support was rock-bottom. In response to three separate questions, a technician who showed no apparent desire to help a Mac user told us, "This monitor is basically for the PC, so maybe the device driver or the Mac adapter has a problem. Contact Apple's tech support." Although the technician had no way of knowing it, his advice was doubly useless, because Apple's tech support is unacceptably hard to reach. We gave up on Apple's tech support after making three calls that each went unanswered after 15 minutes on hold. Tech-support kudos goes to ADI, Mirror, Nanao, Radius, and Sony, whose staff answered our calls — and our questions — promptly and cheerfully.

Easy Pickin's

The good news for prospective monitor buyers: A bumper crop of high-quality 17-inch monitors is available. Believe it or not, there's little bad news — just one caution: Although digital and on-screen controls are a good idea, implementation is inconsistent, so check

the controls carefully before purchase. And, of course, comparing prices and checking customer service is a must.

In spite of the tough competition, we did pick out a couple of favorites. Its scores on all fronts (image quality, ease of use, customer support, and price) make the Sony Multiscan 17sf an all-around winner. For NEC's thoughtful implementation of on-screen controls, we tip our hat to the NEC MultiSync XE17 as well.

But even though these were our favorites, you may want to consider other alternatives. If you want a low price, for example, check out the Orchestra Tuba (\$669 list, \$625 estimated street). Or perhaps your dealer carries and supports a different brand. No matter what, if you follow our advice and if you look with your own two eyes, you'll end up with a high-quality 17-inch monitor. ☞

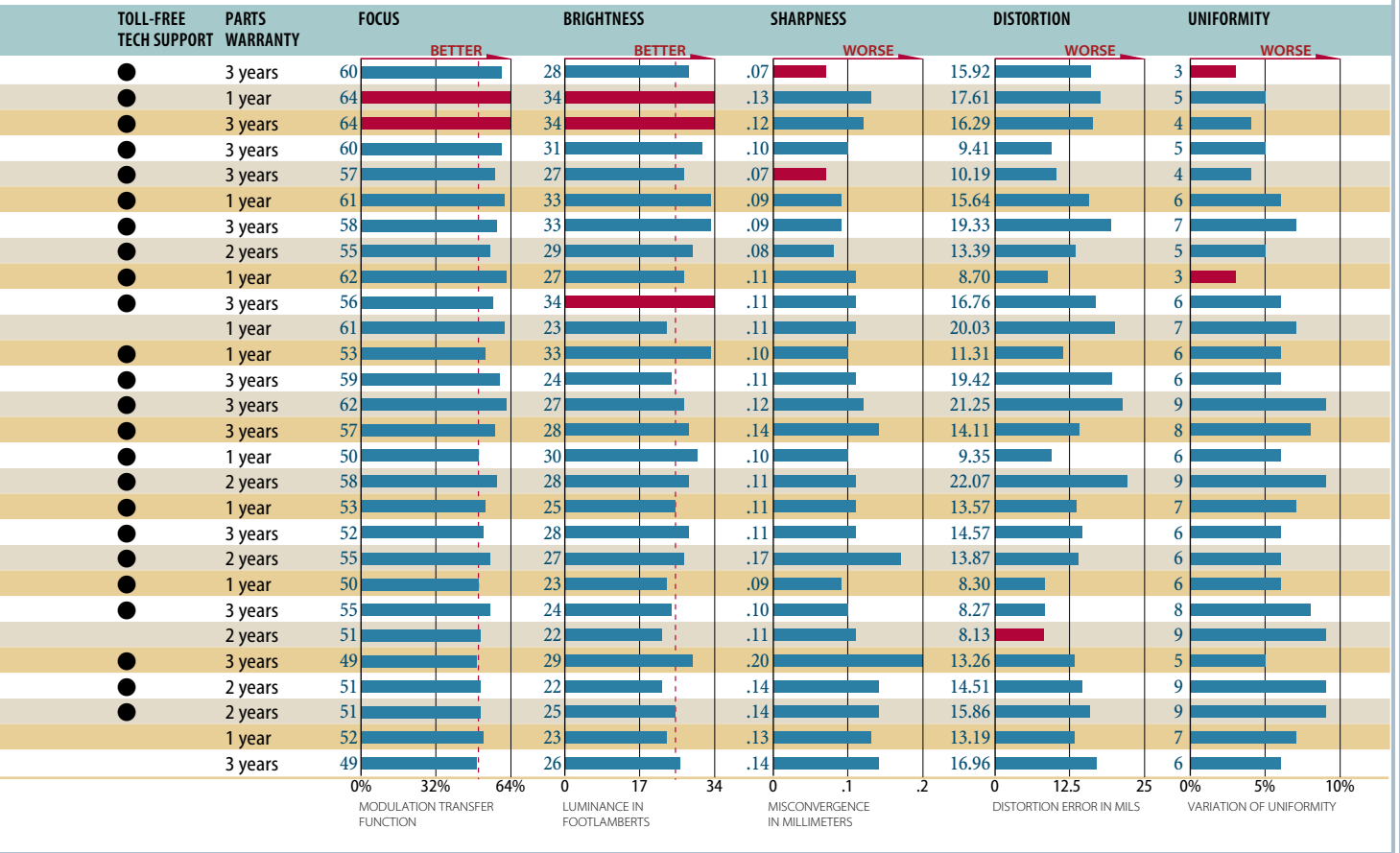
Associate editor Jim Shatz-Akin is saving box tops for a 27-inch, active-matrix, flat-panel LCD screen. Senior project leader Alex Ho, of ZD Labs, managed the testing for this report.



The MacUser Screen Test is available on-line on ZiffNet/Mac. See page 4 for instructions on accessing ZiffNet/Mac.

We were pleased that the image quality of these monitors met or exceeded our levels of acceptability. Compare monitor performance with what we regard as the lowest acceptable result (represented by a dashed red vertical line). The absence of a dashed red line means that all

monitors had acceptable scores. The monitors are listed in order of overall performance. To find overall performance, we combined our test results for focus, brightness, sharpness, distortion, uniformity, and other qualities. The red bars indicate the best performer(s) in each test.



Directory / vendors of monitors tested

ADI Systems

San Jose, CA
800-228-0530
408-944-0100
408-944-0300 (fax)

Amdek

San Jose, CA
800-722-6335
408-473-1200
800-742-6335 (fax)

Apple Computer

Cupertino, CA
800-776-2333
408-996-1010

CTX International

Walnut, CA
800-888-2012
909-598-8094
909-575-6273 (fax)

Focus Enhancements

Woburn, MA
800-538-8866
617-938-8088
617-938-7741 (fax)

Goldstar USA

Englewood Cliffs, NJ
201-816-2000
201-816-0636 (fax)

IBM

Research Triangle Park, NC
800-426-2968
914-765-1900
800-426-4329 (fax)

Iiyama North America

Warminster, PA
800-394-4335
215-957-6543
215-957-6551 (fax)

Ikegami Electronics (USA)

Maywood, NJ
800-368-9171
201-368-9171
201-368-1305 (fax)

Mag InnoVision

Santa Ana, CA
800-827-3998
714-751-2008
714-751-5522 (fax)

Mirror Technologies

Edina, MN
800-654-5294
612-830-1549
612-832-5709 (fax)

Mitsubishi Display Products

Cypress, CA
800-843-2515
714-236-6352
714-236-6172 (fax)

Nanao USA

Torrance, CA
800-800-5202
310-325-5202
310-530-1679 (fax)

NEC Technologies

Wood Dale, IL
800-632-4636
708-860-9500
800-366-0476 (fax)

Nokia Display Products

Sausalito, CA
800-296-6542
415-331-0322
415-331-0424 (fax)

Optquest

Walnut, CA
800-843-6784
909-468-3750
909-468-3770 (fax)

Orchestra MultiSystems

Santa Ana, CA
800-237-9988
714-891-3861
714-891-2661 (fax)

Panasonic

Secaucus, NJ
800-742-8086
201-348-7000
201-392-4760 (fax)

Philips Consumer Electronics

Knoxville, TN
615-521-4316
615-521-3210 (fax)

Radius

Sunnyvale, CA
800-227-2795
408-541-6100
408-541-6170 (fax)

Sampo America

Norcross, GA
404-449-6220
404-447-1109 (fax)

Samsung

Ridgefield Park, NJ
800-933-4110
201-229-4000
201-229-4029 (fax)

Sceptre Technologies

City of Industry, CA
800-788-2878
818-369-3698
818-369-3488 (fax)

SDIS (Sigma Designs Imaging Systems)

Fremont, CA
800-437-4624
510-770-0100
510-770-2993 (fax)

Sony Electronics

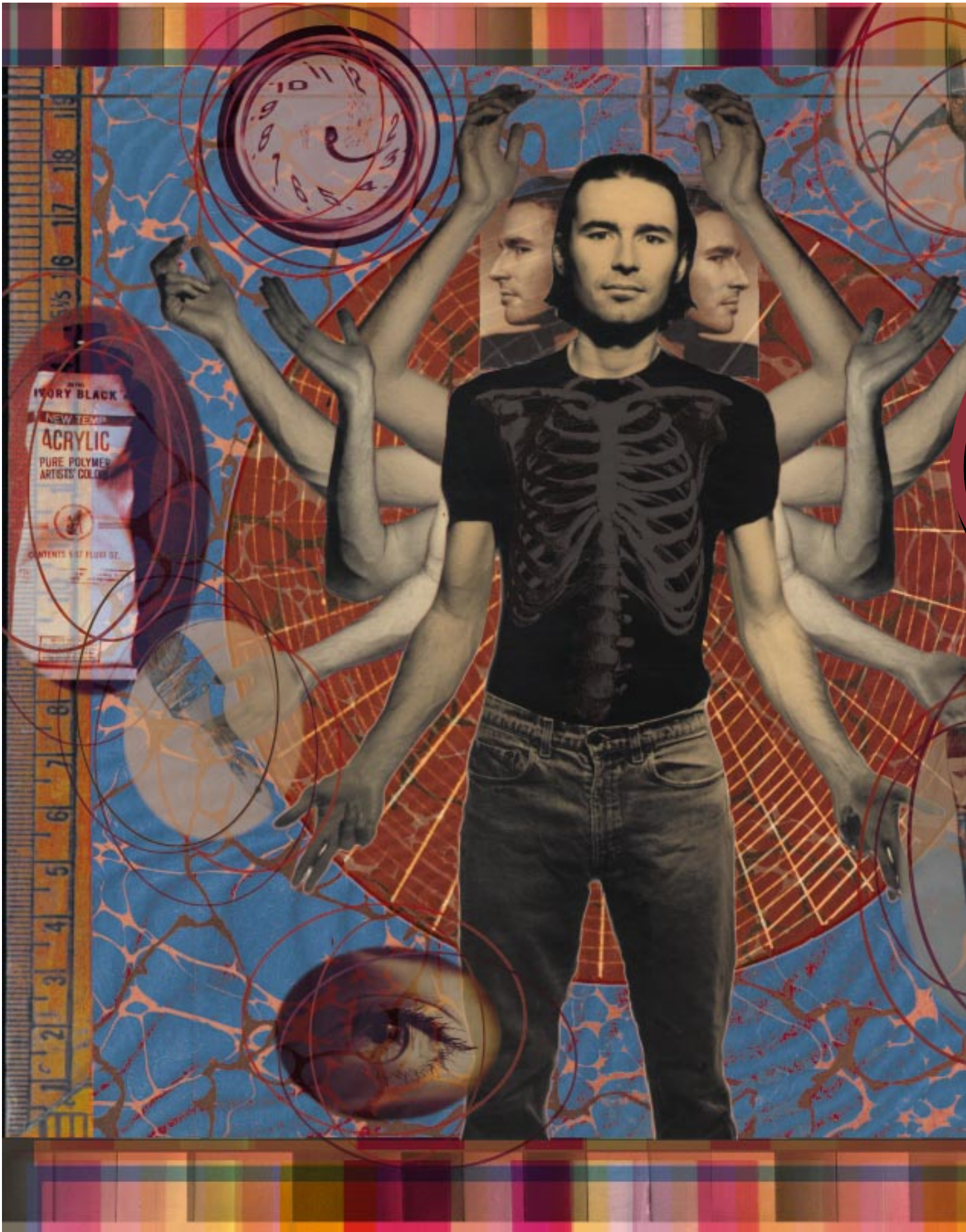
San Jose, CA
800-352-7669
408-894-0555
408-955-5171 (fax)

Tatung

Long Beach, CA
800-829-2850
310-637-2105
310-637-8484 (fax)

ViewSonic

Walnut, CA
800-888-8583
909-869-7976
909-869-7958 (fax)



**THE****Image****MAKERS**

**GET READY,
FOLKS. THE WAY
YOU PROCESS
BIT-MAPPED
IMAGES IS
ABOUT TO
CHANGE — FOR
THE BETTER.**

**BY
DAVID
BIEDNY**

ILLUSTRATION / AMY GUIP

For years Adobe Photoshop has been *the* image-processing package for professionals. Lately, however, several other programs have begun to incorporate image-processing capabilities. Granted, none of these programs offer exactly the same functionality as Photoshop, but if you've read the brochures and product packaging, you may be wondering where the line between the programs is drawn.

OK, we admit it — we read your mind. We rounded up four professional-level products — Collage 2.0, from Specular International; Live Picture 1.5, from HSC Software; Painter 3, from Fractal Design; and PixelPaint Pro3, from Pixel Resources — and set out to see how they could be used to complement Photoshop. We even tried to use each of these four products *instead* of Photoshop.

Each program offers most of the basic features — color correction of scans, photo cleanup, special-effects addition — you need for editing bit-mapped images. And each uses a method of compositing images based on a layer or object metaphor. Like high-end draw programs such as Adobe Illustrator and Macromedia FreeHand, these programs let you rearrange, edit, delete, and insert layers; you can even tweak a layer so that it affects the way layers beneath it look.

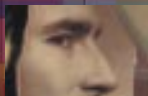


IMAGE-PROCESSING SOFTWARE / a quick guide to five professional-level programs

Adobe Photoshop 3.0

List Price: \$895.

Estimated Street Price: \$575.

Recommended System: 68040 or Power Mac, System 7.1 or later, 16 MB of RAM, 50 MB of free hard-disk space, 24-bit-video card, Photoshop accelerator.

What It Is: A professional-level, all-around image-processing program.

Who Should Use It: Anyone who needs to correct colors in images, apply special-effects filters, or sharpen images.

Company: Adobe Systems, Mountain View, CA; 800-833-6687 or 415-961-4400.

Collage 2.0

List Price: \$399.

Estimated Street Price: \$250.

Recommended System: 68040 Mac or Power Mac, System 7.1 or later, 24 MB of RAM.

What It Is: A program for laying out high-resolution images created in Photoshop.

Who Should Use It: Those who need to lay out several complex, multilayered Photoshop images with numerical precision and who like the feel of a page-layout program.

Company: Specular International, Amherst, MA; 800-433-7732 or 413-253-3100; 413-253-0540 (fax).

Live Picture 1.5

List Price: \$995.

Estimated Street Price: Not available.

Recommended System: 68040 Mac or Power Mac, System 7.1 or later, 64 MB of RAM, 24-bit-video card, 1-GB hard drive, pressure-sensitive tablet.

What It Is: A fast, flexible program for compositing high-resolution images.

Who Should Use It: Professional artists who need ultimate speed when compositing multilayered images or who create extremely large composites and need the best possible resolution.

Company: HSC Software, Carpinteria, CA; 805-566-6200; 805-566-6385 (fax).

Beyond that, however, the programs' capabilities vary widely. You'll find programs that excel at handling high-resolution images and others that offer a bundle of features for creating original art. We've pinpointed six key areas in which the programs differ: layering, selections and masking, retouching and painting, color correction, filters, and speed.

For each of these areas, we've sorted out each product's major strengths and weaknesses and given each product a grade, from A to F. To get an idea of where each product fits, check out our quick guide to these professional-level programs in the "Image-Processing Software" sidebar.

LAYERING: Five Approaches

We said that all the programs support layers, but we didn't say they handled them in the same way. In fact, each program handles layers so differently that most cannot recognize layers created by the others. Only Collage lets you save compositions as Photoshop 3.0 files while retaining all layer information. (All the programs, however, let you save images as TIFF or PICT files the others can open.)

Photoshop treats layers as virtual acetate sheets stacked one on top of the other, with up to 100 layers per document. Each layer can contain a single 8-bit mask channel that controls the transparency of various portions of a layer; a separate control lets you specify the layer's global transparency. You can easily reorder layers by dragging them to the desired place in the Layers palette.

Photoshop's layering capabilities include two powerful tools — *interchannel math* and *clipping groups*. Interchannel-math functions such as Lighten, Multiply, and Screen dictate how a layer interacts with the layers underneath it. For example, if you screen a texture on top of an image, the texture will be applied to the image. With a bit of experimentation, you'll be able to use interchannel math to create sophisticated special effects. Using clipping groups is more confusing, especially for Photoshop novices. You group any number of layers, and the bottom layer becomes a mask for all the layers attached to it. Basically, clipping groups let you run all the specific and global masks you've already set through yet *another* mask.

Collage's approach to layering is closely related to the approach page-layout programs such as Adobe PageMaker and QuarkXPress take. You create objects you can move around. Collage provides numeric controls for specifying attributes for each object, such as its size, location, scaling, and transparency. It's the only program that lets you automatically move and rotate all the objects in a group and apply filters to them — a time-saving feature for laying out images created in Photoshop. You can't, however, scale groups of objects.

In fact, Collage's layering abilities are the program's key strength. Creating composite images in Photoshop is a slow task. Collage,

LAYERING

Adobe Photoshop 3.0: **A**

Collage 2.0: **B**

Live Picture 1.5: **A**

Painter 3: **B**

PixelPaint Pro3: **C**

The Bottom Line

A GOOD GRAPHICS TOOLBOX should contain more than one of these image-processing applications. Today's programs provide a good mix of image-editing tools, image-compositing features, and special-effects options. But no one program excels at everything — not even the highly praised Adobe Photoshop. You'll find Live Picture and Collage better for compositing very large or high-resolution images, and Painter and PixelPaint Pro3 offer top-notch painting tools.

- ⊕ = OUTSTANDING
- = ACCEPTABLE
- ⊖ = POOR

★★★★! **Adobe Photoshop 3.0** ⊕ ● ⊕ ⊕

Powerful layering, masking, and color-correction tools keep Photoshop (\$895 list, \$575 estimated street) ahead of its competitors. The program is a must-have for anybody who works with bit-mapped images. Be sure to load up on RAM and hard-disk space, however; the layering capabilities in this version have made Photoshop even greedier than before.

	PRICE/PERFORMANCE	CUSTOMER SERVICE	LAYERING ABILITIES	TOOL SET
★★★★ Live Picture 1.5	⊕	⊕	⊕	●
★★★★ Painter 3	⊕	⊕	●	⊕
★★★★ Collage 2.0	●	⊕	●	⊖
★★★★ PixelPaint Pro3	●	⊕	⊖	●

Listing is alphabetical within groups of equal mouse ratings.

Painter 3

List Price: \$499.

Estimated Street Price: \$325.

Recommended System: 68040 Mac or Power Mac, System 7.1 or later, 24 MB of RAM.

What It Is: A bit-mapped paint and image-editing program.

Who Should Use It: Creative artists who want to produce digital paintings that contain realistic-looking natural-media effects.

Company: Fractal Design, Aptos, CA; 800-297-2665 or 408-688-8800; 408-688-8836 (fax).

PixelPaint Pro3

List Price: \$379.

Estimated Street Price: \$379.

Recommended System: 68040 Mac or Power Mac, System 7.1 or later, 20 MB of RAM.

What It Is: A bit-mapped paint and image-editing program.

Who Should Use It: Artists who don't need all the options Painter offers but who want more than the basic painting tools in Photoshop.

Company: Pixel Resources, Norcross, GA; 800-851-1427 or 404-449-4947; 404-449-3789 (fax).

however, creates low-resolution proxies from Photoshop images and lets you place and manipulate those low-resolution images at a much faster pace than you can when using the higher-resolution versions in Photoshop.

Live Picture also uses proxies to allow you to quickly composite several large files, but unlike Collage, Live Picture renders proxies on the fly. Thus, no matter what magnification you work in, the image will look good. This capability is possible thanks to Live Picture's use of IVUE, a resolution-independent file format, designed especially to allow users to quickly manipulate huge images. You'll find Live Picture's approach especially handy when working on extremely large images.

With Live Picture, a layer can contain either image data or filter and color-correction processes. For example, instead of applying a blur filter to a specific layer as you would in Photoshop, you create a blur layer in Live Picture, which adds blurring to all the underlying image data. Because Live Picture lets you separate effects from image data, the integrity of the original data is not affected when you create special effects. For example, if you use a distortion brush, you can still return to the original image.

Live Picture's other layer controls include a global transparency setting and numerical settings for the scale, position, and rotation values of layers. As in Photoshop, you can reorder Live Picture's layers by dragging them up or down in a list of layers. Live Picture also has a couple of the same weaknesses as Photoshop — the program offers only basic grouping features and does not let you apply color correction to multiple layers simultaneously.

Painter, like Collage, uses an object-based metaphor. You create an object (called a Floater) simply by selecting it from a portion of the image. You can group objects, and you can scale and move them simultaneously. Also like Collage, Painter provides some handy automatic effects, such as drop shadows and edge feathering. Each Floater has a fully editable 8-bit mask associated with it, although Painter's interface makes this mask harder to manipulate than that in Photoshop. And although Painter offers some interchannel-math functions, these are more limited than those offered by Photoshop.

Like Painter and Collage, PixelPaint Pro3 uses an object-based model. But PixelPaint Pro3's abilities are downright schizophrenic.

The program offers some extremely powerful features (including a healthy selection of interchannel modes), but in general, we found PixelPaint Pro3's feature set and interface inconsistent and, at times, maddening to use. When we selected grouped objects, for example, several effects (including color correction and filters) appeared as active options in menus — but in reality, the menu options work only on single objects. PixelPaint Pro3 also lacks a list of objects, so you can't easily manage the various layers in an image.

SELECTIONS AND MASKING: Isolating Objects

Photoshop's standard tools include the rectangular and circular marquee as well as the trusty magic wand, which lets you select like-colored pixels. The unique and extremely powerful Color Range command lets you precisely isolate a color or range of values; as you select the colors, Photoshop shows you either a gray-scale mask of the selected colors, the selection in color against a black background, or the selection in color against a white background. Photoshop also offers the most-flexible arrangements for viewing, editing, and using multiple levels of image masks. For example, the program allows you to have many masks that remain separate from the layers and it provides a variety of tools for shrinking and expanding the edges of masks.

Collage has no selection tools and only the most-bare-bones features for manipulating masks and alpha channels. You can process alpha channels by using Collage's built-in filters, but you cannot directly edit an alpha channel. Realistically, you need to import objects that have an alpha channel already built in, but this type of preplanning can be difficult.

Live Picture uses a nonstandard approach for selecting items. For example, you cannot simply copy and paste selected areas; instead, you must duplicate a layer, crop it, and then paste in the cropped section. Using the Silhouette layer, you can automatically create masks based on color and brightness ranges. Although the end results are excellent, you may find this feature overwhelming, due to the contorted names of the controls and the difficulty of figuring out how the program decides what, exactly, to put into a mask. All masks are fully editable, and like Photoshop, Live Picture supports global as well as layer-specific transparency masks.

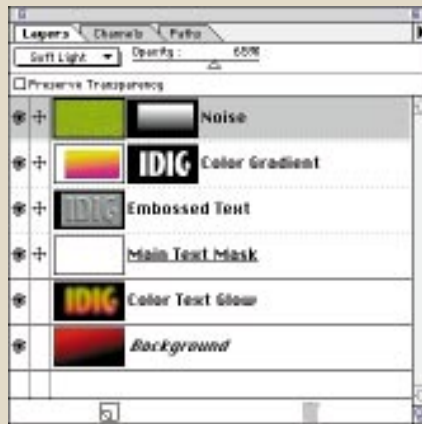
Painter has a solid set of selection and masking tools. Some masking procedures, however, are harder to use than comparable ones in Photoshop and PixelPaint Pro3. Painter provides ample tools for creating paths that can become selections or masks and includes a path-manager window similar to the one in Photoshop. You can also create paths by importing EPS files, a welcome addition for Illustrator and FreeHand users. Mask handling is more

SELECTIONS AND MASKING

Adobe Photoshop 3.0: A
Collage 2.0: C
Live Picture 1.5: B
Painter 3: C
PixelPaint Pro3: B

THE FIVE APPROACHES TO LAYERING / *how each program works*

True to fashion, **Photoshop** sets the standard for powerful layering capabilities (a). Each layer can have its own application mode as well as an 8-bit alpha channel that can be displayed along with the layer contents. With **Live Picture**, color correction, filtering, and painting processes each exist on their own layer. The layer list shown here (b) contains two color-correction layers, a masked layer (the paper in the Silhouetting layer), a distorted layer, and two "normal" layers (Insert apple and Insert kids). Kudos goes to **Collage** for its straightforward object list (c). Each object's size and resolution are displayed in the expanded-view mode, and you can place objects in an active document by dragging them from the list. **Painter's** Floater List displays all the objects in a document (d). Objects are grouped, and the bottom of the dialog box shows the masking modes set for each Floater. **PixelPaint Pro3** lacks an object list, making its layering abilities the weakest (e).



a

b

arduous — Painter has a variety of icons that act as switches for turning masks on and off, displaying masks, and designating other aspects of mask behavior, but it lacks advanced interchannel-math tools for manipulating masks.

PixelPaint Pro3 offers numerous features for creating selections and saving them as masks, including tools for selecting ranges of colors for transparency effects. Besides standard selection tools such as a magic wand, a rectangular marquee, and a curve tool, PixelPaint Pro3 provides some distinctive options. For example, the program lets you select a range by painting it on the screen (akin to the functionality of Photoshop's Quick Mask). PixelPaint Pro3 offers a solid set of masking tools, and it can automatically create masks based on specific attributes of an image (such as brightness). Each object can have an 8-bit mask. PixelPaint Pro3 doesn't let you manage masks among documents, nor does it let you use interchannel-math effects with masks.

RETOUCHING AND PAINTING: The Creative Side

Photoshop's retouching and painting tools are well designed but utilitarian. The star Photoshop performers are the cloning tools, which are handy for detailed image-retouching tasks. Creative tools include the Impressionist brush, the finger smearing tool, blurring and sharpening brushes, and dodging and burning brushes.

Collage, once again, relies on Photoshop abilities. The program doesn't have any painting or retouching tools — not a serious problem if you are using Collage only to composite complex Photoshop images. Still, it would be nice to have at least bare-bones tools for performing last-minute edits in a production environment.

Live Picture's painting tools are incredibly powerful in some areas and incredibly weak in others. For example, Live Picture is the only program that lets you paint with a 5,000-

pixel-wide brush. On the other hand, it offers only a single brush shape (round) and the manner in which it represents the brushes as you paint is problematic — the brush stroke is drawn, but the area underneath the brush is invisible until you release the brush, making fine-detail work a test of patience. Similarly, Live Picture's distortion brushes are a delight to use (you can splash an image with the equivalent of digital water or acid; later you can selectively "paint away" an applied distortion) but the program's cloning tool is ill suited to serious retouching work (you can't clone from multiple areas into a single one).

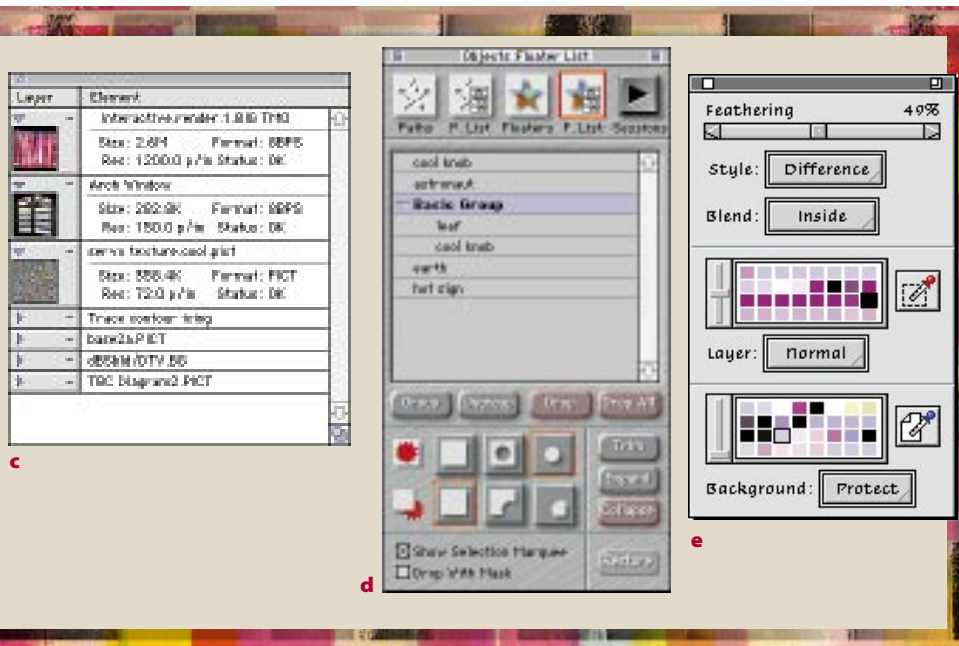
As the undisputed champ of the creative brush stroke, Painter can replicate natural media such as paints, charcoals, oils, and felt pens better than any of the other programs. It also provides the best painting controls — for example, the program offers a tremendous variety of paintbrush modes and precise control over dabs. And although Photoshop, Live Picture, and Painter support pressure-sensitive drawing tablets such as those from CalComp, Kurta, Summagraphics, and Wacom, Painter makes the most of the ability by, for example, allowing you to change not only the brush width and density but also, depending on the direction of the brush stroke, parameters such as color. As you might expect, however, Painter's cloning tools are geared more toward creative work than serious retouching.

PixelPaint Pro3 has a good set of painting and retouching tools, from standard paintbrushes and airbrushes to natural-media options such as charcoals, watercolors, and chalks. The impressionist brush lets you put down dabs in different shapes, and you can use a pressure-sensitive tablet to specify the size and angle of dabs. Overall, PixelPaint Pro3's brushes lie somewhere between the naturalistic tools in Painter and the utilitarian offerings of Photoshop.

RETOUCHING AND PAINTING
Adobe Photoshop 3.0: C
Collage 2.0: F
Live Picture 1.5: C
Painter 3: A
PixelPaint Pro3: B

COLOR CORRECTION: The Photoshop Advantage

Only Photoshop supports CMYK color correction, thus giving it a huge advantage over the other programs for prepress work. (Live Picture 2.0, which should be shipping by the time you read this, will



FILTERS: Beyond the Basics

One of Photoshop's claims to fame is its support for filters — lots and lots of filters. The program comes with an assortment of built-in filters, and it supports an even wider variety of third-party plug-ins, such as Adobe Gallery Effects, HSC's KPT series, and Xaos' Paint Alchemy and Terrazzo. Photoshop's standard suite of filters includes those that are most useful for real-world production work (such as Unsharp Mask and Gaussian Blur) as well as a wide variety of special-effects goodies (distortion filters such as Twirl, Wave, and Ripples, and stylistic effects such as Mosaic and Embossing). You can additionally employ programmable filters to create a wide variety of blurring, sharpening, and embossing effects. The powerful Filter Factory feature lets you write scripts that control RGB

also support CMYK color correction.) Collage does not provide any color-correction tools (a major omission in our opinion). None of the programs let you apply color corrections to multiple layers or objects simultaneously; instead, you must flatten the image into a single layer before applying global color corrections.

Photoshop has an excellent, almost overwhelming, variety of color-correction tools. It can automatically remove overall color casts from images, and it can replace one color with another while still giving you full control over brightness. You can perform rough adjustments to brightness and contrast, using the Levels control, and you can fine-tune these parameters, using the Curves control. The Variations dialog box lets you see the results of a variety of changes, any of which you can save or undo.

Live Picture's color-correction features are comparable to (but not as extensive as) those you get with Photoshop's Levels and Curves controls. Unfortunately, Live Picture does not let you fine-tune brightness and contrast, as you are able to do with Photoshop's Levels control. Live Picture includes easy-to-use features for removing overall color casts from images and provides a solid set of tools for selective color replacement.

Painter's color-correction tools are, in many ways, quite good — for example, color-replacement features and tinting options are comparable to those in Photoshop. But the program's lack of Levels and Curves controls limits its usefulness for precise color-correction work. In addition, you are not able to save color-correction settings, meaning that the program is awkward for production work.

PixelPaint Pro3 has a workable set of color-correction tools for basic tasks such as adjusting brightness and contrast. Beyond that, it is severely limited — for example, it does not let you preview color shifts nor does it offer professional-level adjustment tools.

channels. You might, for example, write a script that adds noise to the blue channel, blurs the red, and decreases the green. Run the script on an image, and you end up with a glow around skin tones, all in one step. Without the script, you'd need to go through several steps every single time you wanted to achieve the same effect. This type of automation is especially helpful if you

FILTERS

Adobe Photoshop 3.0: A
Collage 2.0: C
Live Picture 1.5: D
Painter 3: B
PixelPaint Pro3: B

A Bit of Everything / *speed and flexibility*

WOULDN'T YOU KNOW IT? The minute we finished this article, Fauve Software (800-898-2787 or 919-380-9933) shipped xRes (\$799), its long-awaited image-processing application. We'll give you a sneak peek at its features here and follow up with a full-fledged review soon.

xRes promises to combine the best features of Live Picture and Photoshop — and it takes some hints from Painter too. It uses a technology that speeds most common image-editing tasks. Because the speed gain does not depend on low-resolution proxies, you can work with all the pixels in an image, although you still need to render your final image in order to create a final file.

No matter what kind of image editing you need to do, Fauve claims that xRes can handle the job quickly. The program includes a wide range of retouching and painting tools, special-effects filters, and advanced masking and interchannel processing capabilities — for example, you can paint with natural-media brushes at very high resolutions (Live Picture also lets you paint at high resolutions but without natural-media options such as chalks and oil paints).

You'll also find all sorts of brushes (such as a bleeding watercolor and a Sumi Chinese brush) that you can adjust by using any of 30 variables. And unlike the products we reviewed, xRes can perform color correction on several layers simultaneously. Keep your fingers crossed that Fauve can deliver all it promises. And keep your eyes peeled for our upcoming review.

COLOR CORRECTION

Adobe Photoshop 3.0: A
Collage 2.0: F
Live Picture 1.5: B
Painter 3: C
PixelPaint Pro3: C



SPECIAL FEATURES / where the programs shine

Photoshop excels at color-correction tasks and offers a good balance of visual and numerical controls. The program's excellent — and unique — Variations module (a) gives you an interactive visual guide to color values. **Live Picture's** IVUE color-correction controls (b) come the closest to providing the functionality of Photoshop's Curves control. In addition, Live Picture's brushes let you paint at extremely large sizes at high resolution (c). The unchallenged leader of painting options, **Painter** sports a stunning array of brushes and styles (d). **PixelPaint Pro3** also offers a solid assortment of brushes and a variety of brush effects (e).



apply the same varieties of effects to images frequently.

Collage includes a set of 16 essential filters. You'll find standards such as Gaussian Blur and Unsharp Mask as well as filters that add or reduce noise, despeckle images, and create diffusion effects. The program also supports some third-party Photoshop plug-ins.

Live Picture's filters are the most limited of the bunch. The program offers only blurring and sharpening filters. And unlike the other programs, it lacks the plug-in-filter approach of Photoshop.

In addition to basic blurring and sharpening filters, Painter offers a wide — and innovative — array of special filters. For example, the program includes a good marbling filter; excellent lighting effects; and the Blobs filter, which offers instant psychedelic fun. The Glass Distortion filter lets you use a texture to distort another image; you can use this filter to create any number of "through the shower door" effects. Add the program's full support for Photoshop plug-ins, and you'll find Painter's creative possibilities boundless.

PixelPaint Pro3 offers a fairly robust set of filters, including the basic blurring, sharpening, and unsharp-mask filters you have come to expect. In addition, it boasts an array of creative effects such as embossing, choking and spreading of masks, and find edges. Like Painter, PixelPaint Pro3 supports all third-party Photoshop plug-ins.

SPEED: When You're in a Hurry

First the good news: All five programs run native on Power Macs. Now the bad news: You need a Power Mac to keep these programs running at a bearable pace. And you need to load up that Power Mac with lots of memory and storage capacity. For example, HSC Software recommends that you equip your Mac with at least 64 MB of RAM. HSC claims that the next version of Live Picture will need less RAM — 48 MB — but still, the hardware requirements for serious

image processing are stiff. (See the "Image-Processing Software" sidebar for each program's recommended system requirements.)

Adding more than a few layers to an image of 25 MB or more causes Photoshop to bog down on even the fastest 68040 Mac. On a Power Mac, a 50-MB image that has ten layers causes a noticeable slowdown. You can still work, but not without some irritation.

SPEED

Adobe Photoshop 3.0: B

Collage 2.0: A

Live Picture 1.5: A

Painter 3: B

PixelPaint Pro3: B

are editing. To create a final, high-resolution document, you need to run the image through a lengthy rendering process. Live Picture is significantly faster than Collage when you're building composites, and at \$995 (list), it's also more expensive than Collage, which you can get for \$250.

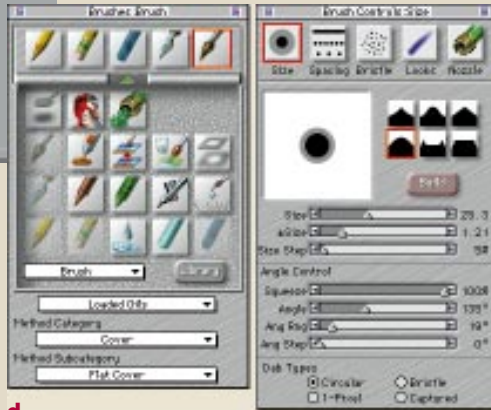
Both Painter and PixelPaint Pro3 run noticeably slower than Photoshop when you're working with files larger than about 20 MB. Even files in the 5-to-20-MB range don't respond as quickly in Painter or PixelPaint Pro3 as they do in Photoshop. Each program, however, feels snappy when you're working with simple images that are smaller than 5 MB.

The Final Analysis

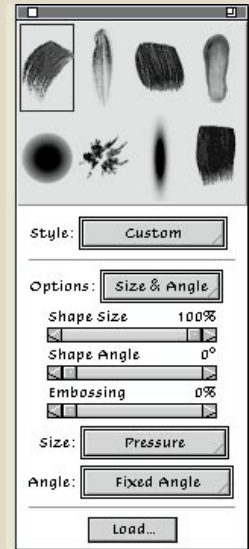
There's no question about it. Photoshop remains the only must-have program for image processing. This reliable, flexible workhorse continues to offer the best overall combination of features, price, and speed. (Yes, that is still the case, in spite of the program's



c



d




e

continually increasing memory and storage requirements.)

But Photoshop shouldn't be the only tool in your image-processing kit. If your core job requires you to work frequently with high-resolution images, then you should consider Live Picture or Collage. Each can save you time when you composite complex images. Live Picture is significantly faster, more flexible, and more full-featured than Collage and is especially well suited to working with extremely large files. Collage, however, is an excellent choice if you need to create, well, collages of images created or edited in Photoshop. The program offers a familiar, straightforward page-layout feel and gives you numeric controls for precisely placing images.

For painting needs, Painter is the hands-down choice. It's the unchallenged leader for replicating natural media such as oils and charcoals, and it takes full advantage of pressure-sensitive tablets.

PixelPaint Pro3 has its strong points (such as its numerous options for creating selections and saving them as masks), but it doesn't offer as much overall functionality as Painter.

In the end, after spending countless hours working with these programs, we decided that none of them can yet replace Photoshop. However, we also discovered that they can all supplement it, shoring up some of the program's weaker areas and adding functionality you might not expect to find in an image-processing program. Photoshop may be the most popular game in town, but it's not the only one. 

David Biedny has been editing bit-mapped images as objects on the Mac since 1985, when he used VideoWorks as a layered composition program. Contributing editor Bruce Fraser is coauthor of *Real World Photoshop 3.0*, published by Peachpit Press.

From the Maker of QuarkXPress / image-processing software

A DARK-HORSE ENTRY in the image-processing sweepstakes, named QuarkXPosure, is in the works from Quark (303-894-8888), the publisher of QuarkXPress. Based on JVC's UNIX-based PixelLens program, QuarkXPosure speeds up image-editing processes by letting you work on low-resolution proxies. The program stores all operations in a list until you are ready to render an image at full resolution. Not only does this approach promise to make working with very large files reasonably fast but it also offers artists unprecedented freedom to change their

minds during the course of their work.

QuarkXPosure's central metaphor is the *lens*, a selection in which operations are grouped. All operations, down to single brush strokes, within a lens are recorded in a fully editable list. The underlying image pixels aren't altered until you render the finished version, so you can save multiple versions of an image as compact operations lists, without changing the pixel data.

You can move and duplicate lenses, and you can edit, save, import, and export operations lists. Lenses can be any shape or size,

and you can apply any number of them to an image. Unlike other proxy-based systems, the operations list stays with the image when you render it, so you can easily use the operations list to fine-tune details in the high-resolution image that you may not have seen in the low-resolution proxy.

Quark says that QuarkXPosure will support Apple's ColorSync 2.0. For high-end users, Quark has licensed the separation engine in PixelCraft's Color Access. QuarkXPosure is slated for release in late summer or early fall. / Bruce Fraser

DESKTOP PUBLISHING

COLOR MANAGEMENT /

Apple Readies ColorSync 2.0

Systemwide solution contains Linotype-Hell color-matching technology.

MATCHING COLORS across devices has been the elusive goal of many companies, including Apple, with its ColorSync systemwide color-management technology. ColorSync is a system extension that handles color matching among scanners, output devices, and displays. The original ColorSync, which suffered from simplistic device profiles and slow performance, was never widely adopted. But with ColorSync 2.0, the technology may live up to its promise.

A new color-matching engine from prepress giant Linotype-Hell and a new cross-platform device-profile standard are obvious improvements. Increased speed, the ability to embed profiles in image files, and support for CMYK input and Hi-Fi color output are also key new features.

Speed — or rather its lack — was a major problem in ColorSync 1.0. According to Apple, ColorSync 2.0 is about five times as fast as its predecessor — a Power Mac 8100/80 can color-match a 5.5-MB image in 5 seconds. The program's architecture is fat-binary, so ColorSync runs in native PowerPC mode on Power Macs.

To address the criticism that ColorSync device profiles were simplistic, Apple led an industry initiative to form the ColorSync Profile Consortium, whose members include Agfa, Eastman Kodak, Microsoft, Silicon Graphics, and Sun Microsystems. Renamed the International Color Consortium (ICC), to better reflect the cross-platform nature of its efforts, the group has created the ICC device-profile specification, which ColorSync 2.0 uses.

Agfa and Kodak, which offer competitive color-management products, are each committed to providing ICC-compliant device

profiles, which should ease the transition from those products to ColorSync for users of existing color-management systems. Printing support for ColorSync 2.0 will come from both a new LaserWriter driver and the next generation of QuickDraw GX.

ColorSync 2.0 offers increased flexibility. The previous version allowed only one color-matching engine to load at startup, but ColorSync 2.0 can link multiple color-matching engines. Thus, a user can use one vendor's engine to correct an image for screen display and then use another's to transform the file for output. "Profile embedding" allows the embedding of a device profile in PICT, TIFF, or EPS images, simplifying both cross rendering among different engines running under

ColorSync and cross-platform color matching among ICC-compliant color-management systems.

ColorSync 1.0 took a lowest-common-denominator approach, with only three input and four output channels. However, the high-quality Linotype-Hell color-matching engine in ColorSync 2.0 allows eight channels each for input and output, making possible the CMYK input required by users of high-end drum scanners, and, potentially, automatic Hi-Fi color separations using up to eight process colors.

These capabilities, and the Linotype-Hell name, should give prepress professionals a comfort factor that was absent from ColorSync 1.0. Vendors of major publishing applications will almost certainly move quickly to support ColorSync 2.0, which will be distributed free later this year through on-line services. 408-996-1010. / Bruce Fraser



ILLUSTRATION / JAMIE KEMSEY

SPECIAL EFFECTS /

Out of Chaos Comes Paint Alchemy 2.0

AS ONE OF THE FIRST commercially available special-effects plug-ins for Adobe Photoshop, Xaos Tools' Paint Alchemy showed lots of potential. But its index-card interface bothered some artists, who wanted more freedom to explore Paint Alchemy's rich brush effects. PowerPC-native Paint Alchemy 2.0 sports a revamped interface and scores of new preset styles.

There's a touch of Kai's Power Tools and Fractal Design's Painter in Paint Alchemy's new interface, which features a dark-blue

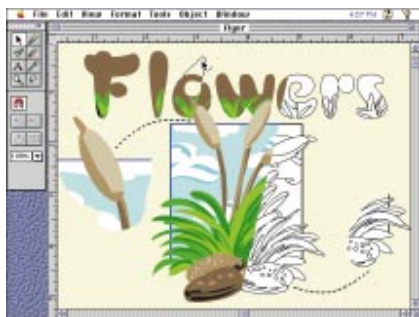
background, gray 3-D buttons, and such cheekily named brush effects as Planet Paint and Wonderbread. Better yet, version 2.0 includes tear-off palettes — each containing an interactive proxy preview — for setting brush strokes, colors, opacity, angles, and so on. A large preview window lets you see the cumulative effect of your actions before you save a file.

With a nod to Xaos Tools' animation-software expertise, Paint Alchemy includes a Jitter Frames feature, which lets you randomly apply brush strokes over time and then animate



them into video clips with programs such as Adobe Premiere 4.0 and Equilibrium's DeBabelizer 1.6. \$199; upgrade from version 1.0, \$50. 415-487-7000. / Pamela Pfiffner

SmartSketch Is an Illustrator No-Brainer



DRAWING A BASIC MAP or creating a simple graphic shouldn't be as frustrating as solving a differential equation. If you shy away from Béziers — and if you like a more painterly look — FutureWave's SmartSketch may be the answer.

SmartSketch is a vector-based draw program like ClarisDraw and Adobe Illustrator, but it's easy to create a polished drawing with its smart tools. For instance, SmartSketch's Pencil

tool can create straight lines, perfect circles, and arcs for the illustration-impaired. Smart Shape recognition cleans up geometric shapes in a snap. Edit any curve by simply clicking and dragging — no handles or points are required. The program lets you merge or overlap objects and create clipping paths simply by dragging two objects together. Familiar paint-program tools such as a paintbrush, an eraser, and a lasso offer ease of use without pixelated results. SmartSketch has several anti-aliasing settings that smooth jagged edges on the fly.

A collection of 500 clip-art images ships with the product, as do eight interactive lessons that not only help you learn SmartSketch's tools but also teach general drawing skills. For experienced illustrators, SmartSketch offers EPS export options so you can move your drawings into Adobe Illustrator or Macromedia FreeHand. (The program also supports the PICT and DXF file formats.) \$70. 800-619-6193 or 619-637-6190. / Sean J. Safreed

New Illustrator Plug-ins Create Flashy Special Effects

HOPING TO RE-CREATE the success of the Photoshop plug-in market, Adobe has released the specs for the Illustrator plug-in format, unleashing a bevy of plug-ins to jazz up any illustration.

Letraset USA. For those who want to twist type or graphics, Letraset now provides the functionality of its LetraStudio program in the Letraset Envelopes Plug-In. The PowerPC-native plug-in offers preset distortion-envelope effects that bend and twist an object as if it were wrapped around a cylinder or other shape — all accessible through a simple dialog box. For those who want to tweak the presets, the dialog box offers Bézier control of the distortion envelope. The basic plug-in comes with 40 distortion envelopes and retails for \$99; four additional packs of 40 distortion envelopes each are \$49 each. You can buy the plug-in and all 200 envelopes for \$199. 201-845-6100.

BelInfinite Graphics. Ranging from wild to mild, the 55 filters in Infinite FX, from BelInfinite Graphics, can tweak and twist any object. The package includes filters that produce wave, rippling, motion-blur, and fish-eye effects. Many of the filters let you twist and stretch object outlines by using simple slider controls. An outline preview



in the filter dialog box shows the effects of the filter before you apply it. Any effect can be combined on the fly with a 3-D rotation of the object. The set is PowerPC-native and lists for \$99. 800-554-6624 or 404-552-6624.

HSC Software. Kai's Power Tools comes to Illustrator 5.x? With a new installment in the popular KPT series, you'll soon be able to apply such painterly effects as Emboss, Flare, Halo, Fragment, Sketch Roughen, Crumble, and Shatter to Illustrator files. Other items in the 18-filter package perform specific path operations that can bend an object or produce a 3-D effect. HSC acquired the set — originally called Sree's Cool Tools — from Intrepid Systems for release this spring. The price will be comparable to that of other KPT products (\$99 to \$149). Most of the filters will be PowerPC-native. 805-566-6200. / SJS

More True Colors

APPLE'S COLORSYNC 2.0 isn't the only color-management system (CMS) in town. Although most users will plug in to ColorSync, you may want the additional features of other CMS products. ★ You can tailor Agfa's new **FotoTune 2.0** (\$395) to suit your work flow. With the PowerPC-native FotoTune application, you can edit monitor and output-device profiles (to compensate each color for dot gain, for instance) as well as create your own scanner profiles. FotoTune Photoshop plug-ins let you match your scanner to your monitor and then export that RGB data to CMYK. With its QuarkXPress XTension, you tag incoming images and print them on any printer, using the color space of your final output device. 800-685-4271 or 508-658-5600. ★ DayStar Digital's **ColorMatch** (\$219) also consists of a set of device profiles, Photoshop plug-ins, and QuarkXTensions that, like FotoTune, let you tag and render images for printing on any output device. Based on Kodak's KCMS software, ColorMatch 1.1 is now PowerPC-native and compatible with the latest versions of QuarkXPress and Photoshop. 404-967-2077. ★ Hardware measuring devices play an important role in color matching. Now X-Rite, the leading maker of densitometers for the printing market, is bringing its expertise to the desktop, with **Digital Swatchbook** (\$1,095), the first in a suite of hardware and software products for the Mac. Like Light Source's Colortron, the hardware device measures spectral data; separate units for measuring monitor light and printing inks are also planned. Digital Swatchbook interpolates 16 bands of information to 32. Like Pantone's ColorDrive, Digital Swatchbook's software lets you measure colors, simulate light conditions, import color libraries, and save custom libraries. 616-534-7663. ★ For an offbeat way to build in color management, consider **Colormeister**, a new Photoshop add-on from Germany. Colormeister loads custom tables for Printing Inks Setup for many press conditions. 0049-(0)-89-159-52-20 (fax) or CompuServe e-mail 100272.215. / PP



GRAPHICS / BY BRIAN P. LAWLER

Photo CD to CMYK

Photo CD technology has spawned several third-party applications for opening and using Photo CD images. Which approach is best?

JUST A YEAR AGO, Eastman Kodak's Photo CD was treated by most people as a wait-and-see technology. It was a curious method for scanning photos onto a CD-ROM and making them available for — well, it

wasn't really clear how the images could be used. Was it for television? Was it some kind of video technology? Was it for multimedia? Ironically, it was Kodak itself that created much of the misunderstanding, promoting Photo CD as a consumer product when it really should have targeted it at those in the graphics and communications industries.

Today Photo CD is viewed by most people in the graphic-arts and multimedia worlds as an alternative to owning a scanner or paying for the use of one. The once curious gold disc is now regarded as a versatile medium for the storage of high-quality images for reproduction, distribution, and archiving — at a fraction of the cost of conventional methods.

Having recognized Photo CD's potential in the publishing business, Kodak is launching an ambitious education and quality-assurance program for Photo CD service providers to help them woo high-end users. And pointing to new directions, Kodak has recently announced a licensing agreement with Live Picture, the company providing the technology underlying HSC Software's product of the same name. The resolution-independent FITS technology will be incorporated into Photo CD and other products in the future.

Here's how the Photo CD system works: A Kodak Photo CD Imaging Workstation writes each image to CD-ROM in a format called YCC, which allows computer and television systems equal access to the image. But because a Photo CD image has a

proprietary format, using one can require an extra step or two, and many users are still stymied by the number of ways in which they can access a Photo CD image and convert it to TIFF or other formats suitable for print reproduction.

Straight from the OS

Actually, you don't *really* need anything special in order to open Photo CD images. Macintosh system software (System 7.1 and later) can open Photo CD images in RGB PICT format, thanks to the Apple Photo Access extension, which reads the preview images on the Photo CD disc and makes

them available to an associated application called Slide Show Viewer. Double-clicking on the Slide Show icon opens a QuickTime slide show that contains numbered previews of all the images on the disc.

Slide Show Viewer also offers double-click access to any individual image on the Photo CD disc. To view a Photo CD image, you select a target resolution and PICT-capable application in Slide Show Viewer's Preferences menu (the target application must accept PICT images).

In addition to reading the preview images, the Apple Photo Access extension creates PICT images from their Photo CD counterparts. The converted images appear in a series of folders named after the five resolutions contained in the standard Photo CD Image Pac (see the "Photo CD Glossary" sidebar), in a folder called Photos. (Because it's created by the Mac, this folder doesn't show up on other computer systems.)

figure 1

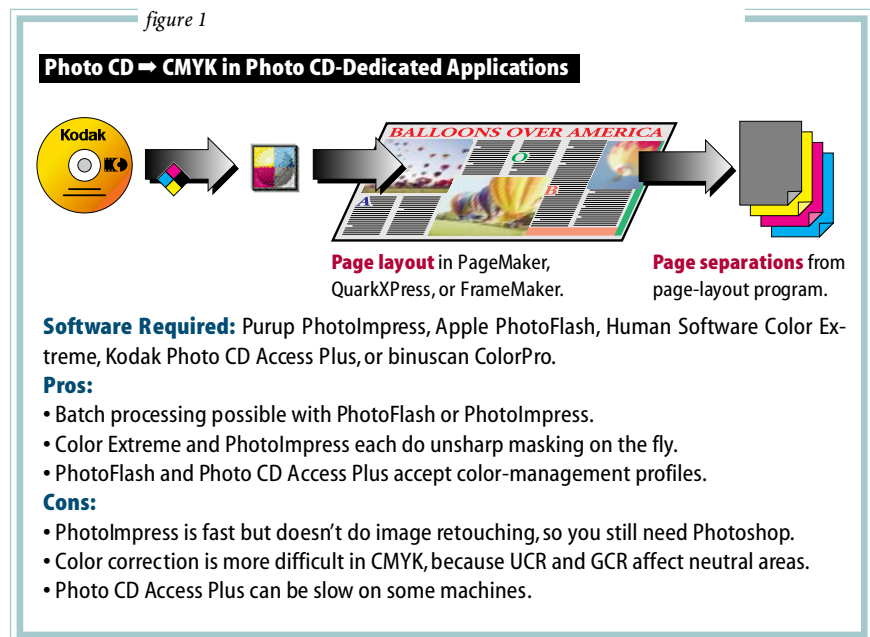


ILLUSTRATION / BRIAN P. LAWLER

Ready for Photo CD

Page-layout products such as Adobe Page-Maker and QuarkXPress can place Photo CD images directly, thus eliminating a step for desktop publishers, and Adobe Photoshop, as we'll see, provides numerous ways in which to open Photo CD images. But several applications have been designed with Photo CD in mind (see figure 1).

Apple PhotoFlash. PhotoFlash opens photos directly from a Photo CD disc and lets you perform simple retouching and image modification. Geared toward the low end, PhotoFlash is nonetheless a surprisingly powerful yet easy-to-use program. It also accepts Photoshop plug-ins such as the Kodak Photo CD Acquire Module for Adobe Photoshop and the Kodak CMS Photo CD plug-in. The program is fully scriptable, so you can use AppleScript to automate any of its functions. That's good news for those who want to open and convert Photo CD images quickly and efficiently. \$129. 408-996-1010.

Kodak Photo CD Access Plus. If you just dabble in Photo CD or don't want to retouch images, this basic tool may be all you need. Photo CD Access Plus opens Photo CD images and permits cropping, rotation, and minor tonal adjustments before it saves them in PICT, TIFF, or EPS format. Photo CD Access Plus ships with a basic set of Kodak color-management-system profiles that characterize an image's input and output colors. You can purchase additional profiles from Kodak

CMS, a division of Eastman Kodak, for better control over the conversion of colors from YCC to RGB or from YCC to CMYK. \$50. 800-235-6325 or 716-724-4000.

Purup PhotoImpress. PhotoImpress, distributed by Display Technologies, is a tool for those who have serious Photo CD intentions. It can open a Photo CD image at any resolution; can apply unsharp-mask functions, rotation, and color correction; and can then save the image in CMYK format. The PowerPC-native program can batch-process several Photo CD images too. PhotoImpress has flexible color-separation controls, including both GCR (Gray Component Replacement) and UCR (Undercolor Removal). It can also build a closed-loop Color Circuit, created by running supplied test documents and then having Display Technologies build a colorimetric corrective file for the application that fine-tunes its performance for your reproduction process. \$1,349. 402-593-6123.

binuscan ColorPro. Another PowerPC-native stand-alone application is ColorPro. This speedy program can produce CMYK or RGB files from Photo CD images. It can handle batches, using a "hot folder" system — whenever you drop a file into a hot folder, the program automatically converts and saves it in either TIFF or EPS format. ColorPro uses a special version of Kodak Photo CD Access Plus that has been modified to work under ColorPro's control. The program creates CMYK color separations that

have many professional color-control features. \$1,950; Limited Edition (RGB only), \$499. 212-681-0600.

Human Software Color Extreme. Another sophisticated application for managing Photo CD images, Color Extreme can make CMYK, monochrome, and RGB conversions directly from a Photo CD disc, adding color adjustments and conversions on the fly. It offers resolution selection, unsharp masking, image rotation, and cropping as well as powerful controls for color-adjustment and color-separation techniques for those who choose CMYK conversion. Two drawbacks are that it's not as fast as Purup PhotoImpress and that it requires 20 MB of RAM. \$695. 408-867-2966.

PhotoCDshop

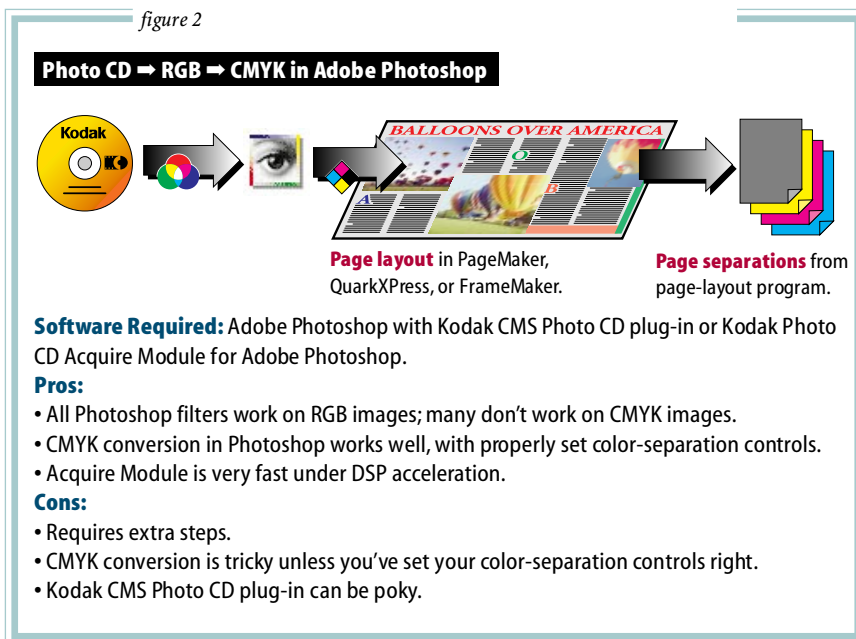
You can easily modify Adobe Photoshop's numerous Photo CD capabilities by adding third-party plug-ins. In addition to letting you open Photo CD images directly, plug-ins extend Photoshop's agility in opening the images. The advantages of plug-ins are potentially better speed, better color quality, and more-advanced color-separation options than those Photoshop provides out of the box (see figures 2 and 3).

Kodak CMS Photo CD Plug-In. When you install Adobe Photoshop on the Mac, you get a Photo CD plug-in that's a product of Kodak's CMS division. This default plug-in allows Photoshop to open Photo CD images in RGB format in any of the available resolutions and convert them to CIE LAB and RGB color. Opening Photo CD images in this way can work quite well, and best of all, the plug-in is free with Photoshop. 800-752-6567 or 508-670-6877.

Human Software CD-Q. CD-Q lets you open Photo CD images directly in CMYK format, obviating the need to do color separation within Photoshop. This plug-in provides unsharp masking, cropping, rotating, resolution selection, and individual color adjustment that it applies to the image while it's importing it from the Photo CD disc. Like its big brother, Color Extreme, CD-Q crawls on a 680x0 Mac, but it's now available for the Power Mac. \$129. 408-867-2966.

Kodak Photo CD Acquire Module for Adobe Photoshop. Kodak offers the Acquire Module, a plug-in that affords considerable speed gains to those who have a DSP accelerator card from the likes of Radius or

figure 2



DayStar Digital (although a DSP card isn't required). The Acquire Module offers the standard resolution choices, preview images, cropping, sharpening, color and brightness controls, and access to more than 20 standard curve controls for fine-tuning the acquired images. It opens images in monochrome and RGB modes only. \$60. 800-235-6325 or 716-724-4000.

Plug In to Plug-ins

You can further extend the functionality of Photoshop Photo CD plug-ins with additional software.

Kodak CMS Precision Transforms. Enhancements to the basic Kodak CMS Photo CD plug-in (which is provided with Photoshop) include some highly sophisticated input-and output-device color profiles that transform Photo CD images from their native format (YCC) directly to CMYK. Kodak CMS makes these available in three packages. The \$99 Starter Pack includes input-device color profiles for a variety of original film types and a generic CMYK output-device profile. The other packages (\$995 each) comprise precision transforms for popular graphic-arts proofing products, such as Kodak Contract (also sold as Enco Press-Match), AgfaProof, and 3M Matchprint. These packages include the input-device color profiles and output-device transforms for four-color printing to SWOP, SNAP, and other standards. Kodak CMS has characterized these transforms for the color qualities

A PHOTO CD GLOSSARY / which format do you need?

Image Pac: An Image Pac is a Photo CD file that contains several components of an image.

Photo CD Master: For this — the original Photo CD disc — the Photo CD system scans from 35mm film only and writes up to 100 images on the disc in one or more sessions. Each image is stored as an Image Pac, which contains five resolutions of the same image (in ascending order, Base/16, Base/4, Base, Base*4, and Base*16), starting at 72K and going to 18 MB.

Print Photo CD: A newcomer to the Photo CD line, the Print Photo CD system is a hardware/software combination that is connected to a high-end prepress system. It allows files to be written from any electronic image file or scanned image to a Photo CD disc in CMYK format. It simultaneously writes an Image Pac of each image in YCC format.

Pro Photo CD: A Pro Photo CD disc contains six resolutions of each scanned image. The largest image is 72 MB when opened in RGB format (Base*64 resolution). Pro systems also allow films of up to 4 x 5 inches to be scanned. The disc can hold a maximum of 25 images.

of the proofing media used. 800-752-6567 or 508-670-6877.

DMMS Software PhotoStep. PhotoStep's function is the building of custom LUTs (lookup tables) for use by the Kodak Photo CD Acquire Module for Adobe Photoshop. Using a two-step process, PhotoStep builds custom curves with which Photo CD images are acquired in Photoshop. These curves let you open images with the greatest tonal information possible in RGB mode and greatly enhance the images' saturation and brightness, for example. \$300. 214-490-9096.

Technodroid Picture Easy. For those who don't want to build their own LUTs, PhotoStep's author, Ray Mullin, now sells a set of LUTs for the Kodak Acquire Module. Picture Easy's LUTs are called Grainy Dark, Web Light, Web Medium, Offset Light, and so on. These files enable the Acquire Module to

access images depending on the quality of the original image and the chosen printing process. \$99. 800-269-9979 or 214-387-8534.

So What Do I Do?

Inundated with software that opens and converts Photo CD images, I prefer a speedy route that doesn't compromise quality.

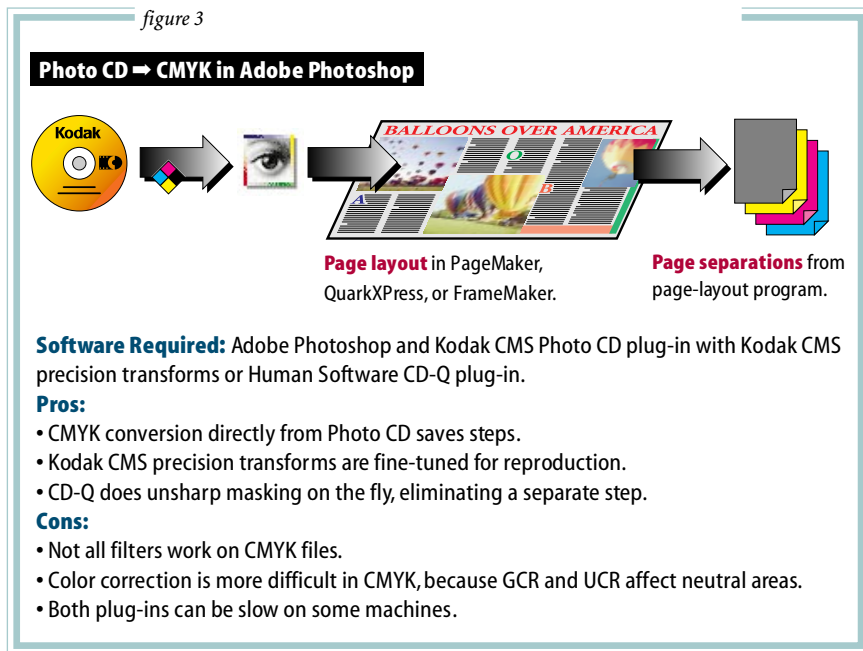
My preference is to use the Kodak Photo CD Acquire Module for Adobe Photoshop. It takes advantage of my Radius Thunder II GX card's DSP chips. The result of DSP acceleration is an impressive improvement in speed over other methods. I routinely open 18-MB RGB (that's Base*16 in Photo CD terms) Photo CD images with the Acquire Module, and it takes less than a minute per image on my Mac Quadra 700, compared to several minutes for other techniques.

After the image has been opened, I re-touch and enhance it as needed in RGB (my preference is to work in RGB because the conversion to CMYK can compromise color) and ultimately convert it to CMYK, using Electronics for Imaging's EfiColor SWOP profiles for the paper I'll be using on-press. I'm finicky about my press-gain control, so I end up bending the curve of almost every image to maximize its reproduction quality.

Lately, I've been using a Power Mac 8100 and Purup PhotoImpress to make CMYK files directly from my Photo CD images. Wow! The speed of this software, coupled with its batch-processing capabilities, just may convince me to use PhotoImpress in production. ☺

Brian P. Lawler is the author of Photo CD Revealed (Color Resource, 1994). In the past two years, he has lectured and led workshops on Photo CD in 65 cities in nine countries.

figure 3



GRAPHICS HOW-TO / BY JANET ASHFORD AND LINNEA DAYTON

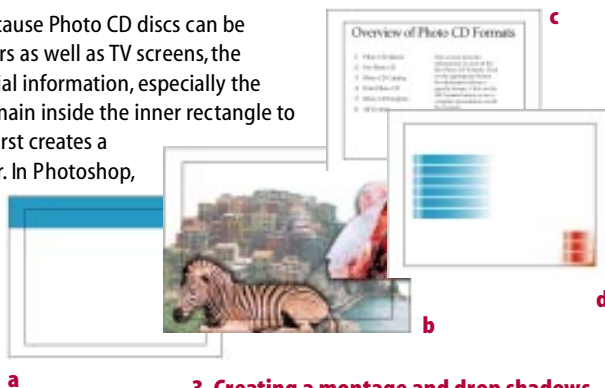
Layers Lend Flexibility

Designers who work on interactive CD-ROMs need supple imaginations — and software.

CREATING SCREENS FOR interactive CD-ROMs requires many of the same skills — and tools — as designing their paper-based counterparts. But bit-mapped images present special problems for on-screen presentations. Because elements such as interactive buttons often change as a project progresses, images must be easy to modify. Thankfully, Photoshop 3.0's Layers palette makes it simple to add changes and experiment with imagery. For the disc accompanying *The Official Photo CD Handbook* (Peachpit Press), produced by Michael Gosney, designers John Odam and Janet Ashford used Photoshop 3.0's Layers controls to make a template containing separate layers for background, buttons, and type.

Janet Ashford and Linnea Dayton wrote and produced Adobe Illustrator: A Visual Guide for the Mac (Graphic-sha). Dayton and Jack Davis authored The Photoshop 3 Wow! Book (Peachpit Press).

1. Drawing a template. Because Photo CD discs can be viewed on computer monitors as well as TV screens, the interactive program's essential information, especially the interactive buttons, must remain inside the inner rectangle to avoid being clipped. Odam first creates a template in Adobe Illustrator. In Photoshop, he then uses that template to create a Photoshop template with layers for the (a) title bar, (b) background montage, (c) type, and (d) interactive buttons (which he makes with Photoshop's Gradient tool).



2. Editing photographs. To create the background for the first screen, Ashford scans original photographs of a village, a young girl, and a zebra (a) at 72 dpi. After adjusting their color, she silhouettes the subject of each photograph. To paint out a fence crossing over the zebra, she uses the rubber-stamp tool. Then she saves each silhouetted image (b) separately.



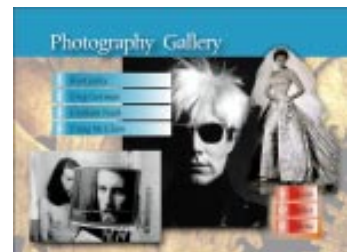
3. Creating a montage and drop shadows. Ashford puts the silhouetted images in successive layers, starting with the village image. To create a drop shadow, she duplicates an image on a separate layer by dragging its name to the New Layer icon on the Layers palette and then moves it below the object's layer. She offsets the shadow 6 pixels, sets the current color to black, checks Preserve Transparency, and fills the shadow with black. She deselects Preserve Transparency and then applies a Gaussian Blur of 6 pixels. Clicking on the Layers palette's links column ties the object and shadow layers together so they can be moved as a unit.



4. Layering buttons. Now working on the button layer, Ashford first removes an unnecessary red button. (She restores the button in the final version, by simply duplicating an existing button in the button layer and adding text on the type layer.) She then creates a light background panel for text by making a rectangular floating selection and making it into a separate layer above the background and below the type. Using the Levels controls, she adjusts the left black triangle of the Output Levels slider to lighten the panel and then adds a drop shadow behind the panel.



5. Adding text. To set the type for the title, buttons, and information block, Ashford works in the Illustrator template to take advantage of Illustrator's precise typographic controls. She imports the Illustrator text file into the type layer of her Photoshop file. She makes all button names and information-block text black and button numbers and title-bar text white. When all the elements are complete, Ashford chooses Save a Copy to produce a final PICT version of the screen but keeps the large file that contains the floating layers, in case further changes are needed. Ashford and Odam created more than 30 screens — one of which is shown here — using these techniques.



EXPERT TIPS / BY BOB SCHAFFEL AND CHUCK WEGER



Under the Rainbow

Using the right proportion of black ink in your color printing can spell the difference between nicely balanced colors and a muddy mess.

THE VISION THING. The science of color. That's what we talked about last month. But what about the technology of color? Putting ink on paper, for example? Despite Internet fever, we think print will be important for a few more years, so it's worth printing your pages right.

The world of printing is an analog mess. As we said last time, offset color printing uses four inks: cyan, magenta, yellow, and black (CMYK). The black is there because even though the other inks combined at 100 percent should make black, the resulting color doesn't look black, due to the imperfect spectral characteristics of ink. Printers use a real-black ink, made from condensed sweat socks (just kidding), to achieve a good-looking black on paper.

But there's another reason to use black ink: You can reduce the total amount of ink blanketing a page by substituting black ink for combinations of the other three colors. How? You use one of two techniques: Under-color Removal (UCR) and Gray Component Replacement (GCR). If adding together 100 percent each of C, M, and Y (theoretically)

makes black, then less CMY, in the proper balance, makes shades of gray. But why not just use black ink? That's what GCR and UCR do: They replace (in GCR) or remove (in UCR) portions of the other three inks.

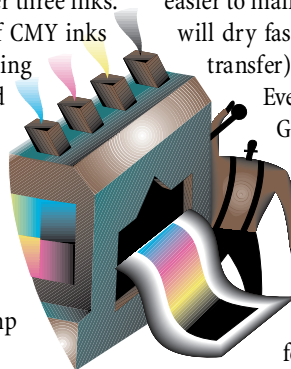
UCR lowers the amount of CMY inks in dark *neutral* areas by reducing the size of the CMY dots and increasing the size of the K dots. This occurs only in shadows (areas that have a lot of ink and already appear achromatic, or gray). With too much UCR, the colors in the shadows perceptibly jump to black-and-white.

GCR goes further, by replacing some of the CMY inks in chromatic, or colored, sections with black ink. This technique takes advantage of the fact that you can make any color (hue) by using one or two inks of the

CMY triad; the third ink merely serves to darken and "shape" the color. The darkening component (consisting of a percentage of all three colors) can be replaced with black, without anyone noticing. But don't take this too far; 100-percent black replacement makes colors look dirty. In practice, most GCR is limited to 50 percent or less.

Why do all this? You use less ink, which means less hassle, more control on-press, and sometimes lower cost. Color balance is easier to maintain with less ink, and the ink will dry faster, preventing offsetting (ink transfer) from sheet to sheet.

Even experts disagree on the best GCR and UCR settings, which depend on the type of job, paper, and press; the press operators' experience; and possibly the phase of the moon. With newsprint, for example, UCR is usually preferred, because *too much* black can muddy photographs rapidly. ☒



Bob Schaffel is technology director of the Professional Prepress Alliance. Chuck Weger is an independent consultant and publisher of the Photoshop Monitor newsletter.

THE BLACK WHOLE / using Adobe Photoshop's Separation Setup controls

PHOTOSHOP ALLOWS SOME CONTROL over how much black is generated in color separations, which is handled in two Preferences settings: Printing Inks Setup, which concerns gray balance, and Separation Setup, which handles GCR/UCR. We're interested in the latter.

Total Ink Limit determines the amount of ink in the darkest areas of the photo. Using 100 percent of each of the four inks (400 percent total) is too much ink for high-speed printing. We usually limit the total to about 300 percent, allocating 100 percent to black. Thus the other three inks must total 200 percent. That's where GCR and UCR come into play.

Here's a quick way to see the effects of GCR and UCR: Open an RGB file, and display Photoshop's Info palette (Window: Palettes: Show Info). Show CMYK values by changing the settings in the Palette Options submenu. Drag the cursor over key areas to measure their CMYK

dot percentages, and watch how the percentages change.

Now let's play with Separation Setup (save your existing settings first!). Photoshop's default GCR setting is Medium. Change it to Heavy (note how the curves change), click on OK, and then go back and remeasure the same areas. The numbers change. These CMYK values are created when you separate the image.

Test several settings to see the effect on the dot densities. Now convert your file to CMYK and turn off the display of the black channel (by clicking on its eyeball icon in the Channels palette) to view graphically how much contribution the black ink actually makes.

We recommend a Black Generation setting of Light for most jobs printed on an offset press. That way you won't introduce black in light areas of your image. But as always, check with your printer first.

TELECOMMUNICATIONS /

Apple Bundles Voice-Mail, Telecom

IS A SOFTWARE MODEM a good idea? Apple (800-776-2333 or 408-996-1010) thinks so and is trying to boost the popularity of its GeoPort technology with a new bundle of hardware and software. The GeoPort Telecom Adapter Kit includes the latest version of the GeoPort system software, AppleTelecom 2.0, as well as the GeoPort Telecom Adapter, Cypress Research's MegaPhone (Mac-based voice-mail software), and Aladdin's SITcomm telecommunications software. However, GeoPort still does not support the 28.8-kbps V.34 modem standard; it has a maximum rate of 14.4 kbps, and Apple isn't saying when that rate will increase.

GeoPort technology emulates a modem in software and integrates it with fax and voice-mail functions. The intelligent-dialing and -messaging capabilities of AppleTelecom 2.0 can distinguish if an incoming call is a voice, fax, or modem call, enabling you to use a single line for all three functions (no, not simultaneously). The components of the GeoPort Telecom Adapter Kit also make

use of the latest Apple system-software technology, letting you send and receive voice-mail and fax messages via the PowerTalk mailbox and also allowing you to transmit faxes via QuickDraw GX desktop icons.

The cost — a \$130 estimated street price for the bundle — sounds enticing, but you'll need to spend about \$50 extra if you want to keep such high-end MegaPhone features as remote message retrieval and automatic directory synchronization with TouchBase Pro and FileMaker Pro databases. The version of MegaPhone that comes with the GeoPort Telecom Adapter Kit is actually just a 30-day trial version; after 30 days, it reverts to a basic version that provides only speakerphone, dialer, and digital-answering-machine capabilities. To keep the remote-message and directory-synchronization capabilities — as well as over a dozen other high-end features — owners of the GeoPort Telecom Adapter Kit can purchase a \$49.95 upgrade from Cypress. 408-752-2700. / John Rizzo



OPERATING SYSTEMS /

Mac and UNIX Swap Identities

RUNNING THE MAC OS AND UNIX on the same machine is now smoother and easier than ever, with major new Mac-on-UNIX and UNIX-on-Mac software releases from Apple (800-769-2775, ext. 7675, or 408-996-1010) and Tenon InterSystems (800-662-2410 or 805-963-6983).

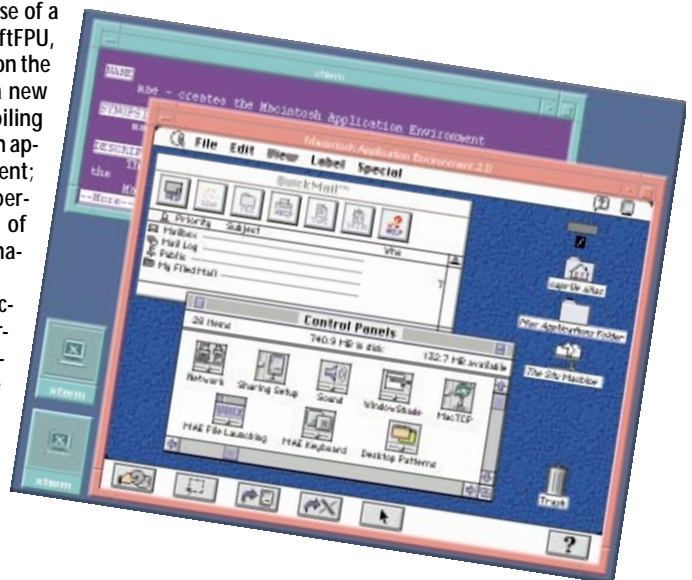
Apple's Macintosh Application Environment (MAE) 2.0 (\$599; upgrade, \$199) runs Mac applications — including *network-based* applications — and the Finder in a standard X Window on two UNIX platforms: Sun SPARCstations running the Solaris operating system and HP 700 workstations running HP-UX. By installing AppleTalk protocols into UNIX, Apple has enabled MAE 2.0 users to run Macintosh groupware programs such as QuickMail, from CE Software, and Meeting Maker, from ON Technology. Users can also make UNIX files and directories available to other AppleTalk users — whether they are on Macs or on UNIX systems running MAE 2.0 — via System 7 file sharing. And for those who like a friendly Mac face on their Internet applications, MAE 2.0 includes MacTCP for TCP/IP connectivity from the Mac environment.

MAE 2.0 includes a number of Finder enhancements as well as improved emulation of

the Mac OS for faster operation. Its version of System 7.1 is enhanced with some handy features from System 7.5, including Find File, Extensions Manager, WindowShade, Stickies, QuickTime 2.0, and a QuickTime player. Although MAE 2.0 emulates a 68040LC chip, which has no floating-point-math capability, applications that require floating-point math are able to run with the use of a shareware program called SoftFPU, which Apple plans to distribute on the MAE 2.0 CD-ROM. In addition, a new feature called dynamic recompiling increases the speed of Macintosh applications by as much as 50 percent; it accomplishes this feat by performing on-the-fly recompiling of heavily used 680x0 code into native RISC code.

On the flip side of the Macintosh/UNIX coin, Tenon InterSystems has added preemptive multitasking to and made improvements in the networking features of its MachTen UNIX-on-Mac software. A standard POSIX-compliant UNIX,

MachTen 4.0 (\$695) can now simultaneously run multiple processes in protected spaces. The improved networking features include a high-speed TCP/IP stack with Internet tools (domain-name service and support for the ftp, SMTP, TCP/IP, UDP, SLIP, and PPP protocols) as well as client and server NFS file sharing. / JR



New Long-Distance Links

WHETHER YOU'RE DIALING in to your office or connecting from a branch office to a corporate backbone, long-distance network access is what you need — and it's the reason firms such as Digital Equipment (800-344-4825) and Engage Communications (408-688-1021) are releasing new products for remote access and long-distance routing, respectively.

Digital's two new remote-access servers, the Digital NetRider 90 (8 ports, \$3,400) and the Digital NetRider 900 (32 ports, \$9,345), support modem connections over PPP from Mac, DOS, Windows, and UNIX machines. Using PPP instead of ARA, Mac users can dial in to an AppleTalk network and then connect beyond that network to the Internet (using IP and an Internet gateway). The NetRider products also support Novell's IPX protocol, for users who want to dial in to a NetWare server.

With these products, you get unlimited distribution licenses for the PPP client software for all platforms. The Mac software also includes Apple's MacTCP and some Internet-access utilities. However, server administrators must either use the provided Windows application or communicate with the server via telnet.

Each NetRider server is available either as a stand-alone unit or as a module that mounts inside Digital's DEChub 90 or DEChub 900 hub products.



On the WAN-connection side of the long-distance market, Engage Communications is expanding and improving its ExpressRouter line of WAN routers. The new ExpressRouter LTI is geared toward LocalTalk networks that need long-distance connections. It includes one LocalTalk port and one WAN port, the latter of which Engage can configure with or without a CSU/DSU (Channel Service Unit/Data Service Unit). The CSU/DSU configuration (\$1,995) supports a fast, frame-relay connection. The non-CSU/DSU configuration (\$1,595) supports other WAN connections such as T1.

Engage has also added frame-relay, SNMP, and IPX support to its existing line of three-port ExpressRouters. For owners of current ExpressRouters, IPX and SNMP support are available via flash-memory upgrades (pricing variable); adding frame-relay support requires a \$500 hardware modification. / Shelly Brisbin

MAC TO UNIX /

Upgrades Ease Connections

THE BARRIERS BETWEEN Macintosh users and UNIX servers continue to crumble, with new upgrades to AFP-compatible file servers from Pacer Software (508-898-3300) and Helios Software, whose U.S. representative is European MikroGraf (408-461-6061). PacerShare 3.0 (\$3,000 per 20-concurrent-user license; upgrade, free with service contract) and EtherShare OPI 1.2 (a \$7,150 add-on to the EtherShare file server; upgrade, \$300) have each enhanced support for Mac users accessing UNIX servers in DTP environments. PacerShare 3.0 has other new features as well.

The key new DTP feature in both products is support for OPI (Open Prepress Interface), a desktop-publishing standard that converts large, high-resolution images into smaller, more manageable bit maps for

use during layout. OPI is a boon for firms that perform layout on the Macintosh but store their high-resolution images on a UNIX server. Since EtherShare OPI 1.2 can



now be used with PCShare, Pacer's UNIX-based IBM-compatible file-server product, it provides the benefits of OPI to Windows users as well as to Mac users.

PacerShare 3.0 additionally offers support for more users and easier password changing and printing from Macs. The maximum number of supported users is now 2,046, not 256, and users can change their own passwords now that PacerShare supports the UNIX-standard NIS directory services. PacerPrint, a print server integrated into PacerShare, now lets Macs use printers on an IP network and supports Mac PPD (PostScript Printer Description) files. / SB

Groupware Meets NetWare

NOVELL IS GIVING AWAY a module that integrates its **GroupWise** office-automation software (e-mail, calendaring, scheduling, and task management) with **NetWare 4.1**, by synchronizing both products' user lists and providing a single point of administration for both environments. The **GroupWise NetWare Integration Pack** contains a GroupWise snap-in module and a NetWare Directory Services NLM. For GroupWise customers, the integration pack is free via modem or \$29.95 by mail. 800-453-1267 or 801-225-5000.

Small upstart **IDT** has upstaged AT&T, MCI, and Sprint in becoming the first long-distance phone-service provider to offer free Internet access with every account. 201-928-1000. It's costing less and less to build a network these days.

Farallon (510-814-5000) has cut prices 14 to 35 percent for its EtherWave connectors and cards as well as for its Ether10-T Starlet hubs. Farallon says its hubs are available on the street for as little as \$24 per port. **Software Architects** (206-487-0122) has acquired **DOS Mounter**, the original DOS disk-mounting utility, from **Dayna Communications** (801-269-7200). Software Architects, which has been bundling DOS Mounter with its utility software for over two years, has assumed all sales and support of the product and has developed the PowerPC-native DOS Mounter 5.0 (\$95; upgrade, \$19.95). Meanwhile, **Dayna** has thrown its hat into the Fast Ethernet ring. The firm will start producing 10/100BASE-T cards for NuBus and PCI slots later this year.

NRC (408-383-9300) has combined flexibility with speed in its MultiGate Switch (base unit, \$7,995), a switched Ethernet hub that uses modular, hot-swappable ports. Each of the 12 Ethernet ports can use any of three media-connection modules: 10BASE-T (\$195), fiber-optic (\$395), or thin Ethernet (\$195). Plus, you can connect to servers or backbones via a high-speed port that supports FDDI, 100BASE-T, 100VG, and ATM modules. Prices for the modules are \$3,995 for FDDI and \$2,495 each for 100BASE-T and 100VG. The ATM price was not set at press time. / JR



NETWORKING TELECOMMUNICATIONS / BY SHELLY BRISBIN

ISDN: The Promise and the Pitfalls

Using ISDN is the fastest way to make an ARA connection, conduct a videoconference, or travel the Internet. Getting your home connected is not so speedy, so be informed.

IF YOU'VE EVER viewed World Wide Web pages on the Internet or used ARA (Apple Remote Access) to exchange files, you've probably been frustrated by a slow modem connection. The promised land for power

telecommuters is supposed to be ISDN (Integrated Services Digital Network) — the digital telephone system moving into more and more cities and neighborhoods around the U.S. You can get an ISDN connection that can move data at 56 to 128 kbps — that's two to four times the speed of V.34, the fastest modem standard.

Still, ISDN is not for everyone. The costs can be high for casual Internet browsers or ARA users, and getting ISDN service working is quite a bit more complicated than installing a new phone line. For those who persevere, the speed can be worth it. But first, you'll need to learn something about the technology — or hire a consultant.

Is ISDN for You?

ARA and other remote-access schemes may be acceptably fast with a high-speed modem, but ISDN (like the telephone in voice communication) makes it possible to work remotely in real time. You might hold a videoconference, collaborate on a document with members of your workgroup, or send and receive complex database queries. You might also choose the Load Images option when using a World Wide Web browser. With a fast connection, transferring GIF and JPEG files via the Internet is no longer an unpleasant task. However, if you use ARA or the Internet only to read e-mail, check your calendar, or perform other tasks that don't require you to move large chunks of data across phone lines, ISDN won't be worth the trouble or the cost.

To figure out whether now's the time to get ISDN service, you'll need to consider cost, availability, and your phone company's hardware.

Cost. Compared to the cost of a dedicated T1 line, ISDN is a bargain that can save money for people who move a lot of data, but it can be an expensive habit for the hobbyist.

For instance, Pacific Bell in California charges \$24.50 a month plus a prime-time fee of 3 cents for the first minute and 1 cent for each additional minute for local calls. For residences, weekend and evening calls are free. ISDN setup costs are similar to those for installing an analog phone line: Pacific Bell charges residences \$35.75 (\$75.75 for businesses) plus a \$125 network-termination fee that is waived after two years and prorated if you cancel service before then. This is in addition to a hardware investment that can run from a few hundred dollars to over \$1,000 (see the "Bringing ISDN to Your Mac" sidebar).

Availability. If your mouth is still watering, stop now and make a few calls to see if ISDN is available where you live. All the regional telephone companies in the U.S. offer home ISDN service in large parts of their service areas (particularly in metropolitan areas), but many are still in the process of adding the capability to their switching equipment.

You should also check to see if ISDN is available at the other end of your connection — your client, service bureau, Internet provider, or employer. If they aren't going to

have ISDN installed for six months or more, delay your installation. Prices for service and equipment are changing rapidly, and new equipment and software are continuously coming to market.

Switch Consistency. To ensure a continuous link to the other end of a long-distance connection, you need to ask your phone company whether the ISDN switches along your connection route are consistent. The phone company uses switches to route and transfer ISDN signals from its facility to your home. Some types of ISDN switches transfer only



56 kbps per channel, not the full 64 kbps each can theoretically manage. Making calls from one switch type to another can cause compatibility problems.

Navigating Installation Pitfalls

Once you've determined that ISDN is for you and is available at both ends of your connection, you're ready for the three big steps: buying equipment, ordering ISDN service, and overseeing installation.

Buying Equipment. As the sidebar details, you need to buy equipment to implement ISDN. But before you make your purchase, verify that the phone company can handle the type of hardware you're thinking of buying. Ask your phone-company representative what type of ISDN service the company offers: custom or National ISDN-1. Most

hardware supports both standards, but be sure to confirm a match before you buy.

Ordering Service. The basic ISDN residential service is called the Basic Rate Interface (BRI). Each BRI has three ISDN channels — two “B,” or Bearer, channels, which can transmit data and voice signals at 64 kbps each, and a “D” channel, which carries signaling information. You can also get additional channels in some areas.

You have some choices on how to configure these channels. With the proper equipment and setup, a person doing big file transfers might want to tie the two B channels together, for 128 kbps total bandwidth. Alternatively, you can keep each B channel separate to conduct two simultaneous ISDN sessions or to use one channel for sending and another for receiving during videoconferencing. You might also use one channel for voice calls while the other transmits data. Although a two-channel ISDN setup can replace your analog line, we recommend holding on to your regular phone line as well. Unlike that of a standard phone line, your ISDN connection will go dead in the event of a power failure.

Once you’ve decided on the type you

want, you’re ready to order ISDN service from the phone company. Getting ISDN up and running requires you to take an active part. Think of setting up ISDN as a team effort: You and the telephone company’s personnel will need to ask and answer many configuration questions.

Installation Time. Pacific Bell says it can have you running on ISDN 7 to 12 days after you place your order. However, veterans of ISDN installation report that it is not a simple matter, even for the phone company. The technician must configure your ISDN line, setting and testing a variety of parameters, and most phone companies recommend that you be there during the process. Plan to spend the better part of a day at home while the service is installed, and don’t be surprised if you have to do some troubleshooting afterward.

Ramping Up to the Fast Track

Veterans of thorny ISDN installations give Pacific Bell and NYNEX high marks for the work they are doing with ISDN. Both monolithic companies have some overwhelmingly complex issues to deal with, from problems caused by diversification to

difficulties in working with the computer industry and its unfamiliar jargon and standards. Both companies have special ISDN groups that can speak to you in the right language (Pacific Bell’s ISDN Service Center, 800-472-4736; the NYNEX Information Hotline, 800-438-4736).

Internet users can access ISDN information on the World Wide Web. Pacific Bell has a Basic Rate ISDN Page (<http://www.pacbell.com/Products/SDS-ISDN/sds-isdn.htm>) and an ISDN Users’ Guide (<http://www.pacbell.com/isdn/book/toc.html>). Bell Atlantic offers ISDN information at <http://www.ba.com/isdn.html>. In addition, there is Don Kegal’s ISDN Page (<http://alumni.caltech.edu/~dank/isdn/>), which has links to lots of ISDN information. Also, you should try to talk to people who have gone through the ISDN installation process. Getting ISDN service can be a tricky proposition, but the best advice for anyone interested in ISDN is to arm yourself with as much information as possible before making any decisions. ☺

Shelly Brisbin is a MacUser associate editor. She’s working up the courage to install ISDN.

Bringing ISDN to Your Mac

TRADITIONALLY, YOU’VE NEEDED two components to complete an ISDN connection: a network terminator (NT1), costing between \$250 and \$500, and a terminal adapter, which can cost from \$500 to \$1,200. Recently, however, Motorola (800-451-2369 or 205-430-8000) began offering the BitSURFER (\$495), a box that performs both functions.

NT1. Stand-alone NT1 units can include an integrated power supply or require a separate unit. Leading vendors include AT&T and Northern Telecom (they distribute their NT1 units through Bell Atlantic at 800-221-0845 or 610-695-2300) and Tone Commander (800-524-0024 or 206-349-1000).

You’ll want to mount the terminator in a permanent location, because unlike unplugging a standard telephone, disconnecting ISDN alerts the phone company’s central office that there is trouble on the line and may result in your being charged for another installation.

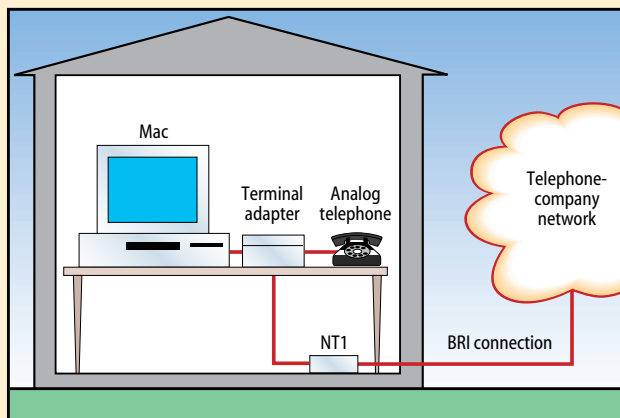
Terminal Adapter. This hardware facilitates the transfer of data to and from your computer. A few vendors, such as Euronis (800-244-3797 or 407-363-9008)

and 4-Sight (800-243-0701 or 515-221-2100), provide NuBus-card-based terminal adapters. 4-Sight’s Assistant bundle includes a NuBus card, an NT1 unit, and software for \$1,995.

You can buy external, non-Mac-specific terminal adapters from AT&T, Motorola, and Hayes Microcomputer Products (404-840-9200). These adapters connect to the Mac’s serial port, which provides slower connections than NuBus does. They’re a good idea only if your Mac

doesn’t have NuBus slots and you can live with lesser speeds. Whether you choose the internal or external variety, get a terminal adapter that includes a jack for connecting telephones and fax machines.

Software. Although NuBus-card-based terminal adapters include driver software, with an external adapter, you may need to search for CCL (connection control language) tools for use with Communications Toolbox-compatible applications such as ARA. You may also be able to write your own CCL scripts with assistance from the terminal-adapter vendor. / SB



For home ISDN, you need a terminal adapter and an NT1 — typically two separate, external units, but also available in one box. We recommend using a terminal-adapter NuBus card (not shown) and an NT1 unit with AC power and battery.

MAC TO PC / BY JOHN RIZZO



Clones' Corporate Clout

Mac clones will be more PC-like than you think — in ways that will help them break existing barriers to the cross-platform corporate market.

IMAGINE YOURSELF sitting in front of one of the first Mac clones. The first thing you'll probably do is check if it's *really* Mac-compatible, just as I did when I recently got my hands on a prototype Mac clone from

Power Computing, the first U.S. company to announce that it would produce clones. I immediately launched Insignia Solutions' SoftWindows, which ran flawlessly.

Although this action garnered looks of "he's at it again" from the other *MacUser* editors, running Windows software did convince me of the clone's Mac compatibility. Emulation is a tricky task, pushing CPU, memory, and I/O to the limits. If a clone can run Windows in emulation, there's a good chance it'll complete the easier task of running Mac applications. At the same time, I wanted to see if this clone was going to be as cross-platform as Apple's Macs. Cross-platform features are vital for the survival of clones, and clones are vital for the survival of Apple.

The clones that will ship from Power Computing, Radius, and Cutting Edge in the coming months — plus Hitachi, Motorola, Pioneer, Toshiba, and Zenith, if rumors are correct — will enhance the Mac's cross-platform viability and will appeal to large organizations in several strategic ways. First, the existence of multiple vendors for Mac clones will allow large organizations — such as the government, educational institutions, and corporations — to solicit multiple bids when buying Macs, as they have in the past when buying PCs (and as many standard procurement processes require). Buyers will also be able to order custom configurations from clone vendors. Furthermore, clones from companies with PC experience are likely to include

features currently found only in PCs, providing better integration into cross-platform offices.

Buying Macs the PC Way

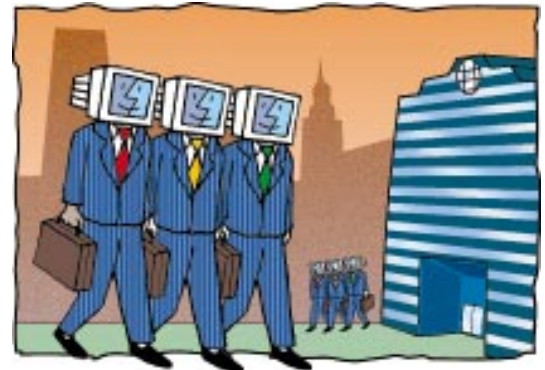
The biggest change clones will create in the Mac market is that there will no longer be only a single source (Apple) of machines on which to run the Mac OS. Single-sourcing is anathema to organizations that purchase PCs as they do office furniture — directly from a manufacturer, in bulk, with a multiple-bidder process.

Single-sourcing has affected individual buyers as well. If you're a Windows user looking for a laptop and you don't like the trackball on Brand X, you have PC clones from about 50 other manufacturers from which to choose (compared to, at press time, a choice of only 5 *models* of PowerBooks from Apple). In fact, the term *clone* is a bit of a misnomer when talking about computers, because machines from different manufacturers are *not* exact copies of each other; rather, they offer differences in both hardware and software configuration.

The ability to order custom configurations — something that's out of the question with Apple Macs — will be another important change. A custom configuration might simply involve specifying the amount of RAM, the capacity of the hard drive, and type of I/O cards. Some companies and government agencies also like to specify the brand of subcomponents, such

as hard-drive controllers, in a PC. In addition, a custom configuration might include wrapping the motherboard in an entirely new package, such as a tower with extra storage bays or an industrial-strength box. Rack-mounted Mac clones, for instance, will be useful for engineers who want to use Macs for process control and monitoring.

There are also customers who want Mac clones that are more compatible than Macs are with PC-compatible hardware. The PCI bus, to be used in new Macs later this year, will greatly help, since it can allow companies to stock a single type of add-in card for Macs and PCs alike, in some cases. Mac-clone manufacturers can move farther in



this direction by adding in other PC-compatible hardware, such as a parallel port, token-ring card, and modem card — items commonly found in PCs today. A clone manufacturer can even decide not to use ADB and instead create a model that uses a standard serial PC keyboard and mouse.

Of course, the ultimate cross-platform clone is one that runs the Mac OS and PC operating systems interchangeably. Fortunately, we don't have long to wait for the Apple/IBM/Motorola common hardware platform, which will ship in mid-1996 if all goes according to plan. Clone manufacturers can get the jump on the common

platform by bundling a clone of an existing Mac with a 486 coprocessor card or SoftWindows — the latter is more attractive than it used to be, now that version 2.0 is completely 486-compatible.

In fact, because Apple is allowing cloning of its DOS Compatibility Card (see “Report from the OS Wars,” February ’95, page 121), Macintosh-clone manufacturers can even make coprocessor cards and build them onto logic boards, possibly lowering costs. A clone manufacturer can also bundle an Orange Micro 486 coprocessor card for high-speed DOS/Windows compatibility.

Leading-Edge Mac Clones

Predicting the evolution of a Mac-clone market would require a crystal ball if there were not an existing model — the PC-clone market. It’s no coincidence that Power Computing, begun in 1993 for the purpose of building PowerPC machines, was founded by Stephen Kahng, an engineer and consultant who helped define the mass market for PC clones in the mid-1980s. Kahng’s former company, Up to Date Technology, designed one of the top-selling PC clones of the ’80s, the Leading Edge Model D. The machine was popular because it offered high-quality equipment at a low price, a feat made possible by an inventive strategy of outsourcing components. Soon after, other PC vendors began following Kahng’s example, and PC prices plummeted.

Kahng was also the general manager at Chips & Technology, a company that helped revolutionize the production of PC clones by providing sets of low-cost chips that could be plugged in to any system. Since then, Kahng has consulted for seven of the top-ten PC-clone vendors to help produce high-quality PCs at low prices.

Kahng has similar plans for Mac clones, which he claims he’ll be able to price competitively against PC clones. He plans to bring the benefits of PC purchasing to Mac clones by filling orders for specialized configurations overnight. Power Computing also plans to follow the PC model of building clones to be sold under the brand names of other manufacturers. One such manufacturer is likely to be Olivetti, Power Computing’s largest outside shareholder. With such strategies, Power Computing hopes to sell 100,000 Mac clones in its first year, to become “the Compaq of the Mac world.”

Besides enabling customers to buy Mac-compatibles the same way they buy PCs, Power Computing’s products will soon include cross-platform features such as PCI. Power Computing also plans to make a clone of the Apple/IBM/Motorola common hardware platform after Apple ships it. Ironically, because Power Computing plans to offer custom configurations, it will also be able to supply older Mac-only configurations, such as NuBus- and 68040-based Mac clones, long after Apple has removed them from its product list.

Portable Platform Crossers

The clone plans revealed thus far have focused on desktop products, but Mac laptops as well could benefit from cloning. For instance, a PowerBook Duo would be much easier to use and more compatible with PC laptops if it had a PCMCIA slot instead of a minidock. Other PC-laptop features, such as token-ring connectivity, aren’t available for any of today’s PowerBooks. Fortunately, laptops will be in the second wave of Macintosh clones. Power Computing says it will make a laptop next year, and major PC-laptop vendors are said to be looking at the possibilities.

Currently, Mac OS licensees get a basic architecture for desktop machines. A clone manufacturer would have to put together its own Mac-clone architecture for a laptop. However, Apple is considering developing a PowerBook-clone license package that would supply a laptop architecture to clone manufacturers, speeding the way for laptop clones.

Even further away is a Macintosh-laptop clone capable of running the Mac OS and Windows interchangeably. So far, nothing whatsoever has been uttered about an Apple/IBM/Motorola common hardware platform for a *laptop*. The best bet for a multiplatform laptop would involve running SoftWindows on a PowerPC 603-based machine, which would likely run Windows somewhat faster than today’s 601-based Power Macs. Unfortunately, it doesn’t appear that anyone will be able to fit a 486 coprocessor card in a PCMCIA slot anytime soon. But if anyone could, it might well be Stephen Kahng. ☒

MacUser technical editor John Rizzo is the author of MacUser Guide to Connectivity and How Macs Work.

Power Macintosh Upgrade Worksheet

You can turn many pre-PowerPC Macs into Power Macs, but is it worth it? Use our handy worksheet, and decide for yourself. / BY TM PETACCIA

Can You Upgrade?

Before you do anything, you need to find out if there's a Power Mac upgrade option — from either Apple or a third party — for your current Mac. Check figure 2 to see if your Mac is one of the chosen ones.

If it is, sharpen your pencil and get ready to fill in the worksheet in figure 1 to calculate your potential savings. You may want to photocopy the worksheet in case you need to calculate the savings for more than one upgrade option. You can also download the electronic version (filename PMACUPSIT) from ZiffNet/Mac, MacUser's on-line service (see end of article for details on accessing ZiffNet/Mac).

The Power Mac You Want (Line 1)

To find out whether buying new or upgrading makes more sense, you first need to figure out which Power Mac model you'd buy if you went that route. Refer to figure 3 for model and configuration information to help you fill in the top line of the worksheet.

Since you can choose the configuration of a Power Mac when you order it, bear in mind the following considerations about what you're likely to need:

RAM. Native PowerPC applications typically require more RAM than 68040 applications. Although Power Macs come with as little as 8 MB, you'll probably need more. You can use Connectix's RAM Doubler software (about \$60) to get the minimum we recommend, 16

MB. If you use a lot of large applications, you're better off with 16 MB or more of real RAM.

Hard Drive. Some native PowerPC apps are disk-space hogs. Get the largest-capacity hard drive you can afford.

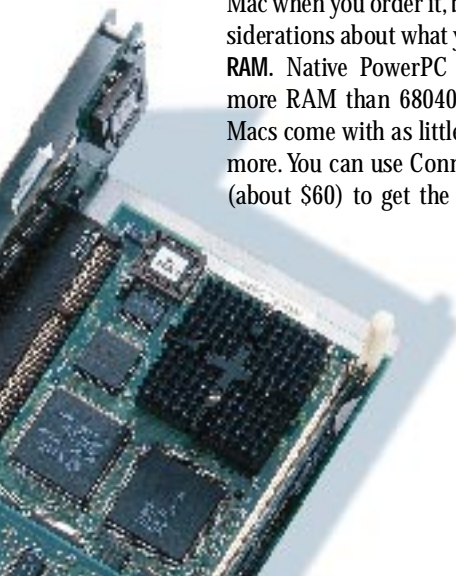
DOS Compatibility. As of this writing, the only Power Macs that have a DOS-compatibility option from Apple are the 6100s. If you want to run DOS or Windows programs on a 7100 or an 8100, you'll have to buy DOS-compatibility software or hardware separately (see figure 4 for options).

Video Capability. From the options in figure 3, choose the color bit depth (8 bits = 256 colors, 16 bits = thousands of colors, 24 bits = millions of colors) and the size of monitor you want to attach to your Power Mac. If you want to use more than one monitor, put that down too.

The Mac You Own (Line 2)

This part of the worksheet is straightforward — just fill in information about the Mac you already own, with the aid of the other tables in this article. Here's some help with the parts that aren't necessarily obvious:

Video Capability. The color capability of your Mac is not obvious. If the Mac has a video card, look in the card's documentation. Otherwise look in the Monitors control panel to see what resolution you're currently using or check the documentation that came with your Mac. A simpler and more thorough guide is available in the Mac Catalog Database, which you can download from





ZiffNet/Mac; it gives detailed color-resolution information for every Mac.

The Upgrade You Need (Line 3)

To figure out the upgrade you need in order to make your Mac equivalent to the Power Mac you listed in line 1 of the Upgrade Worksheet, follow the instructions on line 3 of the worksheet. You may not be able to get an exact match with a Power Mac — for instance, your current Mac may not be able to hold the amount of RAM you want. Take into account such inequalities if you're not sure whether to upgrade or buy new after filling out the worksheet.

Processor. You can get a PowerPC processor upgrade by

adding a plug-in card or by swapping the logic board. Not all Macs give you both choices, though. Take a look at figure 2 to find the options available for your Mac.

The least expensive upgrade options are the Apple Power Macintosh Upgrade Card, the Apple Macintosh Processor Upgrade, and the DayStar PowerCard 601. They're inexpensive because they have a PowerPC 601 chip and very little else. If you choose one of these cards, you don't necessarily get the full clock speed you'd get with a Power Macintosh Logic Board Upgrade, because the PowerPC on these cards can run only at double the clock speed of your original system. For example, if you put a Macintosh Processor Upgrade in a 25-MHz 68040

figure 1

Upgrade Worksheet / should you upgrade or buy new?

	A Processor	B RAM	C Hard Drive	D CD-ROM Drive	E DOS Compatibility	F Video Compatibility
1. The Power Mac You Want (see figure 3)				(yes or no)	(yes or no)	(screen size and bit depth)
2. The Mac You Own				(yes or no)	(yes or no)	(screen size and bit depth)
3. The Upgrade You Need	(Choose card from figure 2.)	(1B minus 2B)	(1C minus 2C)	(yes or no)	(If yes, choose from figure 4.)	(VRAM, video card, or neither)
4. Upgrade Cost (see article for prices)		(3B x \$30/MB RAM)				
5. Total Upgrade Cost	(Add all prices in line 4.)					
6. Cost of a Power Mac	(Add price from figure 3 to cost of any items on line 1 that don't come with the Power Mac.)					
7. Potential Funds from Selling Current Mac	(See the Macintosh Price Index in New on the Menu in the most recent issue of <i>MacUser</i> .)					
8. Net Cost of a Power Mac	(line 6 minus line 7)					
9. Financial Advantage/Disadvantage of Upgrading Your Mac	(line 8 minus line 5; see article for advice)					

*RAM prices change frequently and also vary according to type of SIMM; see Mac-magazine ads for more-accurate prices.

figure 2

Power Mac Upgrade Cards / estimated street prices

Upgradable Macs	Apple Power Macintosh Upgrade Card	Apple Macintosh Processor Upgrade*	DayStar PowerCard 601†	DayStar PowerPro 601 (80 MHz)	DayStar PowerPro 601 (100 MHz)	DayStar Turbo 601 (66 MHz)	Apple Power Macintosh Logic Board Upgrade‡
Ilisi, Ilvi, Ilvx, Performa 600						\$1,200 [◇]	
Ilci						\$1,200**	
Quadra 700, 900, 950	\$500			\$1,900	\$2,200		
Quadra 605, 63x; LC 47x, 57x, 63x; Performa 47x, 57x, 63x		\$660	\$650				
Centris/Quadra 610	\$500			\$1,900	\$2,200		\$1,050 (6100/60 upgrade)
Centris/Quadra 660AV	\$500						
Centris/Quadra 650	\$500			\$1,900	\$2,200		\$1,525 (7100/66 upgrade)
Quadra 800	\$500			\$1,900	\$2,200		\$2,000 (8100/80 upgrade)
Quadra 840AV							\$2,000 (8100/80 upgrade)

*Includes ClarisWorks 3.0. †Same card as the Apple Macintosh Processor Upgrade. ‡Credit for returning the original logic board has been subtracted from the prices for these boards.

◇Should be shipping by now. **Requires System 7.5, which is not included.

These plug-in cards double your original system's clock speed. These plug-in cards come with a RAM cache. Installing this logic board essentially gives you a Power Mac.

Performa 475, you wind up with a 50-MHz PowerPC 601 system — less powerful than any Power Mac offering. On the other hand, if you install one of these cards in a 33-MHz Quadra, the clock speed of your upgrade processor matches or exceeds that of the Power Macintosh Logic Board Upgrade processor. Even if you don't match logic-board-processor speeds, installing one of these cards still makes your current Mac much faster than before.

The other plug-in cards, the DayStar PowerPro 601 and Turbo 601, are significantly more expensive, but justifiably so — they do more. The DayStar cards provide clock speeds of 66, 80, or 100 MHz, depending on the model, and they have a RAM cache, to really put you in the fast lane.

Apple's Power Macintosh Logic Board Upgrades essentially give you a brand-new computer. Along with a new logic board, you get 8 MB of RAM, new system software, I/O enhancements (such as SCSI and network handling), speech capability (PlainTalk), telephony (GeoPort), and even a new Power Macintosh nameplate for the front of your machine. As with the DayStar cards, you get a PowerPC 601 chip.

When you fill in the worksheet, make a note if you're getting a slower clock speed from the processor upgrade than you would

if you were to get a Power Macintosh.

Video Capability. You can increase the video capability of your current Mac in two ways: by adding VRAM (video RAM) or by adding a video card. Adding VRAM is much less expensive, but you may be frustrated by the lack of accelerated video. Check to see if adding VRAM is an option for your Mac. If it's not, you may be able to increase video capability by adding a video card.

If you already have a video card and the processor upgrade you have in mind is the logic-board swap, check with the vendor to see if your video card is PowerPC-compatible. If it's not, ask whether you need a hardware upgrade or a new software driver (drivers are usually free) and make a note of the needed item in this line.

Upgrade Cost (Line 4)

Filling out the cost of each of the upgrade items you need is mostly a matter of looking up the numbers in the tables in this article. These give rough estimates of the current street prices for each item, but you'll get a more precise number if you scour Mac-magazine ads.

Hard Drive. You can get a good 540-MB external hard drive for about \$350.

CD-ROM Drive. Expect to pay at least \$200 for a double-speed drive. Quad-speed drives start at around \$400.

Video Capability. Video cards cost \$500 to \$1,000.

Cost of a Power Mac (Line 6)

Write in the approximate price of the Power Mac you'd like to buy (see figure 3), but add to that extra costs for hardware items you may have to buy from third parties. For instance, if you would like a Power Mac 7100 or 8100 and plan to use DOS or Windows programs, you'll need DOS-compatibility software or hardware (see figure 4 for prices). Software is less expensive but is not adequate if you use DOS or Windows programs frequently.

Another cost on top of what you pay for a Power Mac may come in the form of RAM. The maximum amount of RAM you can get in a Power Mac from Apple is 16 MB, as of press time. You'd probably be more comfortable with 24 MB or more, though — if so, remember to include the extra cost here.

If you plan to move 30-pin SIMMs from your current Mac to a Power Mac, you'll need to buy a converter such as the SimmSaver/8, from SimmSaver Technology (800-636-7281 or 316-264-2244), for about \$60.

If you own a Quadra and have an odd number of RAM SIMMs you plan to move to a Power Mac, you'll have to buy one more SIMM to be able to use them all, since you must add SIMMs in pairs to Power Macs.

Financial Advantage/Disadvantage (Line 9)

Once you've filled out the rest of the worksheet and calculated how much money, if any, you can save by upgrading instead of buying new, the route to take may be clear. If you get a negative number, meaning it costs *more* to upgrade, the choice is clear — buy a Power Mac.

If upgrading costs less, however, you have some considering to do. If the savings are only \$200 to \$300, it's probably worth buying a Power Mac — you'll save a lot of time and avoid the hassle of finding all the pieces of hardware you want and installing them in your current Mac. Also, Power Macs come with a one-year warranty. Make sure you can sell your current Mac for the price you want before you buy a Power Mac if you're counting on those funds.

If your savings from upgrading are higher than \$300 or \$400, consider doing the upgrade. It should be simple. If you're saving that much money or more, you've probably already bought most of the hardware you need and won't need to do much more than install a processor-upgrade card or a new logic board.

If you're still wavering between upgrading and buying new, one of these points may tip the balance one way or the other:

Consider buying a Power Mac clone — they should be out from Power Computing

and Radius by now.

Think twice before you upgrade a Mac II-series computer — the memory architecture, video support, and bus are inferior to those in the Power Macs.

On the side of upgrading, keep in mind that your current software (680x0 versions) is going to run slower on a Power Mac. If you get one of the DayStar cards, you will still be able to run your current software at a speedy pace, because you can use either the 680x0 or the PowerPC 601. So with the DayStar cards, you transition as slowly as you want into the sometimes expensive PowerPC-native versions of your software.

The Waiting Game


If you want faster speed than you can get from the current PowerPC 601 chip, wait a while. Word has it that machines with the next PowerPC chip are due this summer.

figure 4

DOS Compatibility / current options

	Compatible Macs	Estimated Street Price
Software		
SoftWindows for Power Macintosh (Insignia Solutions)	all Macs that have a PowerPC processor	\$300
Hardware		
Apple DOS Compatibility Card	Power Mac 6100, Performa 6100 series	\$700
Reply Technologies DOS on Mac	Quadra 610, 650, 660AV, 700, 800, 900, 950; Centris 610, 650	\$500 (50 MHz), \$700 (66 MHz)
Orange Micro OrangePC	all NuBus Macs (including Power Macs)	\$900 – \$3,400*

*Price depends on the OrangePC card's processor speed and amount of RAM. On the low end, you get a 486DX2/50 processor with 4 MB of RAM. On the high end, you get a 486DX4/100 processor and 32 MB of RAM. Windows software costs about \$90 more. This was the only hardware option for the Power Mac 7100 and 8100 at press time.

If you do decide to wait, just plug the new prices in to this same worksheet to figure out if you want to upgrade the trusty Mac that has kept your desk warm until now. 

TM Petaccia runs Hired Gun, a Mac consulting firm in Charlotte, North Carolina.


 You can find the electronic version of the worksheet (filename PMACUP.SIT) and the Mac Catalog Database in the MacUser and ZiffNet/Mac areas on CompuServe and eWorld. See page 4 for details on accessing ZiffNet/Mac.

figure 3

Power Mac Configurations and Costs / the selection from Apple

Apple sells Power Macs only in the configurations listed here, but you can get other packages from vendors of Power Mac clones, such as Power Computing (408-526-0500).

	Video Capability	Estimated Street Price
Power Macintosh 6100/66		
8 MB of RAM/350-MB hard drive	16-bit on a 14" monitor	\$1,700
8 MB of RAM/350-MB hard drive/CD-ROM drive	16-bit on a 14" monitor	\$1,900
16 MB of RAM/500-MB hard drive/DOS-compatible	16-bit on a 14" monitor	\$2,550
Power Macintosh 7100/80		
8 MB of RAM/1 MB of VRAM/500-MB hard drive	16-bit on a 16" monitor	\$2,700
8 MB of RAM/1 MB of VRAM/700-MB hard drive/CD-ROM drive	16-bit on a 16" monitor	\$3,000
16 MB of RAM/2 MB of VRAM/700-MB hard drive/CD-ROM drive/AV card	24-bit on a 16" monitor (supports two monitors)	\$3,600
Power Macintosh 8100/100		
8 MB of RAM/2 MB of VRAM/700-MB hard drive	24-bit on a 16" monitor	\$3,400
16 MB of RAM/2 MB of VRAM/1-GB hard drive/CD-ROM drive	24-bit on a 16" monitor	\$4,200
16 MB of RAM/2 MB of VRAM/1-GB hard drive/CD-ROM drive/AV card	24-bit on a 16" monitor (supports two monitors)	\$4,400
Power Macintosh 8100/110		
16 MB of RAM/2 MB of VRAM/2-GB hard drive/CD-ROM drive	24-bit on a 16" monitor	\$5,800

MOBILE MAC / BY SHARON ZARDETTO AKER



PowerBook Puzzlers

Confused about lost memory, power conservation, or whether X rays hurt your PowerBook? Find answers to many such PowerBook questions here.

IT DOESN'T TAKE MORE THAN 10 or 20 repetitions of the same question before any columnist valuing her sanity gets the stock answers printed up. So, without further ado, here's a brief FAQ — frequently asked

questions list — about PowerBooks, culled from Apple support; on-line forums; user-group sessions; and yes, from somewhere out there in the Internet soup.

I added more memory to my PowerBook, but it's all being used by the system software. Why is the system using 11 MB of memory (as reported in About This Macintosh)?

You must be using System 7.5 with PowerTalk and QuickDraw GX! (Sorry, cheap shot.) Actually, this is the all-time most frequently asked question for all Macs, not just PowerBooks.

Everything stored in the Mac's memory

has an *address* identified by a number. The Mac was designed to refer to byte-long memory locations by numbers up to 24 *bits* long, the highest one available being 1111111111111111111111111111 (in binary, of course). And although that provides more than 16 million addresses, it doesn't provide more than 8 megabytes' worth for your applications.

Eventually, the Apple powers that be provided an extra group of numbers for memory addresses — sort of like the U. S. Postal Service's

ZIP + 4. The extra 8 bits give the Macintosh 32-bit-addressing capability, which lets it break the 8-MB RAM barrier. You turn on 32-bit addressing in the Memory control panel.

Everyone tells me to turn on 32-bit addressing in the Memory control panel if I have more than 8 MB of memory. But there's no such option in my control panel — what should I do?

Don't do anything. The latest-model Macs are permanently in 32-bit-addressing mode, so you don't have to turn it on. If you don't have the 32-bit option in your control panel, you don't need it. (Of course, this means you can't turn it off, either, so older vertical-market applications that require 24-bit addressing won't run on the new Macs.)



ILLUSTRATION / JAMES O'BRIEN

POWERBOOK SECRETS / opening a Duo

A PIECE OF CAKE — that's how easy it is to open a Duo so you can install memory. In fact, it's easier than with the all-in-one PowerBooks — not like installing a modem; for that you have to remove the display, the palm rest, the hard drive, the backup battery, the trackball assembly, the case stiffener, and the logic board. This process makes a \$50 modem-installation fee a bargain! What we'll cover is opening the Duo far enough to get memory modules installed. Be sure to take prudent antistatic precautions.

First, unplug the power adapter and take out the main battery. Latch the cover, and turn the Duo upside down; then, with a T8 screwdriver, remove three of the four screws that hold the case together: all but the one nearest the front of the computer, under the trackball assembly.

Turn the Duo right side up, and open the display. Tilt the computer toward you, keeping one hand

poised to catch the keypad as the top edge (nearest the display) detaches. The bottom edge of the keypad (against the palm rest) is attached by two small ribbon cables that you don't have to remove. Just flip the keyboard over, and place it upside down on the palm rest. Doing so exposes the memory-attachment area.

When you put the Duo back together, avoid overtightening the screws on the bottom of the case. If you're not careful, it's easy to strip the screws as well as to warp the keyboard and cause erratic keyboard action.

If you're adventurous and want to disassemble the Duo to install a hard drive or modem, see the instructions in *The PowerBook Companion, Second Edition* (Wolfson/Aker, Reading, MA: Addison-Wesley, 1993) and on-line in a file called Duopen (see page 4 for info on accessing ZiffNet/Mac). / Rich Wolfson



PHOTOGRAPHY / GIAMPIERO BENVENUTI

Can I put my PowerBook through the X-ray machine at the airport?

Yes. Trust me. (Unless you want to dig up my July '94 column on the topic — and the October '94 Letters section, in which I responded to the letters it generated.)

Should I turn the PowerBook off (instead of putting it to sleep) when I'm transporting it?

That's not necessary. Apple's guidelines to the contrary, a jostled key isn't going to wake up a sleeping PowerBook while you're schlepping it through an airport or transporting it in the trunk of a car. And even if it did — so what? You *do* have it set to go back to sleep, right?

No matter how careful I am about conserving battery power and reconditioning and recharging my NiCd battery, I can't get much more than an hour of juice. I used to get nearly three hours from this battery. What am I doing wrong?

You're not doing anything wrong. *Rechargeable* isn't synonymous with *immortal*. Rechargeable batteries have a limited *life cycle* — the number of times the battery can be drained and recharged. NiCd batteries average 500 life cycles, which translates into 1.5 to 3 years of use. If you've been faithfully reconditioning and recharging it and you're down to an hour or so of power, it's time for a new battery. (And thank you for recycling!)

I can't run my PowerBook on the battery alone — the AC adapter has to be plugged in too. Help! What's going on?

Sounds like you've blown a fuse — one on the motherboard, which effectively disconnects the battery. There are several possible culprits, the cruelest being a defective adapter. The 17-watt adapters with part number M5140 (check the "brick" for the number) are particularly prone to this nasty problem: Look for a hairline crack in the black ring around the end of the adapter (the part that plugs in to the PowerBook). A defective adapter and a blown fuse add up to a warranty repair, so check with Apple SOS (800-767-2775). But don't expect a replacement unless the adapter is actually damaged; no prophylactic replacements are available!

For information about replacing a blown fuse, see Rich Wolfson's sidebar to my September '94 column. By the way, the other symptom of a blown fuse is that your battery charges in an external charger but not

while it's in the PowerBook.

I've heard that it's a good idea to reset the Power Manager every so often. Why — and how — should I do this?

Resetting the Power Manager is a panacea for all sorts of ills on PowerBooks — much as zapping the PRAM is for all Macs. It's particularly helpful when strange things are happening with your battery — for example, when it won't charge in the PowerBook.

The method for resetting the Power Manager — actually a custom chip with memory that occasionally gets confused — differs slightly from model to model of the PowerBook. For all models except Duos, start by unplugging the AC adapter and removing the battery, and let the PowerBook sit like that for 5 minutes. Then:

For the 160, 165, and 180: Nothing else is required.

For the 140, 145, and 170: Press the reset and interrupt buttons simultaneously by pushing them with a paper clip bent into a U shape; hold the buttons in for 10 seconds.

For the 150: Press the reset switch for 20 to 30 seconds (but not longer), re-install the battery, and then press and release the reset switch again.

For the 500 series: Press the Control, Command, and Power On keys simultaneously for about 10 seconds.

For Duos, all you need to do is press the power button on the back of the PowerBook for 30 to 45 seconds.

What does the switch on a Duo battery do?

Nothing! It's there merely for you to flip back and forth to remind yourself that, for instance, you just took the battery out of the external charger and it's fully charged now. By the way, you have an older battery; the newer ones don't have this switch.

What's the biggest drain on the PowerBook's battery?

The single biggest power eater is the CPU, and the faster it's running, the more power it uses. If your PowerBook model gives you the option of choosing the processor speed, by all means keep it notched down to the lower one whenever possible. Enabling

processor cycling will save you a lot, too.

What the hell is "processor cycling"? Should I keep it on or off — and where can I find the control for it?

Processor cycling, also known as "processor rest," is a very clever way of conserving power. If you're not using the PowerBook but it's still awake, the processor goes into a special rest state instead of spinning its wheels waiting for you to do something. As soon as you do anything, it jumps right back up to speed. In general, I suggest you keep cycling on to prevent the processor from being on all the time. The Allow Processor Cycling setting is in the PowerBook control panel (as of the 3.0 Update for System 7.1). On some PowerBook models, though, it's hidden: You have to Option-click on the Easy/Custom button to get the check box to appear — but even that works only when the control panel is already in the Easy view!

Be warned, though: Because processor cycling puts the PowerBook into a not quite



figure 1 / This mysterious switch on the original Duo battery confuses many new Duo owners, who can't determine what it does. In fact, it does nothing; you can flip it between the filled-in and not-filled-in silhouettes to remind yourself whether the battery is fully charged or not.

asleep state, it can prevent many games and some screen savers from working properly. (And you'll notice that the text cursor blinks veerrry slooowly when the processor is resting.)

Will running my PowerBook in black-and-white instead of color give me more battery time? How about changing the contrast?

Nope, in both cases. Whatever difference either action might make is so small as to not make any difference at all (if you know what I mean). When it comes to the display, it's the backlighting that consumes an inordinate amount of battery power. That's why those color screens are power-hungry: They require stronger backlights. ☹

Sharon Aker frequently asks whether her editors can provide a replacement for her aging 170. Rich Wolfson has just changed his desk model from a Quadra to a Power Mac and thinks it's time to retire the old 100 and jump to a latest-and-greatest PowerBook model.

NET TRAVELER / BY MICHAEL SWAINE



Niceties on the Net

Ten rules of net etiquette that will keep you from getting flamed, plus help for newbies and how to stay virus-free in your travels.

YOU'VE HEARD THE STORIES. An unwary traveler commits some obscure breach of Internet etiquette and gets flamed to a cinder. The natives can be brutal to a clueless newbie. Here are ten rules for flame-

free roaming of the Internet's wide reaches.

1. Lurk first, and ask questions afterward.

Lurking means visiting newsgroups without participating in the discussion. Do it, and don't ask dumb questions. A dumb question is any question answered in the FAQ — the list of frequently asked questions you'll find posted regularly in many newsgroups. You will also find lots of Usenet FAQs at <ftp://rtfm.mit.edu/pub/usenet-by-group/news.answers/>. Read the FAQ.

2. Respect the local population's culture. The net is multicultural. Every discussion group has its own etiquette. The *alt.tasteless* newsgroup has different standards than the *rec.music.dylan* group. Fortunately, many groups post their rules. Read them. Follow them.

3. Post properly. When subscribing to or unsubscribing from a mailing list, don't post the message to the whole list; this annoys the members no end. E-mail it to the automated list manager (often called *listserv* or *majordomo*). Ditto for requests for the FAQ. Keep the welcome message you usually receive when joining a list. If you do, you'll always know where to send an unsubscribe command. And make sure you've joined the right conversation. Some newsgroups and lists are for discussion, and others are for announcements; some are for novices in a subject, and others are for experts. Read Rules for Posting to USENET in *news.announce.newusers* or *news.answers* and in *Dear Emily Postnews*

at *news.newusers.questions*.

4. Eschew surplusage. Don't post a message merely to say "Me too." Quote relevant material from a message you're responding to, but don't quote the whole message. Act as though every byte you send out costs somebody time and money, because it does. Respect bandwidth.

5. Downplay downloads. If you're logged in to a company or school account, go easy on the file transfers. Not everyone in the office needs to download those NASA pictures. On the other hand, *do* download FAQs; don't read them on-line.

6. No kidding. OK, be your waggish self, but don't assume the natives will get the joke. Nuances get lost in transmission. Morphy's Law (Murphy's Law after transmission) says: If your message can be misunderstood, it probably will be. You're safest tagging your wit with :-) or (just kidding). Grin and bear it.

7. Don't spam. Spamming means broadcasting an advertisement to lots of newsgroups or mailing lists. It's guaranteed to get you flamed big-time.

8. Don't flame. Unless you want to be flamed. Flaming, or verbal abuse, is part of the on-line culture, but those who give, get.

How are you doing so far? Eight for eight and feeling smug? Here's one for you seasoned travelers:

9. Have mercy on the clueless newbies. These people are not *intentionally* making your life miserable. Although it's dumb to waste bandwidth saying, "Me too," it's dumber

still to gratuitously point this error out.

And finally, rule 10:

10. There are no rules. Individual newsgroups have their rules, and there *are* general guidelines for avoiding trouble, but the Internet as a whole is distributed anarchy. There are just two values net veterans unanimously defend: individualism and the net itself.

Tip of the Month

You can manage to avoid getting flamed but still get burned. Computer viruses (and Trojan horses) do exist, and you

can't just assume that Virex shots provide you with protection against every strain. Net-con-

connected companies often have a *firewall*, an electronic barrier between computers connected to the net and machines holding precious company *stuff*. You can create your own virtual firewall by following a few simple rules: Download programs only from sites maintained by vendors, or from well-known archive and mirror sites. Beware of messages that come with attachments (especially *unsolicited* attachments). And use antivirus software. If such steps are followed regularly, you (most likely) won't get burned.

Don't Know FAQs from FAX?

MacUser maintains a list of frequently asked questions (FAQs) about the Internet, *MacUser* itself, and this column specifically at faq@macuser.ziff.com. You can reach me at traveler@macuser.ziff.com. ☺



BY CHRISTOPHER BREEN AND BOB LEVITUS / *Tips compiled by Christopher Breen*



Help Folder

What to watch out for when you install a CD-ROM drive, how to manage the font farm, and all you need to pry open even the most ancient of files.

CD-ROM-Drive Surgery

Q. Can I remove an AppleCD 300e Plus external CD-ROM drive from its case and install it inside a Power Mac 7100?

William Jan Hollingsworth
Locale unknown

CHRIS: In short: You betcha. In long: Yes, but it's best to have an authorized Apple dealer do it for you. As ComputerWare's tech wizard Rick Thompson puts it, "It's like crossing the road: It's easy to do, but you don't want to screw it up."

For the moment, let's forget about the obvious dangers

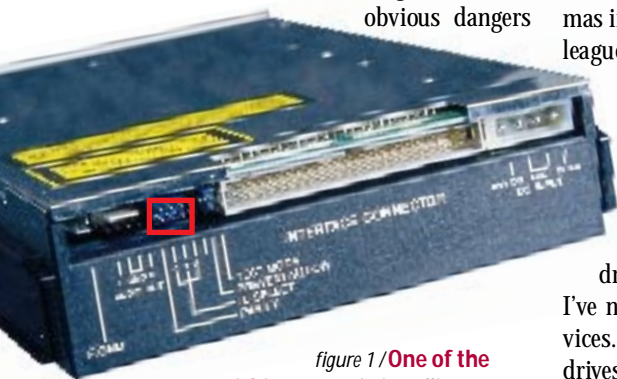


figure 1 / **One of the trickiest steps** in installing a CD-ROM drive in your Mac is adjusting the SCSI-ID number. It must be distinct from the ID numbers of your other SCSI devices.

of tearing the SCSI ribbon or zapping your components with static electricity because you've neglected to wear a grounding strap. Rather, let's discuss SCSI-ID numbers.

When you eviscerate your external CD-ROM drive, its SCSI ID defaults to 0. Does that sound familiar? It's the same ID as for your internal hard drive. To avert the disaster inherent in ID conflicts, you'll need to use jumpers to change the CD-ROM drive's SCSI ID to something a little less redundant — say, 3 (see figure 1). If you think a jumper is a kinky little garment worn by Marlo Thomas in *That Girl*, you're already out of your league. Pungle up the bucks to have the operation done properly.

BOB: I'd go even further, to say don't bother putting the CD-ROM drive in your Mac at all unless desk space is at an absolute premium. What's so great about having a CD-ROM drive in your Mac instead of next to it? I've never been a fan of internal SCSI devices. I wish Apple didn't foist internal hard drives on us with every Mac. (All current Power Macs have an internal hard drive, whether you want it or not.)

My beef with internal devices is simple. If an internal device dies, either you lose the use of your whole computer or you have to open up your Mac and remove the drive yourself. With an external drive, you can quickly disconnect it and take it in for repairs while continuing to use your Mac.

Chock-Full o' Fonts

Q. Does storing 128 fonts in the Fonts folder (System 7.1) affect the speed of my Mac? Does software such as Suitcase speed up the computer, or is it only a convenience? Please explain the pros and cons.

Edgardo Sierra
San Juan, PR

BOB: I've been wondering that myself, so I called Apple. According to one of its graphics engineers, storing hundreds of fonts in the Fonts folder does not noticeably affect speed. The fonts are seldom stored in memory, and when they are, they're stored there only temporarily. Although it is true that speed degrades as the number of font suitcases increases, the difference is so small that you're unlikely to notice it. So why not have all your fonts in the Fonts folder, where they're always available.

There is one con to having so many fonts available — some programs, most notably Microsoft Word 6.0, take longer to launch (see the "Tips / Microsoft Word" sidebar).

CHRIS: As for Suitcase II, it neither speeds up nor slows your Mac noticeably. Some folks find it convenient, but I haven't used it since I switched to System 7.1 — too much bother. Loading fonts manually, by dragging a font suitcase over the System Folder, isn't that big a strain, and I rarely need to change fonts while I'm running an application. If I anticipate I'll need to use specific fonts — notation fonts for a music job, for example — I'll create a startup set of fonts with Now Utilities 5 or Casady & Greene's Conflict Catcher II.

BOB: I still use Suitcase, because it is able to open and close fonts in seconds without my having to quit all open applications. The manual method, on the other hand, is slower than an armadillo crossing the road — you have to quit all open apps and then drag fonts into or out of the Fonts folder.

CHRIS: The poky manual method does have an important advantage — it's free.

Restoring Antique Files

Q. I'm switching from a 512K Mac to a Quadra but can't get my old software to work on the new machine. I got a brand-

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.

new copy of Microsoft Works, but what I really need is to be able to access over 100 floppies full of documents created with MacWrite 1.0 and MultiPlan. Is there any way to get them to load onto my Quadra?

Donald Davidson
Bartonville, TX

BOB: Hang on to those old programs, Donald: Just as the creators of the movie *Back to the Future Part III* predicted that the Mac Plus would appear in antique stores someday, I predict that those old programs will become collectible soon. But they're useless for anything else. I don't know of a way to get those old dogs to work on your new Quadra.

That doesn't mean you can't access the files they created. There are a few techniques anyone can try who needs to open files created in old programs. Try opening them with new software — in your case, Microsoft Works. Just launch Microsoft Works, choose Open from the File menu, navigate to your old files, and open them.

If that doesn't work and you own Microsoft Word, try opening them with that program. Versions 5 and 6 come with the Open All Files command (look in the Open dialog box).

CHRIS: I'm thrilled that you asked that question, if only to justify why I keep so much

allegedly useless junk in my office. I just happen to have a copy of the premier version of MacWrite. And Bob's right on the money: You can open MacWrite 1.0 documents with Microsoft Works with no muss, no fuss (although some of the formatting disappears).

Even without Microsoft Works, you can get your MacWrite documents onto your Quadra, provided you still have the 512K Mac or any other that operates in 24-bit mode. On your old Mac, simply open each of your MacWrite documents and choose Save As from the File menu. In the ensuing dialog box, click on the radio button Save As Text Only, to save the document. Now you can transfer those files to your new Mac to open them with any application that reads text files.

BOB: If all else fails, you may need to invest in a third-party file-conversion utility, such as DataViz's MacLinkPlus. Its translators come with retail copies of System 7.5, or you can buy the package for around \$100 at computer stores or via mail order.

Trackball Troubles

Q. A peculiar thing happens to me every once in a while. For no reason I can discern, my cursor suddenly slows down, requiring multiple spins of the trackball to get the

extension-managing utility such as Casady & Greene's Conflict Catcher II or Now Utilities 5's Startup Manager to create font sets.

Certain extensions can also slow Word 6 to a crawl. If boot time seems excessive (more than 30 seconds) or if typing is slow, restart with all extensions off (hold down the Shift key when you restart). If the problem disappears, you have a conflict.

Don Pickens
Microsoft Product Manager

6-POINT CONVERSION

Word 5 users who aren't ready to make the leap to Word 6 should secure a copy of the Word 6.0 Converter. This converter lets you open Word 6 documents with Word 5.x and is available free on-line (see end of article) as well as from Microsoft customer support (206-635-7200).

Don Pickens
Microsoft Product Manager

TIPS / Excel

CONVERTING TO MINUTES

Here are two ways to convert time expressed in hours and minutes into minutes only, even though Excel doesn't have a minutes-only format:

The first conversion method is to enter a measure of time in hours and minutes, such as 2:25, into any cell, such as A1. In another cell, enter the formula `=HOUR(A1)*60+MINUTE(A1)`. Excel will then convert the time into minutes.

The second way to do this conversion is less intuitive, until you take into account that Excel stores time as a fraction of a day — for instance, it stores 12 noon as 0.5. Enter the formula `=A1*1440` in any cell to multiply the time by the number of minutes in a day (1,440).

Adam Newman and David Chaffin
Tucson, AZ

darn thing to cross the screen. Then, just as suddenly, it goes back to its normal zippy speed. Is it because I'm using FullPaint?

Emily P. Kingsley
Chappaqua, NY

BOB: What is this, ancient-software month? FullPaint has been out of production for years. But if it still works for you, *mazel tov*. Despite its old age, I don't think FullPaint is causing the problem. My guess is you have a dirty trackball.

There are two ways to clean it: Spend about \$20 for a mouse and trackball cleaning kit, or do it with plain-old cotton swabs and isopropyl alcohol (see figure 2). For

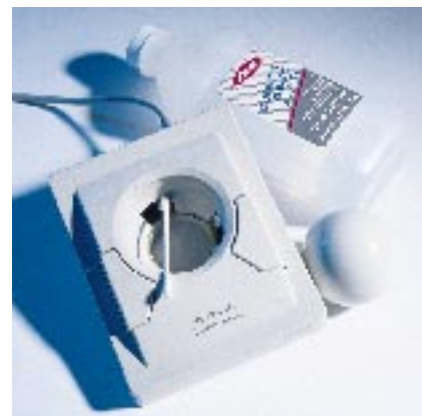


figure 2 / A sluggish cursor is the sign of dirty trackball or mouse rollers. You can make a do-it-yourself cleaning kit with isopropyl alcohol and cotton swabs, or you can buy a special kit.

TIPS / Microsoft Word

TRASHING WORD FILES

A tip in the article "Six Super Fixes" (February '95, page 124) detailed a couple of ways to get rid of stubborn files your Macintosh tells you it can't delete when you drag them to the Trash. But you left out how to do it when the problem is caused by Microsoft Word 5. If you find you're not able to trash a Word file, it may be because Word didn't close it properly, which it may not do until you quit. So try quitting Word and then trashing the file you want to throw away.

Thomas Reed
via the Internet

FATTY FONTS

When Microsoft Word 6.0 first opens, it performs a thorough check to see which fonts are installed on your system. If you have many fonts (Type 1 in particular), Word can take minutes to open. To speed boot time, reduce the number of installed fonts by using an

those who use a mouse instead of a trackball, its rollers needs an occasional cleaning too.

The packaged cleaning kits tell you alcohol-based cleaners dry out rubber parts and cotton swabs may leave little pieces of schmutz behind. I've never had a problem, but if you really want to play it safe, go ahead and spend \$20 on a few spoonfuls of non-alcohol-based cleaner and some foam-tipped toothpicks.

CHRIS: It's the trackball all right, but Emily, your question really speaks to a much larger issue. I'm speaking, naturally, of The Great Cat-Tooth-Cleaning Conspiracy.

I've owned several cats over the years and have noticed that before my previous vet would even deign to grease the thermometer, she'd yank open the cat's jaws, fix me with a wilting gaze, and accuse, "Your cat's

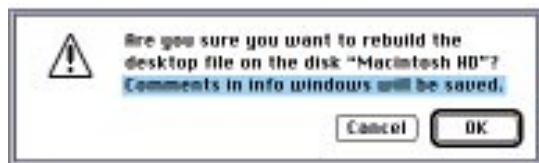


figure 3 / **When you rebuild your desktop**, you get a dialog box warning you that any comments you typed into Get Info windows of files and applications will not be saved. If you have CommentKeeper (freeware available on-line) installed, you see this message instead and your comments are preserved.

teeth are filthy! We must schedule an appointment to have them cleaned. The charge will be \$100."

As much as I love my cats, I'm unwilling to spend more on their toothy care per annum than on my own glistening choppers. I switched vets. When I mentioned the cat's teeth to the new doctor, she opened the cat's mouth, pointed to some nasty-looking plaque, and said, "Oh, you mean this stuff?" With that, she broke off the plaque with her thumbnail in a single motion. "There, all clean."

What this story goes to show — other than that I'm willing to be inundated with angry letters from dentally sensitive veterinarians — is that we're not talking rocket science here. According to those in the know at Kensington Microware (the Turbo Mouse folks), swabbing to your heart's content with an alcohol-soaked cotton swab is just fine for removing the greasy buildup from your trackball and rollers. And as a

bonus piece of advice: For those really crusty rollers, a well-honed fingernail can dislodge the offending crud.

No Comment No More

Q. In the November '90 Help Folder (page 279), you explained how to preserve the comments in Get Info windows that you otherwise lose while rebuilding the desktop. That method worked fine with System 6. How about an updated method for System 7.1?

**Michael Lindsay
Cleveland, OH**

CHRIS: Sure. Just send the following letter to your favorite computer company:

"Dear Apple,

Thanks very much for that nifty new Jigsaw Puzzle DA. I can't imagine how I've managed to live without it all these years!

Now that you've addressed this important issue, do you think you might have the time and resources to solve that teensy little problem that causes the Get Info comments to disappear every time you rebuild the desktop?"

Until Apple gets around to fixing the problem that has plagued users for years, download a copy of Maurice Volaski's freeware extension Comment-

Keeper (see figure 3) from your favorite on-line service. Or you can get an enhanced version of this same utility in Atticus Software's Super 7 Utilities. The FileSaver portion of Symantec's Norton Utilities also provides a way to save these little tidbits.

Freeware Font Printer

Q. Do you know of any program that can print out a sample of the fonts stored in my System Folder?

**Jerry L. Latta
Defiance, OH**

CHRIS: I've got just the thing for you: a wonderful freeware utility called theTypeBook. It can do exactly what you want and more.

To get a printed list of your fonts, simply start up the program, select the fonts you'd like to see, and choose one of the six print options. The options range from printing a small sampling to a full set of characters. You can even print a KeyCaps table that contains all the characters of a particular

TIPS / System Software

QUICK INSTALL

You can make the installation of a new system simple and quick by planning ahead. It's best to perform the following trick just after you've installed a complete new system: Stuff a self-extracting archive copy of your System and Finder files, and leave the archive on your hard disk. If your system gets corrupted, simply restart from the Disk Tools floppy disk, trash the corrupt System and Finder files from your System Folder, unstuff your copy of those files, and put them in your System Folder. When you restart, everything should be back in order.

**James C. LaRoche
Venice, CA**

VIRTUAL-MEMORY TURNOFF

Apple's virtual memory offers a great way for RAM-poor users to keep more applications open, but sometimes you may prefer to do without the resulting slowdown. To disable virtual memory temporarily, hold down the Command key on startup. Virtual memory will remain off until you turn it on in the Memory control panel or restart your Mac.

**David Low
Hillsdale, MI**

FOLDER CATALOG

If you want to obtain a list of the contents of a folder, open the folder, choose Select All (Command-A), and then select Copy (Command-C) from the Edit menu. You can then find the list in the Clipboard. If you want to print it, paste it into a word processor.

**Hubert Fiquiere
Orsay, France**

font, including a list of the modifier keys you need to press to get more-obscure characters such as umlauts and accents. No matter which print option you choose, theTypeBook tells you the name, style, font ID number, and font type (TrueType, PostScript, bit-mapped).

If you want more features, you should get the commercial version of theTypeBook, from Rascal Software (805-255-6823), for \$50 (estimated street price). ☞



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.

Poisoned Apple

I'M GETTING SICK OF the question, but people always ask me about the demise of Apple.

It's annoying because the company's sales have increased into the megabillions over the years and critical mass has long since been achieved. "But they're losing total market share!" they say. Frankly, I'm tired of fighting this pessimism and have decided to join the naysayers. *Of course*, Apple is going to go broke — in the year 2395, maybe. After all, most firms go under *someday*.

Let's run down the list of scenarios and read some obituaries Apple might receive in the newspapers of the future.

Here's the first scenario:

Failure in the Next Ten Years. If Apple is going to go broke soon, this is what we will read: Cupertino (AP) — Jul 13. The board of directors of Apple Computer, Inc., announced today that it is filing for bankruptcy, citing falling sales and failure of its IBM PC clones to make any inroads against industry leaders Compaq and Nintendo. Analysts believe that the failure of Apple to license its technology years earlier than it did resulted in the demise of the once popular company.

Or: Cupertino (AP) — Jul 13. The board of directors of Apple Computer, Inc., announced today that it is filing for bankruptcy, citing the fact that it can no longer compete with itself. "The cheap Apple clones quite simply cannibalized the sales of the original Apple line of products.

The clone products were as good as Apple's but cost much less," said James Beerbucket, chief analyst for Gromely & Co.

Or: Cupertino (AP) — Jul 13.

The board of directors of Apple Computer, Inc., announced today that it is filing for bankruptcy after once again losing millions of dollars. Its decreasing market share and failure to maintain its operations are blamed chiefly on the fact that it licensed its technology and then proceeded to pull the licenses, resulting in user revolt and a boycott that doomed the company to producing only a niche machine that could not survive against the Windows juggernaut.

[*You can't win, it seems.*]

Wacky Unpredictable Endings.

Dallas (AP) — The board of directors of Apple Computer, Inc., has announced that it is selling the company's remaining assets to the State of Texas to be distributed to schools. Ever since Apple's merger with AT&T two years ago, Apple Computer has experienced declining sales and, according to experts, has done little to improve its technology. The directors of the parent company, AT&T, could not be reached for comment.

Or: New York (Reuters) — The board of the Apple Computer Appliance Corporation today announced that it will no longer be in business and that all its assets will be liquidated. The company is best remembered as a late-20th-century computer company but went into appliances when it could no longer compete with the likes of megagiant Packard-Bell GmbH.

Or: Palo Alto (Newsbytes) — Apple-Xerox announced today the closure of the last Apple Computer factory and office in Singapore. The company began a long

downhill slide after its acquisition by Xerox Corp. Analysts say that Apple was not ready for the market changes after the turn of the century; others blame incompetent management at Xerox and petty jealousies among upper management. Whatever the case, the last computer will be made this Thursday and is slated to be sold to a school in Iowa.

Worst-Case Scenarios. Cupertino (AP) — Apple Computer, Inc., was destroyed by a meteor that struck the main offices in Cupertino, followed by individual meteors that managed to hit each of the Apple factories around the world.

According to officials, the unlikelihood of such a coincidence is phenomenal. The government is looking into it. It is unlikely that any more Apple computers will be manufactured.

Or: Redmond (UPI) — Microsoft Corp. today announced the acquisition of all assets of Apple Computer, Inc.,

in an all-cash deal expected to amount to \$100 billion. It is said to be one of the largest deals in financial history, breaking the record set by Microsoft's buyout of IBM a year ago. The U.S. government is not expected to intervene, despite Microsoft's announcement that it will liquidate the company immediately after purchasing it. "This is not an anticompetitive effort. We are doing it for the good of the computing community," said a spokesperson for Microsoft. "We believe that this is the best way to ensure that everyone will be using the newest version of Windows, which despite delays is expected to ship before the end of the year." Apple officials had no comment.

Actually they couldn't be found, because they were all at the Ferrari dealer, looking at the new Ferrari/X. Ferrari was also owned by Microsoft, by the way. ☹

